

A GROUNDED STUDY ON REGIONAL DYNAMICS OF TRUST,
COLLABORATION AND COORDINATION IN THE TURKISH AUTOMOTIVE
INDUSTRY AND EMERGING MOBILITY ECOSYSTEM

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COLLABORATION AND COORDINATION IN THE TURKISH AUTOMOTIVE
INDUSTRY AND EMERGING MOBILITY ECOSYSTEM**

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ABSTRACT

A GROUNDED STUDY ON REGIONAL DYNAMICS OF TRUST, COLLABORATION AND COORDINATION IN THE TURKISH AUTOMOTIVE INDUSTRY AND EMERGING MOBILITY ECOSYSTEM

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The thesis examines the changing nature of regional dynamics of trust, collaboration, and coordination relations among the actors of automotive cluster and traces the characteristics of emerging mobility ecosystem in the region which consists of Bursa, İstanbul, Sakarya and Kocaeli. The study tries to conceptualize inter-institutional trust, collaboration, and coordination relations during the transition process from the automotive industry to the mobility ecosystem within the framework of an inductive approach by taking advantage of the opportunities offered by the constructivist grounded theory. In the light of the collected data, while the basic dynamics of traditional automotive agglomeration were defined within the framework of the concept of "orbital motion", the basic category "(function) sprawl" was developed to describe the emerging mobility ecosystem. Based on the two-system conceptualization, the study presents findings that will enable us to reinterpret the policy tools that can trigger the industrial upgrading at the regional level.

Keywords: Trust, Collaboration, Regional Industrial Policy, Automotive Cluster, Mobility Ecosystem

ÖZ

TÜRKİYE OTOMOTİV SEKTÖRÜ VE FİLİZLENEN HAREKETLİLİK EKOSİSTEMİNDE GÜVEN, İŞBİRLİĞİ VE KOORDİNASYON İLİŞKİLERİNİN BÖLGESEL DİNAMİKLERİ ÜZERİNE BİR GÖMÜLÜ YÖNTEM ÇALIŞMASI

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Tez, otomotiv kümelenmesinin aktörleri arasındaki güven, işbirliği ve koordinasyon ilişkilerinin bölgesel dinamiklerinin değişen doğasını incelemekte ve Bursa, İstanbul, Sakarya ve Kocaeli'den oluşan bölgede ortaya çıkan hareketlilik ekosisteminin özelliklerinin izini sürmektedir. Çalışma, gömülü teori yönteminin sunduğu fırsatlardan yararlanarak, otomotiv endüstrisinden hareketlilik ekosistemine geçiş sürecinde kurumlar arası güven, işbirliği ve koordinasyon ilişkilerini tümevarımcı bir yaklaşım çerçevesinde kavramsallaştırmaya çalışmaktadır. Toplanan veriler ışığında geleneksel otomotiv yığınlaşmasının temel dinamikleri yörüngesel hareket kavramı çerçevesinde aydınlatılmaya çalışılırken, ortaya çıkan hareketlilik ekosistemini tanımlamak için (işlevsel) yayılma temel kategorisi geliştirilmiştir. Çalışma, iki sistem kavramsallaştırmasına dayalı olarak, bölgesel düzeyde endüstriyel gelişmeyi tetikleyebilecek politika araçlarını yeniden yorumlayabilmemizi sağlayacak bulgular sunmaktadır.

Anahtar Kelimeler: Güven, İşbirliği, Bölgesel Sanayi Politikası, Otomotiv Kümelenmesi, Hareketlilik Ekosistemi

To all the women who make my life beautiful

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CHAPTER 1

INTRODUCTION

1.0: Introduction

The astonishingly ineffectiveness of all regional tools designed to ensure inter-institutional collaboration for industrial transformation constitutes the central problematique at the very beginning of the research ideation phase. In order to explore the coordination gap, the study focuses on the automotive industry under the potentially disruptive transformation to analyse and understand the regional dynamics of trust and collaboration. In that sense, the ultimate aim of the study is to draw a framework on the transformation from the automotive industry to the mobility ecosystem in order to support a coherent regional policy design for ecosystem management. Clearly, there are a number of challenges ahead of this demanding task. Chief among these challenges is our very limited knowledge about the impact of transformation on the institutions of regional automotive value chain. Thereby, the main axis of the research project is to examine the attitudes of institutions operating in the regional automotive value chain against this transformation from the perspective of the supply industry. With the deciphering of the relational effects of the transformation, an in-depth analysis opportunity will emerge regarding the methods and tools of the actors who aim to trigger the technological transformation of the industry. Therefore, in order to provide a fresh view to the issue, constructivist grounded theory methodology was used to convey the transformation experienced in the automotive industry. On the other hand, the compatibility of the relational dynamics of the transformation with regional policy was examined within the framework of the regional strategy building and programming processes of the East Marmara Development Agency.

The automotive industry as the pioneer of the industrial revolution is standing at the edge of a potentially destructive transformation. The transition to the concept of mobility is

multidimensional. First, the industry is pregnant with radical changes in the way the customers' interpretation and exercising the cars as means of transport. The emerging business models based on car sharing, ride hailing, other smart phone-based transport systems and micro mobility that are offering innovative, efficient, and sustainable solutions to the challenges of urban mobility have created an increasing pressure on the passenger car market. On the other hand, the global fight against the climate change has enforced the governments to introduce legal restrictions on the CO₂ emissions and the technological advancements are fostering the electrification of the vehicles at an increasing rate. In that sense, the sale of electric passenger cars¹ achieved 2.1 million in 2019 and global stock reached 7.2 million with an annual average of 60 percent rate of growth since 2014 (IEA, 2020, p. 11). The electrification and the other non-fossil fuel alternatives have an exponential growth rate while the combustion engines are still the dominant tradable product in the transport market.

Another disruptive innovation that will likely change our entire transport system is called autonomous and connected vehicle technologies. These technologies have a potential to reforming the concept of mobility by redefining the vehicle interior as a living space. All these developments indicate that in the future, cars will continue to be one of the most important parts of our mobility solutions, but in an exceptionally dissimilar manner than at present. These four major trends of the automotive industry are the autonomous driving, connectivity, electrification, and shared mobility (ACES). These trends, which will constitute the basic characteristics of the mobility ecosystem, will be labelled as the quadruple transformation in the automotive sector.

Considering the deep-rooted history of the automotive industry, Turkey has recently emerged as an actor in vehicle and vehicle parts production as part of the global automotive value chain. Turkish automotive industry started to be emerged in 1960s and fuelled by the foreign direct investments after the customs union agreement between Turkey and EU in 1996 which has become one of the main driving sectors of industrial manufacturing (Taymaz & Yilmaz, 2017, p. 2). The vehicle manufacturing supply chain has become one of the most essential leading industries over the years and it is apparent that the industry will be seriously affected by the quadruple transformation in automotive sector. The reaction of the automotive industry

¹ The electric vehicle with battery or a plug-in hybrid electric vehicle in the passenger light-duty vehicle segment are referred as "passenger electric car (IEA, 2020, p. 10)".

in Turkey to this transition process will probably determine the future positioning of the industry within the global supply chain.

The primary focus of this study is to evaluate the reaction of the automotive industry regarding the transformation process from the perspective of inter-institutional interactions which determine the basic behavioural patterns against the upcoming transition to the mobility ecosystem. The emphasis on the changing nature of the interaction between institutions will be assessed through the evolution of trust, collaboration, and coordination relations. As mentioned before the secondary purpose of the study is to evaluate regional industrial policy from the perspective of the changing nature of institutional interaction among the related actors of the automotive industry. The analysis on the changing structure of the trust, collaboration, and coordination particularly between the main and supplier industry will provide a fertile insight to the industrial policy and support mechanisms at the regional level. In that sense, the cluster level relational analysis of the automotive industry under the conditions of quadruple transition enables us to capture the difference between two systems. In this regard, the regional industrial policy that aims to foster competitiveness through improving innovation capacity of the regional industrial base needs to be redesigned according to the requirements of the mobility ecosystem.

The objective of the study is to explore trust, collaboration, and coordination relations among the actors of BISK automotive cluster and emerging mobility ecosystem within the context of regional industrial policy. The field study has been conducted at the region that covers the cities Bursa, Istanbul, Sakarya and Kocaeli (BISK). The selected geographical area includes a large number of economic and social activities that are clustered around the production of vehicles and vehicle parts. The automotive industry and the companies that produce parts for this industry forms the backbone of the BISK automotive cluster. Although the study focused on these primary institutions, supporting organizations such as associations, universities, public institutions, and intermediary institutions are also included in the analysis when deemed necessary in order to shed light on the transformation process to a service-oriented mobility sector. In that sense, the mobility ecosystem of the BISK region constitutes the background of the research to understand trust, collaboration, and coordination dynamics within the setting of a place-based industrial policy. In a time of a radical technological transformation, the attitudes of the players of BISK automotive cluster towards the other actors into the same cluster and their connections with the other external forces may provide

valuable input to the regional industrial strategy design process. The dynamic interaction among actors of the BISK automotive cluster to create new branches that might become the main development path of the region is the central concern of the study. BISK automotive cluster is trying to prepare and to regenerate itself for the upcoming transition to a new mobility ecosystem. The traditional industrial base of this region has strongly relied on the automotive industry, which is agglomerated around OEMs which are operating in the BISK region. Some of the actors of the automotive cluster are attempting to employ strategies to survive into the transition environment. The transition process to a more advanced regional production system has forced the players of the automotive industry to accommodate their future strategies. Understanding the role of trust, collaboration, and coordination among the players of automotive cluster will possibly transform and diversify the options of the regional policy that may accelerate the process of new path development. The study offers a comprehensive relational perspective to the changing nature of interactive value creation process among the actors. The dialectic of change is observed dynamically through the lens of trust-collaboration-coordination cycle. Finally, these tactics of the BISK automotive cluster actors to cope with the quadruple transition is assessed in terms of place-based regional development strategies that aim to foster industrial upgrading.

The introduction chapter consists of nine sections that intends to explain the main framework of the study. Because the grounded theory replaces the traditional deductive research approach and offers an inductive exploratory method, it was not easy to embed the research presentation into the traditional linear thesis structure. The most fundamental difference of the methodology comes from the order of precedence of the research process. Since the literature review had been designed and written after the research analysis, the part of literature review replaced just before the conclusion part. On the other hand, instead of designing a new approach to present the overall structure of the dissertation, in the introduction part the traditional presentation format was preserved for the sake of simplicity. In that sense, the chapter covers the following retro-modern sections background, research problem, research question, implications, methodology, significance, limitations, key concepts, and structure of thesis respectively.

1.1: Background

The study focuses on an interdisciplinary field that deals with supply chain management and economic geography on the basis of transformation studies. There are a limited number of studies examining value creation processes in the context of relations between companies operating in a certain supply chain, and most of these studies have been conducted by social scientists working on supply chain management (Coase, 1937; Fynes et al., 2005; Gulati & Nickerson, 2008; Helper & Sako, 2010; Kim et al., 2004; Macduffie & Helper, 2006). On the other hand, studies on economic geography have almost been consolidated under the literatures global value chain (Coe et al., 2004; Gereffi et al., 2001; Sturgeon et al., 2008) and regional innovation systems (Asheim & Isaksen, 2002; Philip Cooke, 1992, 2016; A. Isaksen et al., 2018; Tödting & Trippel, 2005). The knowledge generated specifically for the firm level interaction within the automotive supply chain and the literature on economic geography will be concentrated into the analysis of BISK automotive cluster which is under the pressure of quadruple transition.

Following the decision to work on regional agglomerations, the first decision to be made for the research design was the sector selection. Since I have been working for East Marmara Development Agency, my intent was to work on one of the leading sectors in East Marmara. Maritime transport, chemical industry, composite materials, and poultry were the competitors of the automotive industry. The automotive industry stands out as a manufacturing activity with its' diverse pre and post connections, worthy of being called the queen of the system production. Queen sets the rule. The way the automotive industry is organized, and the automotive supply chain coordination mechanisms are closely monitored by other manufacturing industries. The new manufacturing techniques, coordination approaches and organization styles of the automotive industry are taken for granted by the other industries. Besides, the automotive industry has also great meaning for Turkish economy and for the target region. The East Marmara Region was home to four of the six car manufacturing plants locating in Turkey. Another factor I took into consideration when choosing the sector was that the quadruple transformation, which was expected to deeply affect the automotive industry. The disruptive technologies and trends were on the horizon that will potentially change our perception of mobility. Finally, perhaps one of the most important factors

underlying the sector selection is my close relationship with the actors of automotive cluster as part of my duty.

The industry attracts the attention of many academics from different fields (Attias, 2016; Bailey et al., 2015; Gereffi et al., 2001; Spulber & Dennis, 2016; Sturgeon et al., 2008). The automotive industry and industry related issues is an overstudied research area where it is difficult to create an original work. The first method that came to my mind in order to bring the subject to a less studied area was to combine it with the area of regional development in which I have been working professionally since 2010. In this sense, I thought that as a regional development specialist, I could do a specific work in the automotive sector in a field such as clustering or smart specialization, on which I was already conducting a couple of projects on these place-based regional development tools. I decided to work on the agglomeration of the automotive sector in the region, but after examining the studies conducted within the scope of the relevant literature (Ketels, 2016, 2017; Porter, 1985; Scott, 1995, 2006; Sölvell et al., 2009; Tödtling & Trippel, 2005), I decided that I had to dive deeper to generate an original study. I started to think on the widespread belief that Turkish society is not culturally inclined to collaborate, which I heard many times at various meetings I attended as part of my duty. As a result of the proliferation of studies focusing on collaboration in the regional development literature, the necessity of designing programs to improve collaboration between institutions started to come to the fore. In fact, there are solid supporting indicators to conclude that the manufacturing industry in Turkey has a tendency not to develop collaborative relations with the other companies. For instance, although a significant advantage is provided to the projects that have at least a partner in the financial support programs designed for the private sector, East Marmara Development Agency has never received a single private sector project application with a partner since the establishment of the agency. The importance given to collaboration relations in the regional innovation systems literature had a great impact on the decision to build the rationale of the study around the collaboration between institutions (Macduffie & Helper, 2006; Planko, 2018; Schroth & Häußermann, 2018) in the automotive industry. Nevertheless, I kept a distance from the approaches that associate the low collaboration level of Turkish manufacturing industry with the business culture. At the beginning of the research, I had a conviction that the issue of interinstitutional cooperation was due to a lack of practice. So, I decided to explore the material conditions of the lack of inter-institutional collaboration

practices in industrial production processes through an industry which is on the brink of transformation.

Instead of treating inter-institutional collaboration as a distinct concept, I prefer to establish a holistic analysis tool of trust, collaboration, and coordination cycle. In this regard, while the notion of trust represents the suitable conditions to initiate the action of collaboration, the concept of coordination symbolizes the management and regional policy tools that aims to foster and maintain both trust environment and collaborative actions among the relevant institutions. The need to develop an original analysis tool to examine inter-institutional relations within and outside the supply chain in a way specific to the quadruple transformation process has been emerged as a guide in combating the ambiguity inherent in the grounded theory research process. In that sense, the trust-cooperation-coordination (TCC) cycle has been defined as an analysis tool to examine the quadruple transformation in the regional automotive cluster through the lenses of symbolic interactionist approach. The TCC framework provides depth and breadth to the grounded theory analysis that intends to explore the interaction among the institutions of BISK automotive cluster. The TCC tool empowers the study to explore the material conditions of the reaction to the transformation in the automotive sector through providing a template to compare the relational conditions of industrial production. With this method that emerged during the research phase, I had the opportunity to make a relational comparison between the automotive industry and the mobility ecosystem, which I have conceptualized as two different production systems. The TCC cycle provides an in-depth insight on the relational foundations of the emerging mobility ecosystem which amplifies the opportunities to design a coherent regional industrial policy for the future of the industry.

As recommended in the grounded theory methodology, while setting the background of the research, I have not made any literature review up to the final stage of the analysis. However, since I worked as a regional development specialist for a long time and carried out many projects with the automotive industry representatives, I couldn't be able to begin the field study as a tabula rasa which is the primary recommendation of Glaserian classical grounded theory. On the other hand, although I cannot ignore the opinion (doxa) I have gained before both in the field of regional development and in the automotive value chain, I tried not to allow the implicit knowledge arising from my personal experiences to contaminate the theory

emerging from the data. In his regard, the review of the relevant literature has been completed after the core categories of the research has been constructed.

1.2: Research Problem

The distinction made by the founders of the grounded theory methodology between theory “builders” and “testers” may constitute an affirmative entry to the section on the research problem.

[...] many potentially creative students have limited themselves to puzzling out small problems bequeathed to them in big theories. A few men (like Parsons and Merton) have seen through this charismatic view of the great men (forefathers of grand theories such as Weber, Durkheim, Simmel, Marx, Veblen, Cooley, Mead, Park, etc.) sufficiently to generate "grand" theories on their own. But even these few have lacked methods for generating theory from data, or at any rate have not written about their methods. They have played "theoretical capitalist" to the mass of "proletariat" testers, by training young sociologists to test their teachers' work but not to imitate it (Glaser & Strauss, 1967, p. 10).

The research process in grounded theory methodology does not require a research problem at the initial phase. While there is no hierarchical positioning between constructing and testing, there are serious differences in method of execution. The process of theory construction contains a long-term uncertainty that needs to be dealt by the researcher. Instead of a research problem, a constructivist grounded theory methodology begins with general keywords that determine the loose playground of the research. As Glaser and Strauss indicates “good theory is produced by a fortunate combination-an inquiring mind, rich experience, and stimulating data (1967, p. 14).”

Accordingly, the research problem has emerged from the data during the subsequent phases of research process. The structure of the analysis has been built upon three phases of exploration. The first stage seeks to conceptualise the transition process through defining two systems of value creation for the automotive agglomeration² in BISK region which are defined as automotive industry and mobility ecosystem. The second stage focuses on exploring the changing nature of trust, collaboration and coordination relations at the supply chain and ecosystem levels. In that sense, the interaction among the cluster actors have been

² The term “automotive agglomeration” is used to describe a critical mass of firms in automotive industry that are operated at the geography of BISK, but the level of interaction and the information flow is not sufficiently utilized by the firms. Instead of agglomeration some scholars prefer to use the term *latent clusters* (Enright, 2003, p. 104). The low level of cooperation at the inter-organizational setting differentiates the term agglomeration from cluster (Terstriep, 2008, p. 8).

analysed under the two system of value creation process in the automotive industry and mobility ecosystem through the perspective of trust, collaboration, and coordination relations. In the third stage, the changing nature of the trust, collaboration and coordination relations within the automotive cluster has been analysed from the perspective regional policy making process. The focus of the third stage is the technical and financial support programmes that support the institutions of the automotive cluster. The coordinative role of the East Marmara Development Agency that intends to foster both the competitiveness of the supply chain and transition to the mobility ecosystem is designed as quasi-case-study research. The case of East Marmara Development Agency will provide valuable information on the coordinative power of regional authorities in terms of industrial policy. The case will be demonstrated in relation with the analysis on the regional dynamics of inter-institutional trust, collaboration, and coordination relations.

The notions of trust, collaboration, and coordination under the circumstances of an industrial transition have been constructed the background of the study. More specifically, in order to understand the nature of the change in automotive industry, the study will focus on the dynamics of trust, collaboration and coordination relations based on a spatial and temporal snapshot of the global automotive value chain. In that sense, BISK automotive cluster constitutes the locus of the study. The exploration on trust, collaboration and coordination relations within a given geography, time, and value chain under the circumstances of quadruple transition has a potential to shed light on the regional industrial policy that aims to foster the regional industrial upgrading. The reactions of the automotive value chain actors to the quadruple transition comprise the first stage and general framework of the theory. At this stage, in order to make a comparative analysis, the historical mutual positioning of the actors that make up the automotive value chain and the mobility ecosystem formed within the framework of the transformation are separated through defining two systems of value creation.

The conditions and positioning of automotive supply industry particularly in relation with the vehicle manufacturers constitute the core of the second stage of the three-step research structure. In the first phase, the focus is on trust, cooperation and coordination relations established and transformed at the regional level among the automotive cluster actors, while the second phase of the research concentrates on the transformation of the relations between the vehicle manufacturers and the supply industry, which are the chief elements that make up

this cluster. The growth of collaboration across the firms of complex automotive supply chain was discussed in the context of the organization of automotive production. The post-research comparison of the inductively constructed data-driven theory with the literature is started to be examined in the second phase of the research.

The last phase of the research is designed to understand the role of the regional industrial policy on the competitiveness of a particular industry and the upgrading process through examining the activities of the East Marmara Development Agency in relation with the automotive industry. The mode of the relationship built along the supply chain or between ecosystem actors in value creation processes has provided significant information to elaborate the technical and financial support mechanisms that aims to improve competitive of target industry. However, regional industrial policies that try to increase the competitiveness of an industry operating at the regional level as a part of the global value chain by reducing the costs and improving the current product quality are rapidly becoming obsolete. In this respect, the changing nature of TCC dynamics in global value chains has a potential to guide regional industrial policy making processes.

1.3: Research Question

The specific objective of the research is to explore trust, collaboration, and coordination relations among the BISK regional mobility ecosystem within the context of industrial transition. The automotive industry is at the edge of a disruptive transition that has been directly shaped by the progress of new technologies. The name of this technical progress is Connected and Autonomous Electric Vehicles (CAEVs) which does not only transform the vehicles but the way how we manufacture and even how we move from one place to other. In that sense, the organization of production in the automotive industry probably is going to face with a fraction, but the effects of technological advancements on the manufacturing side still are not apparent. How the actors of the mobility ecosystem deal with this ambiguity through constructing and reconstructing connections?

Although all inquiries need a question (or sometimes couple of questions) to steer the study, comparing with the problems addressed by quantitative research, the qualitative research questions be likely to be wider and generic in nature (Corbin & Strauss, 2015, p. 54).

However, among the qualitative research methods, different procedures are recommended regarding when the research question should be formed during the research process. In constructivist³ version of grounded theory methodology, the research process does not require any hypotheses or a detailed research question at the outset (Bryant, 2017, p. 27). An essential juncture that is frequently emphasized in Glaserian and constructivist grounded theory methodology is that the research problem will emerge from data. The initial starting point of the research might be a general question or a notion that can be tracked into the data and evolved during the research process.

Following the constructivist approach, a set of notions have been selected to initiate the research on the automotive industry agglomeration within the triangle of Bursa, Sakarya and Istanbul. Trust, collaboration, and coordination under the circumstances of change were chosen as the major notions to investigate the nature of the automotive industry in Turkey which is spatially agglomerated in the BISK region. The first wave of the interviews was constructed on these notions. During the first phase of the study, the following research question has been emerged from the initial data analysis.

Research Question: How are the institutions of the BISK automotive cluster responding to the emerging regional mobility ecosystem?

The focus of the study has been designed around the reactions of the automotive value chain actors to the upcoming transition in automotive industry. At his point, the changing actors, and characteristics of the relationships in automotive industry and the emerging mobility ecosystem has caused to arise the following sub-questions from the data.

Research Sub-Question 1: What are the differences between the automotive industry and the mobility ecosystem in terms of the institutional interaction patterns?

The sub-research question led to explore trust, collaboration, and coordination relations in terms of two different systems which are distinguished as automotive industry and mobility

³ The Glaserian Grounded Theory approach does not also allow any preparatory literature review to generate a comprehensive research question. On the other hand, although the Straussian School prohibits initiating the research with a predetermined theory, the approach permits to design a preliminary research question in line with a literature review (Thai et al., 2012, p. 4).

ecosystem. Observing the trust, collaboration, and coordination relationships over these two systems enabled the analysis to be formed within a dynamic framework. In that sense, a dialectical approach has been adopted, which enables the analysis of these three different forms of relationship, realized at different levels and with the participation of different actors, within the framework of two systems.

The second research sub-question is designed to connect the analysis on the changing conditions of interaction during the process of transition with the regional policy. The evaluation of the extent to which coordination mechanisms adapt to changing conditions has been examined within the framework of this sub-question.

Research Sub-Question 2: What are the consequences of the changing nature of trust, collaboration affairs on the regional industrial coordination?

As the theoretical saturation of the research has been achieved an additional second sub-question emerged from data. The second sub-question is designed to explore the changing requirements of ecosystem approach. The coordination mechanism was analysed in terms of regional industrial policy framework which covers regional industrial planning (or strategy building) and programming processes. In parallel with the transition from automotive industry to the mobility ecosystem, the requirements of a coherent regional industrial policy change radically because supporting supply chain coordination processes is no longer enough to maintain the regional competitiveness of the regions. In this regard, the regional policy has to be designed to facilitate ecosystem management efforts.

Considering the complexity of the research question and its sub-questions, the analysis is divided into three digestible parts. Figure 1 illustrates the relation between the main and sub questions that are emerged from the analysis of the initial data gathering process. The two-tier structure of the analysis is clearly identified from the cause-and-effect relationship established between the sub-questions.

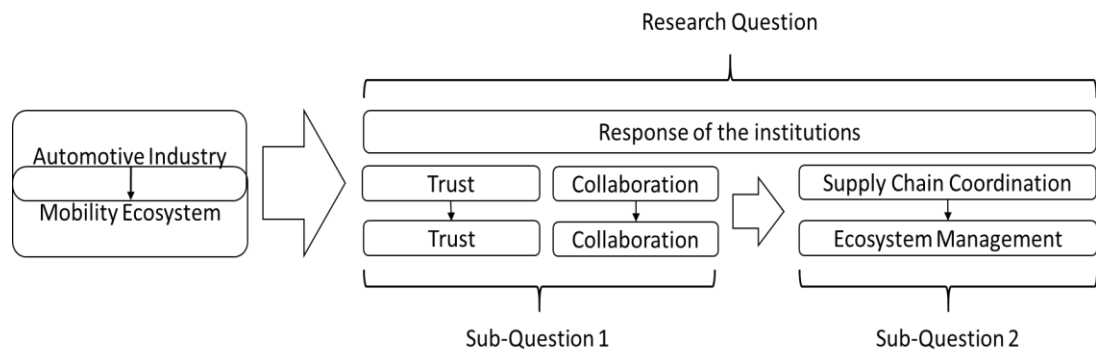


Figure 1 - The Relation between Research Question and Sub-questions

In terms of dissertation plan, Chapter 2 provides a general methodological and theoretical framework on the analysis of mobility transition in terms of the immediate reactions of the regional automotive value chain actors. It locates at the position where a literature review should be introduced. However, since the literature review is used to test the emerging theory in the grounded theory, the literature review chapter is postponed to the last chapter before the conclusion. The response of the regional actors to the transition is conceptualised in this opening section that constitutes the entry point to the research outcomes. After the general framework of the theory is established, the first research sub-question is evaluated in Chapter 3 while Chapter 4 is dedicated to the dynamic analysis of regional coordination mechanism. As indicated before, the adjourned literature review is positioned as Chapter 5 within the framework of the research design.

1.4: Implications

The possible contribution of the experience and knowledge gained during the research process to the theoretical and practical field constitutes the primary focus of this section. The findings of the research on the changing context and characteristics of relationships among the instructions of automotive value chain under the conditions of mobility transition are evaluated in terms their potential influences on theory and practice. The implications of the research are elaborated into two different titles that demonstrate the potentiality of the results within the realms of theory and practice.

The first theoretical implication of the research is a brand-new mode of analysis to compare relationships between the actors in the supply chain and regional ecosystem. The tool is named as TCC (Trust-Collaboration-Coordination) that enables the researcher to analyse the nature of inter-institutional relations among the supply chain and ecosystem comparatively. The outcomes of the research project have been classified under two categories “orbital motion and sprawl.” Orbital motion is a concept that identifies the relationship of the automotive supplier industry with the vehicle manufacturers and the other institutions. On the other hand, sprawl identifies the reactions of the relevant institutions to the transition from automotive industry to the mobility ecosystem. In that sense, the exploration of the dynamics of trust, collaboration and coordination during the transition process have provided an important insight to the inter-organizational relations among the global value chain. Additionally, the research provides a relational understanding to the automotive industry from the perspective transition process. The comparative analysis of the changing nature of relationships provides theoretical foundations for regional industrial policy that seeks to promote both the competitiveness and upgrading of the automotive industry.

The two-system approach that has been derived from the changing characteristics of the interinstitutional interaction among the actors of BISK automotive cluster. The transition from automotive industry to the mobility ecosystem has radically transform the trust base of the interinstitutional interaction in terms of context, conditions, objectives, actors, expected outcomes and impact. Revealing the divergent structure of trust relations within the two systems allows to interpret the differences and contradictions between these two systems. The distinction between the two distinct trust base allows also to differentiate the primary attitudes of the actors within an agglomeration and ecosystem. In that sense, the distinction between an industrial agglomeration and ecosystem is defined in terms of regional behavioural dynamics. When considering the two-system approach in the behavioural patterns of the automotive industry, the categories of “orbital motion” and “sprawl” have emerged from the data. Understanding the basic behavioural patterns between these two systems provided a very clear understanding of the nature of inter-institutional collaborations within the framework of the quadruple transformation. From this point of view, it was possible to make some inferences about the formation phases of the mobility ecosystem that has sprouted from the interinstitutional interaction in the agglomeration economy. The definition of these phases enabled to be classified the diverse actors in the automotive agglomeration based on their attitudes towards transformation. In this framework, the approaches of industrial enterprises

operating in the automotive sector regarding the quadruple transformation processes are classified under four groups. These groups are named as stationaries, product seekers, collaborative product developers and ecosystem builders. These are also identified as hierarchical categories that specifies the maturity level of the companies in terms of transition process to the mobility ecosystem.

In order to interpret the data obtained in terms of regional industrial policy, it was necessary to narrow down the field of study and analyse the policies carried out by the East Marmara Development Agency in the automotive sector since its establishment. Comparing the research findings with the regional industrial policy design and implementation processes allowed a framework to be established to support industrial transformation processes at the regional level. The policy analysis part, which is the point of the research that brings theory and practice together, was handled within the framework of coordination relations. In this context, a separate section for regional industrial policy has not been set up to analyse the research results in terms of policy making processes.

1.5: Methodology

The dynamics of the trust, collaboration, and coordination within an emerging mobility ecosystem of BISK region is explored through grounded theory methodology (GTM). GTM provides a set of tools and methods to construct a theory through the interaction of the researcher with the chaotic data bundles. The process of research comprises designing, examining, and synthesizing theoretical categories through coding the data to generate middle-range theory (Charmaz & Belgrave, 2015). Iterative study design, theoretical sampling and method of analysis are three distinctive features of the GTM. The methodology offers an iterative action and interaction cycles between the researcher and the real world. It covers the cycles of data collection and analysis simultaneously. It is assumed that the analysis will guide the second cycle of data gathering process. GTM offers a systematized iterative process of interpretation and review of narrative data. The method of analysis offered by the grounded theory has some distinctive features among the qualitative research tradition. The data gathered from different types of sources will be analysed through the tools of grounded theory methodology. Codification of the qualitative data is an essential step for the initiation of the grounded theory methodology. It offers a systematic guide to explore the

qualitative data through coding and categorization. Constant comparison is a valuable tool, which is defined as the main principle of grounded theory data analysis. As a data-analytic process, constant comparison aims to compare the similarities and differences of each interpretation and finding that emerges from the data in a continuous manner. According to the grounded theory methodology, everything is data. Besides interviews and focus group conversations, published and unpublished documents, web sites, emails, and even social media sources can be regarded as types of data that can be benefited during the process data analysis. The researcher is going to exploit all the possible types of data to conduct the coding processes. The primary data has been generated from semi-structured one-to-one in-depth interviews which are designed around the concept of trust, collaboration, and coordination.

In order to build a theoretical framework from the fragmented data on the trust, collaboration, and coordination relations, I have categorized the pieces of data that I have collected from the semi-structured interviews, participant observation, organizational archives and policy documents. The data collection process is organized according to the flows of the GTM iteratively to serve the theory-building process. From the beginning of coding the relevant data, I have tried to take a set of field notes on the data and data collection process in order to facilitate creating codes and categories. Although the issue of taking field notes have disappeared at the new versions of GTM (Bryant, 2017, p. 199), together with mind maps and transcripts, field notes are the primary source of conceptualization.

The semi-structured interviews are the primary source of data to generate the conceptual framework of the BISK mobility ecosystem. In that sense, selecting appropriate interviewees requires great deliberation through a GTM tool of purposeful sampling. At the initial selection of cases, the purposeful sampling was used to catch the technical purpose of the research according to my existing contacts from BISK mobility ecosystem. I did not set any geographical or institutional quota at the stage of selecting samples. After the first couple of emerging concepts, I have purposefully selected the samples or gone back to the previous samples to develop emerging concepts through constant comparison. The transcripts, mind maps, and field notes that have been generated from 24 semi-structured in-depth interviews were carefully analysed to create conceptual categories from the coding process.

Since 2010, I have been working as a regional development practitioner at the NUTS II Region TR42. In addition to the contribution of my personal experience as a regional

development specialist to the theory-building process, I have personally involved in an operation design process with the major actors of the mobility ecosystem. In that connection, participant observation is another primary source of data that enables me to co-construct trust, collaboration and coordination relations among the regional mobility ecosystem that covers only the cities İstanbul and Kocaeli. The operation AutoCUP (Automotive Value Chain: Collaborative Upgrading) has accelerated my involvement process to the network of the regional automotive industry. The operation had 11 partners from reputable universities to the leading business association of the automotive industry and aims to establish six decentralized open-access centres at the partner universities to accelerate collaborative innovation process between universities and automotive industry. According to the design of the operation, the collaborations aim to develop new services, systems, or goods on autonomous and connected vehicles, and an independent intermediary organization would coordinate these collaborative innovation processes. In order to strengthen the justification of the project, the consortium members decided to conduct 8 workshops with a total number of 75 attendance, to understand possible impacts of the quadruple transition on the automotive cluster. The workshop reports were also used as supporting data to construct the theoretical framework of the dissertation. As indicated in the GTM, everything is realised as data and can be used to construct the main categories for the thesis.

After one and a half years of collaborative development process together with the 11 partners of operation, volunteers from academia and automotive industry, we have developed a business model for an independent intermediary organization that would foster and coordinate the trust, collaboration, and coordination relations among the actors of the mobility ecosystem. The final version of the operation was presented to the group of experts from the Ministry of Industry and the Delegation of the European Union to Turkey and rejected. Although the operation AutoCUP could not be able to overcome traditional and lymphatic minds of Eurocrats and Turcocrats, I have entered into a valuable network of distinguished people from the regional mobility ecosystem.

The interactions, events, and projects around the mobility ecosystem constitute the background of the research. However, it must be stressed that the research is not about the operations and projects implemented in the automotive industry. The main concern of the research is to construct a theory about the trust, collaboration, and coordination relations within the BISK automotive agglomeration with particular attention on transformative

activities. In that sense, the data gathered through my personal experience on the transformation process from automotive industry to the mobility ecosystem will be used extensively. However, the borders of the research are designed on a far broader conceptual realm that constitutes the arena of inter-institutional interactions among the actors of BISK automotive agglomeration. In that sense, my prior experience on the automotive industry enables to develop an insight on a more sophisticated theoretical framework on the what's going on in the automotive industry during the quadruple transition process.

The importance of theoretical sensitivity for the grounded theory methodology comes from the assumptions that professional experience of the researcher will increase the possibility to generate concepts from data and to generate coherent connections with the emerging theory (Charmaz, 2006; Glaser & Strauss, 1967; Locke, 2003). Another possible contribution of the prior experience of the researcher on the field might come from the already established reliable contacts of the researcher at the cornerstones of the automotive industry and planning authorities. The social network of the researcher will help to persuade the important actors of the field to attend the cogeneration of the main concepts and theories. On the other hand, the previous involvement of the research into the target field has the potential to contaminate the quality of the data because of bias threat. As a risk mitigation measure, the researcher will employ data triangulation techniques to strengthen the validity of the data. This includes the necessity of taking similar examples repeatedly at different levels in order to consolidate the reliability, validity, and robustness of the theory.

1.6: Significance

The study covers a multifaceted interaction among the actors of BISK automotive agglomeration under the pressure of transformative forces. One of the main axes of the interactions among the actors have been constructed on the relations between the main and supplier industry. In this context, the buyer-seller relationships in the upstream automotive supply chain have been explored throughout the research in relation with the quadruple transition in the automotive industry. The characteristics of trust, collaboration and coordination relations between the suppliers and main industry within a particular value chain have a potential to influence the capacity of innovation. However, the research showed that the relationship between the buyer and seller does not always facilitate the emergence of a

collaborative milieu. The modes of automotive supply chain coordination have been differentiated according to the characteristics of buyer-seller relationships blended with diverse cultural background which have been constructed throughout the automotive history. The institutional reactions of the automotive regional chain actors in BISK region to the quadruple transition have a potential to explain the dynamics of change in terms of relational perspective. The changing scale, scope and context of the trust, collaboration, and coordination relations among the institutions of global automotive value chain have possibly great impact on the competitiveness of the regions. The study analyses the transition from a sectoral to an ecosystem understanding in the automotive manufacturing by separating and defining two systems of value creation through applying a relational approach. The hybrid structure of the thesis that combines the trust, collaboration, and coordination relations in the automotive sector under the realm of transition and the regional industrial policy as a supportive structure to improve the competitiveness of the region stipulates a valuable insight to the different academic literatures. In that sense, the research produces an innovative contribution to the dynamics of trust, collaboration, and coordination among the actors of automotive regional supply chain and mobility ecosystem. The transition from buyer-seller relations to the ecosystem level relations has deeply influenced regional innovation policy and the potential effects of the upcoming transition has been elaborated in the dissertation.

1.7: Reliability and Validity

The rhythmic back and forth movement between the phases of data collection and analysis constitute the primary robustness and reliability of the research process based on grounded theory methodology. The constant comparison process ends at the last stage where the emergent theory is benchmarked with the existing literature (Bryant, 2017, p. 260). In order to construct reliable and robust categories, grounded theory methodology offers an iterative purposeful sampling strategy which prevents an artificial division between the stages of data collection and analysis (Charmaz, 2006, p. 101).

Following the rhythm of GTM, the research process has been constructed on iterative cycles of data collection and analysis. The research has been initiated with the data collection about the sensitizing concepts trust, collaboration, and coordination within the BISK automotive cluster. The data collection process involves 24 interviews and the workshop reports that have

been designed to understand the quadruple transition from the automotive industry to the mobility ecosystem. Each of the data collection process has been followed by coding, writing memos, and defining categories. The data collection and analysis cycle has been repeated three times until the emergence of the theoretical concepts from the data. During the process of data analysis more than 400 codes have been generated with nearly 2,000 coded sections from the interviews and other sources of data. Finally, I have created substantial number of notes, memos, diagrams, and voice records during the process of data collection and analysis. All these data regarding the analysis process are an indication of how detailed the study has been done on the collected data to increase the reliability and validity of the study.

The data triangulation is another source of rigor that enables the reliability of the data. Although the focus of the research has been determined around a core group of automotive suppliers, a substantial number of representatives of the other institutions such as government, associations and start-ups have been interviewed to triangulate the data. The conflicting ideas and perspectives about the concepts have provided fertile source of ideation of the research project. In addition to the diverse range of interviewees, other sources of data have been used to triangulate the data to be able to refine relationships among the categories created at the certain stage of research.

1.8: Key Concepts

The study employs two types of concepts to illuminate the changing dynamics of inter-institutional relationships under the quadruple transition. The first group of concepts are called sensitizing concepts which have been used as the gate to the topic. As mentioned before, the sensitizing concepts of the research are trust, collaboration, and coordination. The inter-institutional relationship in BISK automotive cluster has been studied through the notions of trust, collaboration, and coordination.

The theoretical concepts of the research have been divided into two groups to reflect distinct realms of inter-institutional relationships. The concepts “protecting” and “accumulating” describe the dominant types of inter-institutional relationship which have occurred between automotive part suppliers and vehicle manufacturers. The buyer-seller relationship has been described through the concepts of “protecting” and “accumulating.” On the other hand, the

inter-institutional relationships among the actors of mobility ecosystem have been defined through the concepts of “bridging” and “venturing.” The theoretical concepts have been generated in the form of gerund to emphasize the action rather than individuals and institutions to improve theoretical sensitivity of the analysis (Charmaz, 2006, p. 136, 2011b, p. 172).

1.9: Structure of Thesis

The thesis composes of six chapters which have been organized around the emerging theoretical construction explained in chapter four. The most important difference of the structure envisaged for the presentation of research findings from studies using traditional research methods is the position of literature review. The literature review section has been placed in the section before the conclusion due to the inducement of GTM on going to the field without doing any preliminary research and in order to compare the findings of the research with the existing literature. As the fifth chapter of the dissertation, the literature review is designed around the concepts of regional industrial policy, inter-institutional relations in automotive supply chain and the transition process to the mobility ecosystem. The second chapter of dissertation is dedicated to the methodology of the dissertation. In this chapter, the application of constructivist grounded theory methodology is explained in a detailed manner. The third chapter of the dissertation is about the reflections of the transition process to the mobility ecosystem on BISK automotive cluster. The analytical tool that has been developed to analyse the inter-institutional trust, collaboration, and coordination under the circumstances of mobility transition will be introduced in this chapter. Following an overview on the general framework of the dissertation and tools to be used in the research process, chapter four explores trust, collaboration, and coordination relations in two systems which are automotive agglomeration and mobility ecosystem. The adjourned literature review will provide an overview to the topics covered in the dissertation with an emphasis on the research findings. The last chapter before the conclusion explains the implications of research and discussions about the application areas of the developed theoretical framework in regional industrial development policy. The process of evaluating the research results, which we started to discuss in the last part of the fourth chapter, within the framework of regional support mechanisms, will be discussed in a more holistic way in terms of regional industrial policies in the conclusion part.

CHAPTER 2

METHODOLOGY

2.0: Introduction

Trust, collaboration, and coordination relations under the quadruple transformation within the context of regional industrial planning constitute the main axis of the research. Facilitating regional industrial upgrading process is a slippery and complex issue to explore especially under the circumstances of industrial transition. In that sense, theorising the dynamics of regional industrial transformation may open up distinct and fresh potentialities for a bottom-up mission-oriented approach for regional industrial planning. It is apparent that discovering new ways of coordination among the relevant actors to overcome the regional industrial challenges requires high level of creativity and dedication. However, without a comprehensive understanding on the regional dynamics of industrial transformation the interventions to accelerate industrial transformation will remain external to value creation processes and, however innovative, will have little chance of success. As Kurt Lewin indicates wisely, “there is nothing so practical as good theory (1951, p. 169).” According to his view, the purpose of the theory is to foster and guide action through transforming information into the knowledge of regional dynamics. In that sense, inductive methods of theory building have a potential to assist the regional discovery process through decoding the complex interaction among the regional stakeholders. The ability to address complex issues makes the inductive methods popular among both the scholars and regional development professionals (Eisenhardt et al., 2016, p. 1113). Sir Isaac Newton (1642-1727) is maybe the most famous scientist who employed inductive methods in his ground-breaking studies. He states “I keep...the subject constantly before me, and wait till the first dawning open slowly, by little and little, into a full and clear light (Watkins, 1808, p. 415)” to describe his habit of study.

The inductive methods require a theory building process from the data derived from situations and interactions. The common and conflicting features of various incidents are analysed inductively to achieve a sound theory. The inductive methodologies are generally necessitates sharing the power of researcher with the participants in a collaborative and dialogic interaction. Transferring some power of the researchers to the participants requires an active involvement of the participants as a co-creator of the theory building process, which facilitates a dialogic learning. Grounded theory is one of the most popular methodologies which is based on inductive reasoning. The study targets to apply the procedures of constructivist grounded theory methodology in order to build a mid-range theory on trust, collaboration, and coordination relations within regional business ecosystems under the conditions of industrial transition.

2.1: Grounded Theory Methodology

Grounded theory is a qualitative methodology developed by Glaser and Strauss (1967) that seeks to construct theory from the data inductive and abductively. The prominence on theory development constitutes the most salient feature of GTM. The symbolic interactionist philosophical approach founds the epistemological stance of GTM. The roots of symbolic interactionism can be traced to the American pragmatist philosophy of the mid-twentieth century, which emerges as a reaction to the dominance of positivist approaches. Symbolic interactionists are trying to understand and interpret the interactions among individuals through language and communication (Carter & Fuller, 2015).

As being, one of the two founders of grounded theory, Glaser defines the process of theory building as follows: “a general methodology of analysis linked with data collection that uses a systematically applied set of methods to generate an inductive theory about a substantive area (1992, p. 16).” Like the definition indicates, GTM provides the researcher with a set of methodical procedures to follow in order to generate a bottom-up theory. The inventors of GTM, Glaser and Strauss were at odds on the objectives, values, and techniques of GTM (Lowe, 2013). The discussion has become apparent after Strauss and Corbin published *Basics of Qualitative Research: Grounded Theory Procedures and Techniques* in 1990. The book is not welcomed by Glaser, and he accused the writers with distorting one of the basic principles of GTM, such as parsimony and theoretical emergence (Glaser, 1992).

After this first cleavage, many variants of GT have emerged, and three of them have become prominent. The classical GT, which contains more positivist elements (Bryant, 2017, p. 106; Charmaz, 2006, p. 127) comparing to other approaches, is represented by Corbin. The other side of the bifurcation is represented by Strauss who stresses the importance of sophisticated and systematic coding techniques (Corbin & Strauss, 2015). Another interpretation of GT has been pioneered by Kathy Charmaz (2006) who represents the constructivist turn. As a follower of interpretivist tradition, “a constructivist approach places a priority on the phenomena of study and sees both data and analysis as created from shared experiences and relationships with participants and other sources of data (Charmaz, 2006, p. 130).” In this research, constructivist grounded theory method has been adopted due its strong emphasis on the co-construction process of theory building among three different approaches.

2.1.1: Defining the Basic Characteristics of Grounded Theory

Quantitative methods are assumed to be more ‘rigorous’ than the qualitative studies. (Bryant, 2017, p. 14; Charmaz, 2006, p. 6; Glaser & Strauss, 1967, pp. 223, 234). Glaser and Strauss (1967) struggled with this idea by developing a systematic theory building process that separates the data collection and analysis stages of the study. Although the steps of data collection and analysis separated in the GTM, the research process has been built upon repetitive cycles of data collection and analysis. In other words, while data collection and analysis processes are methodically separated from each other, data collection and analysis processes are handled with a holistic approach in the form of repetitive cycles throughout the research process. Grounded theory methodology provides a solid base for rigorous, reliable, robust, and systematic investigation for conceptual construction. The following characteristics of GTM (Charmaz, 2006, pp. 6–7) distinguish the methodology from other ways of doing qualitative research.

i. Inductive and abductive reasoning:

The power of constructing explanations as a part of human reasoning enables us to construct an understanding about the nature of things. As a non-deductive reasoning practice, abduction is used in order to clarify complex observations. Under the circumstances of incomplete information, abduction helps to construct explanation from

evidence (Aliseda, 2006, p. 28). However, these defining features of abductive reasoning are also true for the inductive way of interpretation. Inductive methods are also defined as a process of learning from cases and this type of analysis aims to generate theory from data (Eisenhardt et al., 2016, p. 1113). The abductive reasoning initialises the explanation process from a single observation unlike the inductive methods that aims to construct general statements from a number of samples. Unlike the inductive methods, abductive reasoning requires a background theory to construct and test its explanations (Aliseda, 2006, p. 35). Grounded theory begins the research with an inductive reasoning to generate tentative categories from a number of incidents but once the categories emerge researchers need to employ abductive reasoning to test and explain these empirical outcomes. Through abductive reasoning researchers, seek to find counter observations, surprising incidents, and irregularities into the data through developing and testing hypothesis for each possible explanation (Charmaz, 2006, p. 104, 2008, p. 157). The practice of inductive and abductive reasoning in GTM can possibly assist the researcher to construct more rigorous, creative, and robust explanations for the complex and dynamic relations.

ii. Sampling purposefully:

The researchers begin to study a topic by choosing the individuals, groups, institutions, or settings according to their intuition about the relevance of the sampling (Locke, 2003, p. 80). At the beginning of the study, the sampling is determined according to the key terms of the study that are carefully chosen by researchers purposefully. As a sub-category of purposeful sampling, theoretical sampling is used to test and explore the emerging categories by revisiting the field. In theoretical sampling, the concern is not to achieve demographic representation but to assess and enrich the tentative category. The objective of theoretical sampling is to rise the robustness, validity, and convenience of the emerging category. Theoretical sampling is the process of data collection for generating theory and is realised as one of the primary method of GTM (Charmaz, 2011a, p. 167). Glaser and Strauss define the theoretical sampling process as a joyful and exciting journey of searching, as follows:

The sociologist will find that theoretical sampling, as an active, purposeful, searching way of collecting data, is exciting, invigorating, and vital. This point is especially important when one considers the boring, dull, and stultifying effects on creativity of the methods involving separate and routine data collection, coding, and analysis, which are used frequently in descriptive and verificatory studies (Glaser & Strauss, 1967, p. 76).

iii. *Adjourning the literature review:*

In order to remain to be indifferent to the prior studies as much as possible, the researchers do not begin the field study through reviewing existing literature because the objective of the GTM is to construct a genuine theory on the theme to be explored. Strauss and Glaser warn the novice researchers about the extensive reading of literature may “brutally destroy” their ability to sensitize the emerging theory (1967, p. 253). However, it is incredibly challenging to disassociate oneself from existing literature related with the research area. It is crucial to recognise the threat of gathering prior theoretical information from the field before the basic concepts emerge and using the theoretical approaches on the topic without referencing to the earlier studies consciously or unconsciously. In that sense, it is essential being straightforward while doing GT research and trying to debrief yourself according to the threat of pretending of being a tabula rasa to avoid any unconscious contagion from earlier theories (Henwood & Pidgeon, 2003, p. 137). What is the right time to perform a literature review in GT research? According to Glaser and Strauss, the researchers have to postpone the literature review until they complete the analysis (Glaser & Strauss, 1967). On the other hand, reviewing current literature as part of the analysis enables the researchers to recognise unconscious influences of earlier studies on the original GT analysis and revise them appropriately.

iv. *Doing synchronised data collection and analysis:*

Data collection in GTM is a purposeful process, which is directed by the desire of building a theoretical framework. Collecting data is a flexible and unstructured process allows researchers to make modifications on the method of collecting data according to the emerging conceptual categories (Locke, 2003, p. 55). GT researchers begin to analyse data immediately after the collection of first data. Conducting a synchronised data collection and analysis provides valuable information for the further data collection process. It also enables to recognise the nuances of the meaning of participants’ phrases and reactions. Wandering around the data back and forth provides a depth and thickness to the analysis (Charmaz, 2006, p. 103). The dynamic data collection and analysis also provide the researchers to comprehend the whole theory construction process and help to develop an intuition about the next steps of research. On the other hand, the iterative process of data collection and analysis that aspires to sensitize the emerging concepts is likewise thrilling and even sometimes scary particularly for the novice researchers. In

order to solve the mystery, GT requires steely-nerved obsessive researchers who have to learn to cope with the ambiguity during the iterative process of data collection and analysis.

v. *Developing analytic codes and categories:*

Researchers aim to generate concepts through coding the data. The method of generating categories from the previously defined logically deduced hypotheses is not used in GTM. Researchers constantly are trying to hunt the concepts from the data and constructs the codes and categories from these concepts that are embedded to data. There are three types of coding which represent different levels of conceptualisation. These are named as *open (initial)*, *axial (focused)*, and *selective (theoretical) coding*. Open coding belongs to first cycle of coding which is performed immediately after the first data are gathered. GTM does not begin the research process with a clear understanding of research objectives and questions. Thus, the first phase of GTM is an open process of investigation, which intends to explore the dynamics of research context. Since the open coding process is about breaking the data into manageable pieces in order to explore the field, researchers need to ask general questions about the data. The fragmented data at the phase of open coding are gathered together or linked with each other at the phase of axial coding which is added to the GTM as a type of coding process by Strauss and Corbin (2015). The process of axial coding aims to tell the story of the observations again but in a conceptual manner through establishing links between the categories and subcategories. The conceptual stories are constructed around the axes of categories which demonstrate the map of relationships through organising the large amount of data. After researchers have constructed some robust analytical understanding about the data through conducting open and if necessary, axial coding, selective coding serves to generate core categories from the previous analyses. Theoretical coding paves the path from the categories to concepts that is the final step to construct a substantive theory from data. The relations among the categories are usually explored through the study of sorting and organising the memos. The emerging theoretical codes might force researchers to discover the implicit links and connections among the categories (Charmaz, 2006). The last phase of coding requires a certain level of creativity to find out implicit connection between the categories and because of this Strauss recommends periodic long walks into the fresh air in order to stimulate imagination of researchers along with the process of conceptualisation (Corbin & Strauss, 2015, p. 161). GTM also

offers the instruments of writing memos and drawing diagrams to foster the creativity of researchers in order to make connection within and between the pieces of data.

vi. *Writing memos and drawing diagrams:*

The analysis begins with coding, and after a while, the GT researcher starts to take notes and draw illustrations to discuss and analyse the generated codes. These instruments of GTM are called as memos and diagrams, which try to facilitate the interpretation process of the codes and categories that are generated from data. Memos and drawings are the first analytical products of the researchers during the process of theory building. The intense interaction of researchers with the codes and raw data are resulted with some initial notes that contain emerging ideas. No matter how short and unstructured, memos and diagrams are crucial methods that have to be developed by the researchers during the course of analysis. For qualitative researchers memo writing and drawing are two essential skills that have to be developed during the course of elaborating categories by defining peculiarities, relations and gaps through comparing them with the other categories (Charmaz, 2006, p. 6).

vii. *Making constant comparison:*

The researchers ought to employ constant comparative method, which is a cognitive strategy for interpreting the data through consecutive memos on the generated concepts and categories. The method intends to perform constant comparisons among the incidents, data, codes, and categories in order to ascertain conceptual not only similarities and differences but also to provide consistency between the categories (Corbin & Strauss, 2015, p. 66; Henwood & Pidgeon, 2003, p. 136). Constant comparison also enables researchers to verify the meanings of the data against the continuous flow of incoming data. The constant comparative method does not end with the completion of data analysis and extends to the phase of the literature review in order to compare the findings with the current knowledge base.

viii. *Aiming to construct theory:*

Finally, and probably most importantly, GTM aims to construct an original theory from scratch. The process of theory construction requires a sustainable mental determination from researchers. As Karl Marx stated in the preface of the French Edition of Capital (1872), “there is no royal road to science, and only those who do not dread the fatiguing

climb of its steep paths have a chance of gaining its luminous summits.” The luminous summit of GTM is an original and rigorous theory, which has been constructed by the constant hard work of the researcher. A concept that has a power to explain all the categories extracted from data is called as core category and constitutes the label of the theory in a few words. The core category emerges from the integration of concepts, memos, diagrams, and categories that has to be the one and only explanatory concept of the generated categories.

The scholars who decide to perform a grounded theory methodology in their research need to decide between these variations or construct their own way of research using the analytic tools provided by GTM. The tension between the classical and recent versions of the GTM lies behind the stance of the researcher against the data. This is the tension between realist and constructivist approaches and is named as *the dilemma of qualitative approach* (Henwood & Pidgeon, 2003, p. 134). According to the realist stance, the perspectives and viewpoints of the participants need to be directly reflected by the researcher from a safe distance. That is the essence of inductive approach, which grounded theory methodology has been proud to operationalise it. On the other hand, data is not something gathered from the field and theory is not just emerged from data directly because the researchers interpret the data consistent with their pre-existing knowledge and experience. In that sense, theory is generated within an interactive manner between researcher and participants through a co-construction process.

2.1.2: Getting Started to a Constructivist Grounded Theory

The main distinction of grounded theory from a traditional qualitative method comes from the starting point of the research. Rather than a fieldwork strategy centred around a research question designed to test previously theorized hypotheses, the researcher attempting to implement the GTM has ambiguous initial concepts and a few carefully chosen people who have a potential to clarify these concepts. It doesn't mean that a grounded theory researcher begins to the field study as a “tabula rasa” which is defined as “the mind in its hypothetical primary blank or empty state before receiving outside impressions (*Meriam-Webster*, n.d.).” However, how naive it looks, the grounded theory asserts that researchers have to leave behind the past theories at the initial point of the research. The main reasons are to prevent the possible contamination that might come from existing theories about the topic and to

foster the creativity of the researcher. Glaser asserts that the first step of the “theoretical sensitivity” comes from entering the research area with a few predetermined ideas as possible. The researcher needs to remain sensitive to the data for the new theories (Glaser & Strauss, 1967). GT researchers launch their study by determining some *sensitizing concepts* and dive into the field as soon as possible. It is crucial not to narrow the topic too much before starting because GT researchers have to stay as open as possible to the expected flow of data from the field. Interaction between the researchers and the setting has to be protected from the influences of the existing literature at the beginning of the research. Therefore, GT researchers have to postpone the literature review until constructing the conceptual categories. In that sense, rather than the naïve theoretical ignorance approach, theoretical agnosticism (Henwood & Pidgeon, 2003, p. 138) is offered as a better catchphrase to stress the necessity to remain open to the flow of information from the field.

The terms of the trust, collaboration, and coordination constitute the departure point the study. I do not conduct a literature review study prior to the field study. However, because of my professional standing point as a regional development specialist, I have prior knowledge about the setting and context of the study both at the theoretical and practical levels. I constructed a semi-structured interview guide, which has been constituted around the terms trust environment, collaboration environment and collaboration strategies in relation with the setting which is manipulated by the quadruple transition heavily. Under each section, I have prepared tentative possible questions that might open the conversation. However, during the process of interviews, I preferred not to intervene and interrupt the flow of the speech with the questions sequentially. I tried to follow the stream of answers through the interview control card in order not to miss any information that I want to collect. After the first four interviews, I have calibrated the questionnaire according to the reactions of the interviewees against the questions. The new version enabled a smoother conversation process for the remaining interviews. The initial sampling process is organised purposefully according to my previous experience about the setting. The data collection process covers the interviews with the representatives of following type of institutions (Appendix A).

Interviews

- Automotive Main Industry
- Automotive Part and Component Industry
- Mobility Start-ups

- Research Institutions
- Research Centres
- Central Government
- Regional Government
- Non-governmental Organizations

I have conducted 24 interviews with the consciously chosen most appropriate research participant in order to get more information about the concepts trust, collaboration, and coordination. The preliminary interviews about the general research design and the position of primary concepts within the context of regional development was held at the end of the 2018. After a considerable long period of time, I began to collect data from the field in September 2019. As a result of my limited research experience and my insistence on keeping the interview under control within the framework of the questions I set, I realized that it was difficult for me to get the depth and variety of information I wanted from the first few interviews. By analysing the process quickly, making minor changes in the interview questions, and being more patient in case of going off-topic, I started to get the results I wanted from the interviews. From September to November 2019, I have conducted 17 interviews and initiated the coding process simultaneously. Following the main wave of interviews, I took a break from interview process for about 3 months and focused on interview transcriptions and analysis of the data I collected. Although I could not reach a very clear theoretical framework during this process, I went down to the field again and continued the interviews with five more people who I thought were knowledgeable in the weakest parts of the data.

While I had been conducting interview process, I started to read the strategy documents of the BISK regions comparatively. Despite meticulously completing the coding processes of all documents, I was able to obtain much less material on trust, cooperation, and coordination relations than I expected. This allowed me to move away from my initial research plan and focus my attention on the interviews rather than the documents. The list of the documents that I have looked for any type of related data desperately are below.⁴

⁴ One of the main reasons why there is not a single line regarding industrial transformation in regional plans is the decision of central government to increase the second planning period from 3 to 9 years. In a period when the change was experienced so rapidly, the decision of the former Ministry of

Documents

1. İstanbul Regional Plan 2010-2013
 - 1.1. İstanbul Regional Plan 2010-2013 (Main Document)
 - 1.2. Appendices of İstanbul Regional Plan 2010-2013
 - 1.2.1. Appendix 1 - Current Situation Analysis
 - 1.2.2. Appendix 2 - SWOT Analysis
 - 1.2.3. Appendix 3 - Analysis of Regional Strategic Priorities through Analytic Hierarchy System Model
 - 1.2.4. Appendix 4 - Participation Process Analysis of Regional Plan
2. İstanbul Regional Plan 2014-2023
 - 2.1. İstanbul Regional Plan 2014-2023 (Main Document & Appendices)
 - 2.2. İstanbul Regional Plan Priorities, Strategies, and Goals 2014-2023
3. East Marmara Regional Plan 2010-2013
4. East Marmara Regional Plan 2014-2023
5. Bursa Eskişehir Bilecik Regional Plan 2010-2013
6. Bursa Eskişehir Bilecik Regional Plan 2014-2023
 - 6.1. Bursa Eskişehir Bilecik Regional Plan 2014-2023 (Main Document)
 - 6.2. BEBKA Current Situation Analysis (2014-2023)

2.1.3: Co-constructing Data

There are two types of data sources of the research: interviews and texts. Interviews are the most traditional way of data gathering method that seeks to discover the relevant information about the research area through questioning the research participants. The method is used by both qualitative and quantitative researchers in order to provide data for the analysis process. Close-ended interviews are common among especially the quantitative researchers since the beginning of nineteenth century. However, since 1970s, qualitative researchers begun to use

Development to tie the regional plans to 2023 was the beginning of the defunctionalisation process of the development agencies. This decision was taken at a time when agents were starting to learn regional collaborative planning as regional planning authorities. As a result of this decision, a wide area was emerged between the national plans and the regional level, and eventually the centralization process of the agencies began with this decision.

open-ended and less structured interviews in order to capture the lived experience of target group (Poole & Mauthner, 2014, p. 463).

Most of the conventional interviews stick to a semantic scientific neutrality that intends to prevent the influence of the researchers on the participants as much as possible. However, the process of interviewing is not merely a neutral process that ensures a static cycle of asking questions and receiving responses (Poole & Mauthner, 2014, p. 465). In terms of constructivist approach, collecting data is a co-construction process between the researcher and participants that has to contain constant reflections. The researchers need to prepare themselves to the interviews in order to learn something about the world of participants. Since the co-construction is deliberate and conscious positioning of the researchers, they need to question themselves about how the interview and analysis may be affected by the actions and reactions of them. It is also important to think about the effects of the researchers' prior knowledge and experience on the whole theory building process.

Studying texts may provide supporting evidence to the emerging concepts that have been generated from the analysis of primary sources of data. The detailed analysis of the relevant texts helps to situate them in the context. Plans and strategy documents both at national and regional levels constitutes the main texts that are analysed to get close the settings of the study. Plans and strategies are the texts that have the function to define the current position, to discover the new opportunities, to reveal endogenous institutional potential and to organize the stakeholders around the objectives of the region. In that sense, the regional plan texts have a potential to "construct, sustain, contest and change our senses of social reality (Miller, 1997, p. 77)." Since the texts provide valuable information on the setting of the research, grounded theory researches are generally started the process of text analysis prior to the initial interview data collection (Charmaz, 2006, p. 41). In that sense, I begun the text analysis before the interview process without any intended sequence.

I have primarily 6 types of texts to analyse. I choose to initialize the research process by coding the regional plan documents as the secondary data of the research. Because of the regional plans are too voluminous in size to analyse. First, I have summarised the plans of regions TR10, TR41 and TR42 according to the five predetermined keywords: participation, industry, cluster, collaboration, and automotive. I have tried several methods that I have learned from the academic literature on the qualitative data analysis and grounded

methodology (Bryant, 2017; Charmaz, 2006; Charmaz & Belgrave, 2015; Glaser & Strauss, 1967; Locke, 2003; Malterud, 2001). First, I try to code the texts by hand. I do not recommend this method because it is not efficient, not practical, and not useful. The second method that I tried to work with an electronic document separated into two columns. The text locates at the left, and the column at the right is dedicated for the coding process. It was better than the coding by hand, but still, I do not feel comfortable with this method. Finally, I tried to use MAXQDA for the coding process. I started to code my first document and completed in a night. The result does not look convincing to me again. Although using MAXQDA was the best coding experience for me, I have 100 codes that belong to one of the shortest documents, and they still look like a mess. I deleted all the 100 codes that I generated in a one whole night.

I have realized that I need to work on my own style of coding, particularly for the document analysis. I have developed a five-step-coding protocol for the documents as secondary data sources, which is not analysed in-depth in the literature. I have written the following notes for myself on the initial coding process that might guide novice GT researcher:

i. Coding the paragraphs:

If you are trying to code a lengthy document, coding each paragraph of the document might be useful for the analysis phase. The paragraph codes have to be one single word. If you have something to say about the paragraph, write a memo. Do not try to explain your feeling into the codes. Stay away from line-by-line coding at least for the documents if you do not want code the document in your remaining lifetime.

ii. Finding in vivo codes:

In vivo codes are the concepts that have been used in text by the own words of the writer. The own words of the research participant are also named as in vivo codes. Try to find in vivo codes into the text that might have a relation with the concepts that you are analysing.

iii. Conceptualizing some of the clauses:

Look some phrases and clauses into the text and try to conceptualize them with our own words.

iv. *Underline striking clauses:*

Underline relevant clauses into the paragraph that you find attractive, but at that time, you do not know how to code the clause. These are striking expressions that might be connected with the theorising process during the following steps of analysis.

v. *Coding characteristics:*

When I read the regional plans, I realize that the character of the document is changing from one paragraph to another. Some parts are informative, and other parts are strategic, other parts are manipulative. The changing character of the regional plans generally comes from the internal sequence and rhythm of the text. For instance, the first chapters that are dedicated to current situation analysis in a regional plan usually have an informative character. However, the fluctuation of character from one paragraph to another under the same section cannot be explained only with the rhythm of the text. I have decided to label some of the clauses, sentences or, paragraphs in the regional plans with a single word that describes the character of that part. The first document I coded is the “Appendices of İstanbul Regional Plan 2010-2013” that covers the analyses on the region. I have extracted the following five different characteristics codes from the first document: descriptive, determinative, informative, predictive, and suggestive. The categorization of the phrases enables a comparative analysis within and between the regional plans.

As mentioned before the field study begins with sensitising concepts in the GTM. After initiating the analysis of the plans and strategies through coding, the process of interviewing and coding goes hand-by-hand. In my opinion, this dual working cycle is the most difficult, stressful, tiring and challenging part of grounded theory methodology, especially for beginners. As a result of uncertainty and inability to get quick results, the endless doubt that the method is not used incorrectly makes the initial stage very troublesome. It's like a distillation process, and the process of coding functions really drop by drop at an annoying slowness.

The data collection process in constructivist GT is divided into three phases. The initial data collection process begins with a series of information gathering process about the context of the research. As advised before, the context of the research should not be narrowed too much at this stage of data collection process. The first pieces of data have to be analysed through initial (open) coding process. Because of the GT does not recommend having a research question at the first stage, this stage of analysis covers generic questions about the setting of the research. It is important to remain open into the context of key starting point in order to increase the probability of getting something interesting from the data at the first stage.

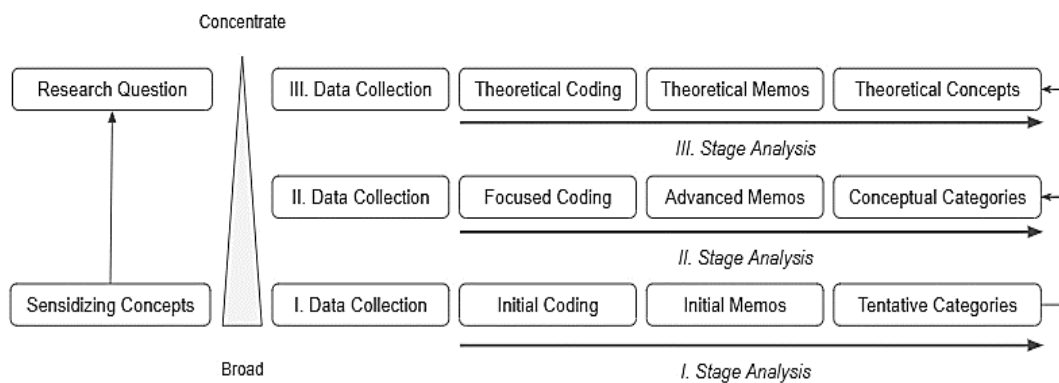


Figure 2 - The Process of GT from Data to Theoretical Concepts

Trust, collaboration, and coordination are the terms that I used at the initial interviews in order capture what is going on at the BISK automotive cluster under the pressure of emerging mobility ecosystem. In accordance with the selected concepts, I had formulated a few tentative questions about the social setting through employing my prior experience in the field. At that stage, I have to decide whether to send the tentative interview control cards to the participants prior to the interview. On the one hand, I have an impulse to send the interview control card before the interview in order to inform the participant about the topic and clarify in the mind of participant possible questions. Giving prior information about the tentative interview questions might create an opportunity to study on the questions for the participants. If the participant spends some time to study on the questions, he/she might provide detailed and accurate information. Having information on the possible questions might also reduce the tension especially at the beginning of the interview process. On the other hand, interviewing is not a static game of asking the right question and getting appropriate answers. It has to be designed as an interactive construction process between the researcher and participant. The in-depth interviews are not only about what the participants say but also how they express them. The emotional responses of the participants to the

questions help both parties to feel the rhythm of the co-construction process and reactions of the participants may provide valuable information about the implicit meaning of the words. Sending the questions to participants might not be logical because it has also a potential to reduce flexibility of the researcher during the interviews. The researcher is free to change the sequence, to revise the wording or to renounce asking the questions at the interview control cards. In that sense, I planned about not to send the tentative semi-structured interview control card to the participants in order not to restrict the options of both parties during the co-construction process. However, I have decided to send the 'voluntary participation form' with a short explanatory e-mail about the topic of the research prior to the interview.

For the early stages of analysis, it is suggested to begin the analysis a series of 'what' questions to understand the basic characteristics of the context (Glaser & Strauss, 1967). The simplest and useful question to begin the idea formulation is to ask as "what is going on here?" This simple question and other variants of 'what' questions may help the researcher to understand the context. For further investigation the questions might help the researchers to sensitize the viewpoints of the participants, to capture the essence of the participants' reactions against changing conditions and to understand the diversity of meanings attributed to the setting by the participants (Bryant, 2017, p. 100; Charmaz, 2006, p. 20).

2.1.4: The Process of Coding & Memos

The process of coding is the primary data analysis technique of grounded theory methodology. Codes as products of a qualitative analytic process accommodate simply the first conceptual elements of the theory. Transcripts of interviews and field notes are the central source of data that are subject to the coding process. The process of clustering of the codes into the groups is defined as categorizing, and the categories constitute concepts around the core category. Codes, categories, and concepts pave the way for theorizing. Initial and focused coding are two main phases of coding. The initial coding covers the classification process of the fragmented data according to their analytic importance. The goal of initial coding is to open to all kind of theories without making a prior reservation while dealing with the data. The following coding process is about looking and working on the most promising categories. The integration of the categories with the theories begin at the stage of focused coding (Charmaz, 2006, p. 46). Charmaz makes a clear distinction between the logic of coding in grounded theory and qualitative methods.

[...] quantitative logic applies preconceived categories or codes to the data. [...] we create our codes by defining what we see in the data. Codes emerge as you scrutinize your data and define meanings within it. Through this active coding, you interact with your data again and again and ask many different questions of them. As a result, coding may take you into unforeseen areas and new research questions (2006, p. 46).

The process of coding is frustrating for novice researchers. It is not important how well you read and understand the coding process theoretically, in practice developing coding style is a painful process. Your first codes seem awkward to you, and you always have a feeling that you are missing the most critical things in the text. When you have completed the coding process of your first document, you have hundreds of codes that make you feel trapped in a maze. You do not have any idea what will come next. I feel like I am sitting in a messy room when I look at a pile of codes and underlying texts. Of course, this situation inevitably causes a serious pressure on the researcher.

2.1.4: Theory Building

Before discussing the theory-building process within the framework of grounded theory, it is useful to explain the meaning we ascribe to this concept. Rather than trying to make a simple definition, it would be appropriate to start the discussion on the importance attributed to ‘good’ theory which is term put forward by Popper (1957). Wacker (1998, p. 362) states that theory is essential for both the scholars and practitioners from three dimensions. First, a ‘good’ theory offers a solid structure for the research and analysis on a particular issue. Secondly, it provides a method for the development of a scientific field of research and finally, theory constructs explanations and regularities for the practitioners. While these three elements reveal the value of the theory for the academic and practical world, they also list the characteristics of the product that will emerge from the theory-building process. It is useful to take a look at the indispensable components of the theory by going one step further. Researchers are generally defined ‘good’ theory through four elements which are “(1) definitions of terms and variables; (2) a domain where the theory applies; (3) a set of relationships of variables; and (4) specific predictions (factual claims) (Wacker, 1998, p. 363).” While the theory is built on concepts, it is obvious that abstraction is required at different levels in order to create the concepts. Being able to reveal the relationships between these concepts in a unique, generalizable, and internally compatible way can be defined as the critical virtues of ‘good’ theory.

As mentioned before, generating theoretical ideas from the data is the primary methodological strategy of the research. Obviously, as one of the most creative methodological stances, GTM provides a general framework for data gathering and analysing processes as a systematic way of discovering (or constructing) the theory grounded in the data. However, as has been pointed out Barney G. Glaser and Anselm L. Strauss who are two founding fathers of GT,

[...] generating a theory from data means that most hypotheses and concepts not only come from the data but are systematically worked out in relation to the data during the course of the research. Generating theory involves a process of research. By contrast, the source of certain ideas, or even “models,” can come from sources other than the data. The biographies of scientists are replete with stories of occasional flashes of insight, of seminal ideas, garnered from sources outside data. But the generation of theory from such insights must then be brought into relation to the data [...] (1967, p. 6).

The passage above indicates that sensitive insights of the observer are the primary triggering issue of the theorizing process. Creating a unique, generalizable, and internally compatible theory from thousands of codes and categories requires a comprehensive understanding on the research topic. Just as mentioned, the information filtered from the large data set starts to make sense over time and form certain patterns at some point. In the research process, where there are successive stages of focusing and disintegration, the construction of the theory on an idea that emerges out of nowhere begins and ends rapidly. After the work of organizing and aligning the findings to form a meaningful whole is done, the only question that remains is how valuable the insight is. Although it is debatable whether the developed theory is within the scope of Popper's ‘good’ theory, the pride and joy of being able to apply a research method properly leaves a taste that will always remain on the palate.

2.1.5: The Problem of Objectivity

Data is not the only source of concepts, models, and theories, but the subjective interpretations or even sometimes speculations of the researcher play an essential role in constructing the framework of research. However, such insights of the researcher have to be linked and strengthened with the data. The assertion has some implications on the positioning of the researcher concerning the research setting. The source of these mysterious and crucial insights may come from data or no wonder from the prior personal experience of the

researcher. Glaser and Strauss have an illuminating and radical example on the relation of personal experience of the researcher and the researched.

Recently a group of sociologists was discussing a colleague's article, "The Cabdriver and His Fare: Facets of a Fleeting Relationships." This paper was based on the actual experience of the author, who had driven a cab while in graduate school. One sociologist asked whether field notes had been taken during his work as a cabbie; if not he implied, then the article was really not based on field work—which is, after all, an intentionally systematic enterprise. The author explained that he had taken virtually no field notes, and indeed has gotten his principle guiding ideas for the paper long after giving up the job. He admitted that the paper was not based on fieldwork as such, but asserted that his experiences nevertheless seemed akin to fieldwork data (1967, p. 252).

As experiencing individuals, researchers have a right to transfer their particular expertise to the fieldwork honestly and transparently. If not, they are usually forced to suppress their personal experience or more tragically; the transfer of personal experience is realized implicitly. The naturalistic generalizations of the researcher (Stake, 1978) comes directly from personal expertise, which is generally derived from tacit knowledge. It seems that the naturalistic generalizations come from the accumulated experience of the researcher on the topic of research, which is as accurate as of the participants' experience. However, like any other contribution of participants, the naturalistic generalizations, which come from the experience of the researcher, need to be strengthened by confronting with the field study data.

The story on cabdriver is exceptionally relevant to the research context that I propose, and it summarizes my positioning into this research proposal. I have been working as a regional development specialist since 2010, and I prefer to use my personal experience in regional industrial planning as an input in an appropriate way. However, I am very aware that the dualistic positioning of the researcher both as participant and observer need to be managed in a subtle way among the whole research process. Managing of that dualistic positioning requires close monitoring of a priori knowledge that comes from personal experience of the researcher during research. The evolution of naturalistic generalizations has to be monitored during the data gathering and analysing processes. The awareness of the researchers on their tacit assumptions and interpretations requires a high level of reflexivity. The danger of elevating the previous assumptions and generalizations of the researcher to the status of 'objectivity' has to be eliminated through the scrutiny of the researcher overall process. For instance, naturally, I have some ideas, interpretations, and assumptions about the nature of regional economic planning because I have a long professional experience as a regional development expert. "Preconceptions are not the same as bias unless the researcher fails to

mention them (Malterud, 2001, p. 484)." In that sense, if I want to design reflexive research, I have to express all my beliefs and overviews at some point of research that might help to construct a theory on the regional dynamics of trust, collaboration, and coordination. However, these kinds of preconceptions have to have collided with the data. During the research, the preconceptions about the research area are going to be carefully analysed, reinterpreted, and co-constructed along the data collection process by the researcher.

From my point of view, my professional knowledge and experience on regional development policies does not constitute an obstacle reaching the "theoretical sensitivity." Unlike the naive view of the founders of the grounded theory about starting the study with an empty mind, I prefer to employ the term of "theoretical agnosticism" which means that rather than pretending not to know the existing theories, taking a critical stance to the theories of the field might prevent the contamination. Through "theoretical agnosticism," I draw a general outline of the literature that is related to the topic in broad terms. In other words, I am going to determine the borders of the topic through a general literature review for the research proposal document. In that sense, the in-depth literature review is going to be realized in the middle of the field study at the point where the categories emerge. The existing theories might help to improve the insights and contexts of the categories that have been drawn from the data by comparing the concepts of the other researchers (Charmaz, 2006, p. 165).

2.1.6: Constructivist Grounded Theory

The reflexive stance that I prefer to position the research has some implications on the decision-making process among the varieties of grounded theories. As mentioned at the beginning of the part, grounded theory has been discovered through collaborative work of Barney G. Glaser and Anselm L. Strauss (1967). They developed systematic methodological strategies to theorize from data rather than testing the hypotheses, which are generated from theories (Charmaz, 2006, p. 6). The book of Glaser and Strauss is named, as "*The Discovery of Grounded Theory*" was not written for the operational concerns of the novice researcher. As the newcomers, they understandably try to manifest their positioning to the research community with their treatise.

The original methodological monograph was written as a polemic against hypothetico-deductive, speculative theory-building and its associated research practices that characterized the sociological context of the time. This polemical focus is reflected in the book's specific purposes. These are stated as to encourage researchers to use their intellectual imagination

and creativity to develop theories relating to their areas of inquiry; to suggest methods for doing so; to offer criteria to evaluate the worth of discovered theory; and to propose an alternative rhetoric, that of generation, to balance out the rhetoric of justification featured in journal articles and monographs (Locke, 2003, p. 33).

Although the original work of Glaser and Strauss does not stress on ontological and epistemological assumptions of the grounded theory methodology, the later versions of the methodology emphasize its philosophical foundations more clearly. The discussions among the versions of the grounded theory have relied on the old contrast between positivist and constructivist worldviews. The debate between the different versions of the methodology is clustered on the nature of reality. As a contemporary version of methodology, the constructivist grounded theory assumes that knowledge is socially produced rather than assuming there is an objective reality independent from the perspective of the researcher and participants. According to the constructivists, there is nothing to discover but the knowledge is going to be produced by the interaction among the researcher, participants, and other data. It does not mean that constructivists deny the existence of the real world, but they assert that reality cannot be separated from the perspective of the researcher and participants. In that sense, designing, conducting, and writing research is not realized as neutral acts that aim to discover the unknown into the objective world. From this point of view, constructivist grounded theory methodology approves ontological and epistemological stance of interpretivist research paradigm that denies single or objective reality like the methods such as case study, action research, and ethnographic research. Although these methods represent a shared viewpoint, they offer different tools and methods to discover or construct social reality.

GTM provides a set of tools and methods to construct a theory through the interaction of the researcher with the chaotic data bundles. The process of research comprises coding data; designing, examining, and synthesizing theoretical categories to generate middle range theory (Charmaz & Belgrave 2007, p.2023). Iterative study design: theoretical sampling and method of analysis are three distinctive features of the GTM. All three fundamental features of the grounded theory need to be operated in a synchronized way. The methodology offers an iterative action and interaction cycles between the researcher and the world. It covers the cycles of data collection and analysis simultaneously. It is assumed that the analysis will guide the second cycle of data gathering process. There is an intense debate on the starting point of the first action among the varieties of grounded theory. For instance, Charmaz (2015)

indicates that she started the research by listing interested parties and a few broad keywords (Gibbs, 2013). Her approach reminds me the maxim of Deleuze and Guattari “[...] proceeding from the middle, through the middle, coming and going rather than starting and finishing (2005, p. 25).” Actually, as a regional development specialist, I am going to design the research on three broad terms as Charmaz suggested: trust, collaboration, and coordination. The trust, collaboration, and coordination relations in BISK mobility ecosystem constitute the main research area of the dissertation.

2.2: Conclusion

GTM opens a new way of doing research through elaborating an inductive and abductive method of theory generation. The distinctive characteristics of GTM from the other research methods also demonstrate its complex structure. Inductive (and abductive) reasoning, purposeful sampling, delaying literature review, synchronised data collection and analysis, analytic code and category generation, memo and diagram writing, constant comparison and goal of theory construction are eight distinctive characteristics of the GTM.

The research was carried out within the framework of the constructivist grounded theory methodology approach. The main axis of the fieldwork was completed within five months. The interview process began with the sensitizing concepts of trust, collaboration, and coordination. As GTM principles suggest, the following question and its sub-questions have emerged from the data:

Question: How are the institutions of the BISK automotive cluster responding to the emerging regional mobility ecosystem?

Sub-Question 1: What are the differences between the automotive industry and the mobility ecosystem in terms of the institutional interaction patterns?

Sub-Question 2: What are the consequences of the changing nature of trust, collaboration, and coordination affairs on the regional industrial coordination?

A research process in which the question and the explanation emerged at the same time was completed, along with the concepts and categories that have matured step by step in the process from the sensitizing concepts to the research questions. In order for the resulting

explanatory template to have as much scientific validity as possible, it had to be analysed comparatively with data from different sources. The approach of constant comparison has been conducted at all stages of the research process. The complex data gathering, and analysis process provide the reliability, validity, convenience, and robustness of the theoretical framework, which is formed by trying to answer the research question within the framework of different dimensions and perspectives. By explaining the applied method step by step, a quasi-how-to-do-guide for GTM has been created for researchers who will apply similar approaches in their research.

CHAPTER 3

THE REFLECTIONS OF TRANSITION ON BISK AUTOMOTIVE CLUSTER

3.0: Introduction

Trust, collaboration, and non-coercive coordination are considered as founding economic, social, and spatial concepts that contain multidimensional, dynamic, and emotional references. The sensitizing concepts of the research will be discussed through all the founding and supporting elements of an industry that are spatially concentrated in a certain region. Another issue that should be evaluated within the scope of the research is the condition that traditional automotive industry is on the verge of a destructive transformation which necessitates a dynamic analysis framework. An analysis tool has been attempted to be developed in order to be able to read and evaluate the relations between the institutions that form an agglomeration that has undergone a metamorphosis from the automotive industry to the mobility ecosystem. Within the framework of this tool, relations of trust, collaboration, and coordination were considered as cyclical and interdependent behavioural patterns. In this section, the context of the research, the analysis tool used and the main findings that emerged as a result of the analysis will be discussed. It can be considered as an introductory part that provides also some background information about the setting so that the research results, which we will present in detail in the next section, can be understood within the context of the research object.

3.1: History of Automotive Industry

The use of steam power into the factory has provided locational freedom to the act of industrial manufacturing. The production plants were no longer had to locate near a streaming water which was the most efficient source of power to generate spinning. The displacement of human and waterpower with the steam power has created an enormous productivity

increase since the development of efficient steam engines for factories around 1770s by James Watt. The transition to steam power at the production process did not occur immediately. The factories using steam power as the main source of energy started to be established in Britain only for the few primary industries beginning from 1780s and 1820s steam-powered wool-spinning machines offered hundred times faster production comparing to manual spinning (Stearns, 2013, pp. 8–9). The spread of the steam technology into the other parts of the world took more or less half a century. For instance, steam powered factories were established in Turkey within the last quarter of the nineteenth century which was a result of an increasing demand to the Turkish carpets in Europe and US. The demand for carpets increased twofold between 1870s and 1890s as a result of the growing prosperity in the western countries (Stearns, 2013, p. 187).

Introduction of the electricity power into the industrial production process was also a giant step for the society as a whole. The organization of the production has been radically changed by the electrification of the factories. New ways of production powered by transition from steam to electric power in the factories had increased the productivity threefold within the first fifty years of the twentieth century in US. However, the transition was very slow again. At the very beginning of the twentieth century only 5 percent of the factories were electrified (Rifkin, 2014, p. 52). The steam powered factories were organized around a huge steam engine which powered a single massive drive shaft. The main drive shaft of the factory set the system components such as wheels, belts, presses and hammers in motion through several subsidiary shafts. The centralized layout and the organization of production within the factories could not be transformed immediately because the engineers simply replaced the central steam engine with an electric dynamo. The expected productivity increase from the electrification of production had happened in a very slow pace within the quarter century because the engineers could not be able to quickly understand the liberating potentials of the electric power within the production processes. They had to recalibrate their mind-sets and reset their prior knowledge on the nature of production process entirely. The spatial independence of the production from a single steam engine enabled by the opportunity of placing several small electric motors into the production plant. The factory electrification did not impact to the productivity growth until early 1920s when electric dynamos started to be used in a more efficient way in the factories (David, 1990, p. 357). The birth of the production line was the main outcome of this liberating logical transformation which allows an enormous

rise in productivity especially after the Great Depression because the pace of the production was no longer determined by a giant steam engine but by workers.

3.1.1. The Emergence of Automotive Industry

The expansion of electric power into different branches of production and consumption has created new opportunities to organize the daily life. The electrification into the production plants triggered a series of innovation including assembly line that is pioneered by Henry Ford. He was one of the first entrepreneurs who realized the potential of electric power in mass production. There were only 11,235 cars in the whole country in 1903 when Ford Motor Company was found at Highland Park in Detroit. Only five years later in 1908 the famous Model T was ready for the market with a price \$850 (Klein, 2007, p. 180) where annual wage of a worker in Ford Motor Company was \$415 in 1908. The price of the Model T had drop to its half price \$440 comparing to the seven years before while the annual wage of a worker had reached \$1.100 in 1915 (Beaudreau, 2005, p. 64). Henry Ford, just like Elan Musk did it in electric cars, had implemented a series of disruptive innovations both at the product and production process. Ford Motor Company was an “ideal type” for new entrepreneurs especially both with its moving assembly line and identical interchangeable parts (Klein, 2007, p. 180). The moving assembly line was the primary enabler for the mass production that was the trademark of the second industrial revolution. Just as the textile industry represents the first industrial revolution, automotive is the iconic sector of the second industrial revolution. The automobile became the main power of economic growth in twentieth century through triggering both supply and demand side of the economy. The car has emerged as a technology that promises people a new way of life, in that sense it was not just a consumer product. The automobile industry triggered other critical industries through consuming substantial amount of raw material including steel, aluminium, copper, lead, nickel, zinc, and rubber. The automotive industry constituted the central part of a giant industrial mass production supply chain and the era was called as the “Auto Age” (Rifkin, 2014, p. 52).

A few years earlier from the establishment of Ford Motor Company in 1900, the competition among the different sources of power for moving the vehicles had not been concluded with the clear victory of the petroleum products. In that year the total number of cars in New York,

Chicago and Boston were 2,370 and only 400 of them are powered by gasoline. Nearly half of the automotive stock which corresponded 1,170 cars was powered by steam-engine and 800 of them were electrified (Sulzberger, 2004, p. 66). According to the top speed of the early models, the ranking of these three types of the engines is electric, steam and gasoline fuelled motors. The first automobile race in the American history had been ended by the victory of an electric car in the year 1896 (Sulzberger, 2004, p. 68).

The first years of petroleum industry that corresponded with early twentieth century was dominated by one type of petroleum product which is named as kerosene. The first oil well was built in Pennsylvania by Edwin Drake in 1859 for the purpose of producing kerosene for lightning through distilling oil (Klein, 2007, p. 90). Kerosene was used generally for heating and lighting fuel in the beginning of twentieth century. The popularity of the steam-powered vehicles among the other alternatives was fed also by the availability of kerosene as fuel.

The expansion of the gasoline supply network has occurred quickly, without entering the loop of vicious cycle between supply and demand for the contemporary alternative fuels such as electricity charging and hydrogen stations. Gasoline was the excess product of the crude oil refinery processing that aimed primarily to produce kerosene. In 1905, the amount of gasoline production was 7 million barrels and only 8.5 percent of this amount was consumed by the vehicle owners. The overproduction of gasoline was generally used as a solvent for the purpose of cleaning and the excess product was discharged into the rivers instead of distributing to the market (Melaina, 2014, p. 4). Today only 0.1 percent of the crude oil turned into the kerosene in the refineries of U.S.A. (*U. S. Energy Information Administration/Petroleum Supply Annual*, 2018). The gasoline delivery network, in some extent, has been built on the existing kerosene supply infrastructure easily and in 1930 the share of gasoline production into the crude oil has been reached to 40 percent (Melaina, 2014, p. 5). The first network of gasoline stations across the United States had been established by the Standard Oil Company in 1870 by John D. Rockefeller who is the innovator of vertically integrated business trust. The company was producing, transporting, refining, and marketing oil products through a vertically integrated business operation. In 1911, the U.S. Supreme Court ruled that the company was an illegal monopoly and divided into 34 separate companies that ironically made Rockefeller the first billionaire of the history (Mayhew, 2008, p. 18). The nationwide gasoline station network of the Standard Oil allowed people to move from one end of the country to the other with their internal combustion engine vehicles. The

availability of easily accessible gasoline stations and discovery of assembly line production by Henry Ford enabled internal combustion engines to become the main method of power supply for all types of vehicles.

In 1908, when Henry Ford introduced the famous Model T, there was no widespread network of gas stations in the United States to ensure an uninterrupted transportation although the conversion of kerosene suppliers to the gas stations had leveraged the diffusion of the cars to the whole society as a mobility solution. While automotive technologies were developing rapidly on the one hand, innumerable innovations were being made to meet the gasoline needs of the cars on the market in a fast and efficient manner. Today, the chicken-and-egg paradox between the small size of the electric vehicles market and the insufficient number of charging stations is trying to be solved by massive innovations in both fields. However, the infrastructure that will provide the necessary power for today's electric vehicles is not realized by the transformation of the existing infrastructure as in the past. It is still an exception that existing gas stations are also used as electric charging stations. The first complete transition from a gas station to a fully electric vehicle charging station in the United States was completed in 2019 in Maryland State, with the \$ 786,000 financial support provided by the Maryland Energy Authority (Douglas, 2019). Of course, the slow realization of the transition from current gasoline stations to electric charging ones has several reasons including low profitability and spatial inadequacy. However, the most important obstacle in front of the transition does not material but mental and requires different type of mind-set about the economy, earth, and society as a whole. The owner of the gasoline station in Maryland has been convinced by his 17 years old daughter that could able to think beyond economic rationality (Douglas, 2019). However, in an economic system built on the principle of continuous capital accumulation, it is very difficult to create the material conditions for a world-oriented mental transformation.

3.1.2. Transition in Automotive Industry

The automotive industry is in a period of transition. The waves of change are approaching that will hit eventually to the automotive industry extremely hard. The name of the first wave is electric vehicles (EVs) and electrified cars are already on the roads. At the end of 2018, the global electric car fleet reached 5.1 million in which 2 million are expected to be sold in 2018.

Many institutions develop scenarios about the future of the EVs. According to the New Policies Scenario, that accounts the success indicators of the related policy announcement, in 2030, the EV stock will reach 130 million unit, and the global annual sales are predicted to be realized 23 million unit. The technical developments, private sector investments, and policy requirements are feeding the fire of transition to the EV. The leading technology enabler is the scientific developments in battery chemistry, which enables long ranges. Private sector speeds up the volume of investments in battery production and charging infrastructures. On the policy side, the fuel economy standards, incentives to zero and low emissions vehicles, financial and regulatory support to establish charging infrastructures and public nurturing of novelties in relations with the new technology enablers have accelerated the transition to electric vehicles (EVs). In terms of the number of parts, it contains, EVs are simple to manufacture in comparison with the internal combustion engine (ICE) cars. The engine and its components are the only moving part of an EV that means EVs have much fewer moving parts as compared to ICE and batteries constitute half of the cost of EVs (Till Bunsen et al., 2019). The decrease in the number of the parts of EVs will probably wound some of the automotive parts and components manufacturers severely. Moreover, the simplification of the manufacturing process may cause to reduce the entry barriers of the industry that means a fears competition may push some of the major players out of the market.

Driving has been a human-led activity over a century and might become obsolete in a few decades. However, AI-powered and electrified machine-led mobility paradigm are on doorsteps. The shift in the mobility paradigm will lead to significant changes in the landscape of the cities and our way of living (Nikitas et al., 2019). The second wave, which has the potential to erase the driving habits of human beings and change the way we move forever. Connected and autonomous vehicle (CAV) revolution, together with the electrification of vehicles, will probably have the power to transform the whole value chain of the automotive industry. CAVs are a smart combination of hardware and software technologies that enable cars to see, move, communicate, and decide on their own. The disruptive technologies on autonomous systems, connectivity, artificial intelligence, machine learning, and telematics are the main catalysers of this transition. The level of autonomy has divided into six and labelled from L0, which means no autonomy to L5-Full Autonomy. The required technologies for each level of autonomy are generally classified under the categories of safety, connectivity, and autonomy. Ford, BMW, and Nissan are targeting the year 2021 for

L4 – High Autonomy Level cars that are described as geo-fenced autonomous driving (Kromhout & de Groen, 2017).

The third wave relies strongly upon the first and second waves but will have substantial effects on the industry. “Mobility as a Service (MaaS)” is a business innovation that will probably be constructed on the technologies that enable Connected and Autonomous Electric Vehicles (CAEVs) (Alkheir et al., 2018; Toglawa et al., 2018). It requires a mental transformation from the concept “ownership” to the “usage” of the vehicles. It is expected that MaaS will dramatically reduce private car ownership, and it enables us to move both human and non-human customers of transportation. MaaS has the potential to ensure the sustainability of mobility (Giesecke et al., 2017; Kromhout & de Groen, 2017). The effect of MaaS on annual car sales may not be destructive on automotive manufacturers. However, since the expectation of the customers may radically change towards a more digital environment, the process of transition forces the automotive manufacturers to collaborate with the new mobility and technology firms to capture the emerging business opportunities (Spulber & Dennis, 2016).

The transition to CAEVs will also have a series of consequences on the society, environment, and automotive industry. In terms of the industry, the information and communication technologies (ICT) will emerge as the principal point and key competitive market of the mobility ecosystem at the world of CAEVs. These breakthrough technologies have already begun to trigger the change even in the name and definition of the industry. The term of mobility refers to a whole business ecosystem that includes institutional actors from the automotive Original Equipment Manufacturers (OEMs), automotive parts and components suppliers, public transportation, newcomer established technology companies, start-ups, research institutions and public authorities (Faber et al., 2019). The borders of this ecosystem are expanding continuously with the newcomers in the form of giant technology companies, innovative start-ups, and spin-offs. The technology-driven transition from the automotive industry to the mobility business ecosystem challenges the established mobility providers like OEMs, automotive parts and components suppliers and even public transport system (Faber et al., 2018). Some actors belong the conventional automotive industry have been trying to integrate their business model into a continuous transition of the business environment while others are waiting for the perfect storm and hope to survive without making a meaningful change.

3.1.3. A Short History of Turkish Automotive Industry

The first automobile assembly plant in Turkey was established by Ford Motor Company in 1928 in Istanbul Tophane. The assembly plant was built multifunctionally in order to produce cars, trucks, and tractors. The capacity of the plant has been reached to daily vehicle production of 48 with employing approximately 450 workers. In those years, the number of private cars in Istanbul was around 200, and when you add the taxis to this number, the total number of cars in İstanbul was counted 500. It is estimated that there are around 1500 cars in the total automobile park in Turkey (Streather, 2011, p. 45)⁵. Considering the national vehicle stock, it can be said that this factory was established within the framework of an export-oriented strategy rather than producing for the domestic market. Although the assembly plant continued production for a while after the 1929 depression, it stopped production in 1934⁶ (Dolanay & Oğuztürk, 2018, p. 228).

It took 20 years to make a second investment in the automotive industry and a Türk Traktör factory was established in Ankara in partnership with Koç Holding and CNHI. Today, Türk Traktör still continues to produce in its two factories in Ankara and Sakarya with an annual production capacity of 50,000 tractors. The 1960s were extremely dynamic for the automotive industry in Turkey. The First Five Year Development Plan which covers the years 1963 and 1967, carefully planned an investment programme for the establishment of heavy vehicle manufacturing plants (OTOKAR, A.I.O.S., BMC, KARSAN, MAN and Mercedes Benz) under the import substitution policy (Taymaz & Yilmaz, 2017, p. 4). The first indigenous automobile brand Devrim, which could not start mass production, Uzel, which started tractor production in Istanbul in 1962 with the partnership of M. Ferguson, and Anadol, the first Turkish automobile, were produced in these years. Anadol's production continued until 1980. With the foreign partnerships they have established, Koç and Oyak started the production of Tofaş and Renault branded cars, respectively, in their factories in Bursa in 1971.

⁵ Although almost a century has passed, by 2021, one third of the country's vehicle stock is in Istanbul (TUIK).

⁶ In one of the interviews (I4), it was mentioned that the factory was closed because the imported cranes were thrown into the sea by the porters for fear of losing their jobs. However, during my research, I did not come across any document supporting this narrative.

The second wave of foreign direct investment has been opened by the investment of TOYOTA manufacturing plant in Sakarya in 1994 with the enabling power of Customs Union agreement between Turkey and EU. After a short period of time Honda and Hyundai invested in Kocaeli in 1997 albeit Honda has recently closed its production facility in Turkey. These three manufacturing plants were the last automotive main industry investments of Turkey. However, with the re-investments of the main industry companies and the investments of important brands operating in the supply industry in Turkey, the automotive industry has made a significant breakthrough especially from the beginning of twenty-first century which reached an export volume of 30 billion dollars in 2019.

The long history of automotive production in Turkey is willing to transform into a new phase by producing an original indigenous car under a national brand. The mission has a potential to transform and concentrate the industrial policy of Turkey. The last round of domestic car adventure of Turkey began in 2011 and resulted the establishment of a private consortium Turkey's Automobile Joint Venture Group (TOGG) which aims to produce the first domestic car of Turkey with the extensive support of Turkish government. TOGG was formed in November 2017 with the participation of Anadolu Group, BMC, Kıraca Holding, Turkcell Group, Zorlu Holding and The Union of Chambers and Commodity Exchanges of Turkey (TOBB). The equity share of TOBB is 5 percent and the other five partners share the rest equally. TOBB has played an effective facilitator role in the establishment and execution of the consortium between the government and private sector. In the next 15 years the partners are agreed to spend \$3.7 billion to the project. The first indigenous car of Turkey is expected to land off the production line in 2022 (Ergocun, 2019). The indigenous car mission of Turkey was first set by the government years ago, at the end of the 2011. The task of "solidarity for domestic automobile production and building a new brand" was handed over by Erdogan's statement to private sector representatives at a meeting of Turkish Industry and Business Association (TUSIAD). It was the first nudge that came from the government side to create a domestic automotive brand in Turkey. However, the verbal encouragement of the Prime Minister did not have the expected impact on the private sector, he started a public debate around the phrase "babayiğit" that means "brave fellow" in English. The search for a brave fellow to produce the first domestic car of Turkey remained inconclusive for a long period of time. However, although there has been no concrete development for a long time, the issue of domestic automobile has been repeatedly used as an important political discourse. In fact, the minister of industry of the period, even made public statements about the market price of

domestic automobiles in 2011 (*İşte Yerli Otomobilin Satış Fiyatı*, 2011). As the representative of the OEMs engaged in production in Turkey, Automotive Manufacturers Association (OSD) was the first address of the potential bearer of the domestic car project. The report prepared by OSD on the production and marketing possibilities of the indigenous automobile project was the first concrete step in this field, but the report was not shared with the public. The involvement of OSD to the project remained at this level and OSD has not conducted any other activity about the issue which was reflected in the press. However, the government continued to seek methods and cooperation possibilities for the production of domestic automobiles to be undertaken by the private sector. Mission was set by the government, but the implementation body of the project still did not exist.

Since his term as mayor, Erdoğan has executed several mission-oriented policies on the local, national, and international problems. As a mayor of İstanbul, he was able to solve urgent municipal problems of İstanbul such as garbage and utility water. The municipal achievements carried him to the chair of prime minister. As a prime minister and later as president, he has continued to implement mission-oriented policy style but now the problems were more complicated at the national level. Some of these policies were gaining the appreciation of a critical voter audience, while others were among the most severe failures in the history of the republic. Creating a domestic car brand was one of the mission-oriented policies in his carrier that needs high level of cooperation and coordination. The first serious attempt of creating a Turkish car mission has been undertaken by the Scientific and Technological Research Council of Turkey (TUBITAK) which is a public institution for managing, funding, and conducting applied research, founded in 1963. In February 2013, TUBITAK announced a call for proposal under the 1007 Programme “Supporting Public Institutions Research and Development Projects” to support production of first domestic electric vehicle of Turkey with a total budget 100 million TL which was equal to around 56 million USD. The deadline of the call was in May 2013 and TUBITAK received 20 proposals. Since there was no restriction on the type of vehicle, the proposals covered a wide range of electrical vehicle market segments. While some of the companies and consortiums have proposed to develop electric passenger cars, others offered to produce different types of electric vehicles such as commercial vehicles and buses. KARSAN applied to the funding programme with the electric taxi concept which was developed for New York and ranked among the top three in “taxi of tomorrow” competition. After the initial evaluation, it was announced that 10 projects were entitled to bid for the second phase of the “Development of

Electric Vehicle Technologies” financial support programme. As a result of the long evaluation process conducted by the funding institution in March 2014 Anadolu Isuzu Consortium was selected as the winner of the call for proposal. Interestingly, the winning consortium under the leadership of Anadolu Isuzu included Yıldız Technical University and Altınay, as well as the TÜBİTAK Marmara Research Centre and the proposal offered to develop an electric bus. After the budget allocated by the operating authority was halved, the winning consortium withdrew from the project in July 2014 (Özpeynirci, 2015).

The aim of the proposal was the domestic development of components critical to electric vehicle technologies and the production of a domestic electric vehicle using these components developed accordingly. While the program aimed to localize elements such as original design, battery, electric motor, and vehicle control systems on the one hand, it was expected to design a vehicle suitable for urban use consisting of these products. The design of the programme was unique and required a complex collaboration between R&D institutions and industry. The components of the proposed electric vehicle were expected to be developed by R&D institutions and the vehicle itself planned to be produced by manufacturing companies. One of the most critical obstacles that prevented the success of the program was the lack of a clear determination of the desired market segment to be produced as final output. Bus, minibus, commercial vehicles, and passenger cars were suitable as a final product but each of the vehicles require different type of market segment and production process. A competitive passenger car model and its components require a capital-intensive mass production while the production process of bus and minibus is based on labour intensive craftsmanship. The required investment and the organization of production is widely diverse for these different types of vehicle segments. Naturally, the end product offer of the winning consortium was an electric bus. I5 is an academician who participated in the project preparations on behalf of a university, also thinks that the call was announced without enough preparation.

We said that we need to improve our electric vehicle technology before the electric car call, so we need to develop electric drive systems, Turkey has not even a capability on battery technology [...]. So what happened, a lot of consortiums, worked together, a lot of people worked together, consortiums were established, they said that there will be a budget of 100 million Euros, everyone was so seriously engaged, 3-4 folder project files of this thickness [shows with his fingers] were prepared. (2019.10.02 - I5, Pos. 52).

I5 also stressed that the requirements of the call for proposal such as sales guarantee was exactly heavy and more importantly the ecosystem was not ready to undertake an electric car production under the circumstances of ambiguity. S/he stressed that it was already difficult

for this call to be successful in an environment where the government did not even have any policy approach on electric vehicles. However, even such failures played an important role on preparing necessary conditions for the electric car production of Turkey through expressing the will of the state. The call of TÜBİTAK on electric vehicle technologies was the first serious action of the ‘entrepreneurial state’ on the production of an electric car. After the TÜBİTAK call, it had become certain that the domestic car will have an electric power system.

After the failure of call for proposal, TÜBİTAK decided to venture directly to the production of the electric vehicle through Marmara Research Centre and began to work behind closed doors on the project. Little is known about the work done by TÜBİTAK on electric vehicle apart from the news for political purposes. The limited information on the electric car project of TÜBİTAK can be found at the web site of a Swedish company NEVS (National Electric Vehicle Sweden) which acquired the \$460 million worth assets of Saab Automobile in 2012. Under the section of partnership, at the website of the company, the following entry gives some information about the collaboration between TÜBİTAK and NEVS.

In June 2015, NEVS began a collaboration with the Scientific and Technological Research Council of Turkey to develop the Turkish National Electric Car. In the long-term, the partnership means creating industrial synergies in development and manufacturing, and in the short-term, NEVS will provide IP and support during the development process – from the design of vehicles, products and services to production facility set-up and go-to-market capability (NEVS, n.d.).

The details of the agreement between TÜBİTAK and NEVS was published by the national press based on a parliamentary question issued by the deputy of Kocaeli province Tahsin Tarhan. According to the said document, the total price of the four contracts that constitute the agreement has been determined as 47.7 million Euro. The main contract 40 million Euro worth (Özpeynirci, 2017) was the licence agreement on Saab 9-3 Model which was originally produced between the years 1998 and 2010 with an internal combustion engine. NEVS announced that it will start the production of electric vehicles in the factory they will establish in Tianjin after its acquisition by Evergrade Group at the beginning of 2019. After the Minister of Science, Industry and Technology of the period introduced the domestic car prototypes to the press in camouflage, the project became the target of intense criticism. Auto enthusiasts quickly realized that the prototypes introduced as domestic electric cars were actually 9-3 model of Saab. This launch was the end of the Domestic Electric Vehicle

Development Project carried out by TÜBİTAK. An academician who has been working on electric cars, I6 mentioned about the project as follows:

Then there was a known attempt at TUBITAK, and the SAAB system was purchased, and it was even painted differently so that it was not clear that it was SAAB. In TÜBİTAK, one of our students from İTÜ [Istanbul Technical University] worked on this project and is still our doctorate student, for example he was very hopeful. Of course, since I do not know the detail, [...] but it would be very good if this was not left, he told me many times (2019.10.02 - 16, Pos. 20).

As part of the Domestic Vehicle Development Project, we know that the team formed at the TÜBİTAK Marmara Research Centre has worked on the localization of critical components such as the electric motor, vehicle control unit and battery. At the reply to a parliamentary question issued by the deputy of Niğde, Ömer Fethi Gürer, it was stated that the knowledge and experience gained within the scope of these studies are used in the projects, activities and studies conducted for the scientific and technological development of the country (*Niğde Milletvekili Sayın Ömer Fethi Gürer'in 7/6650 Esas Sayılı Yazılı Soru Önermesine İlişkin Cevaplar*, n.d.). Although it is not known how much of the knowledge and experience created by this project is used by the further steps of domestic car adventure, we can see the project as a concrete but novice step in the effort to establish an infrastructure in the field of advanced vehicle technologies. National Electric Vehicle Sweden (NEVS) was the last attempt before the enforced collaboration among the five “babayiğit” to produce the first electric automobile of Turkey.

The mission of producing first domestic car of the Turkey has seriously evolved and became more apparent over time both in terms of market segmentation and methodology since 2011. At the idea phase of a domestic car, the type of the vehicle that was aimed to be produced was not obvious and with the call of TÜBİTAK on “Development of Electric Vehicle Technologies,” it was implicitly confirmed that the car of the Turkey will be powered by an electric drive system. The vehicle segment to be produced under the framework of the program was targeted to be an electrically driven, rubber-wheeled (min. 4-wheeled) land vehicle suitable for widespread use and mass sales in the city (Özbay & Ağkaya, 2013, p. 3). The methodological uncertainties regarding to the implementation phase of the domestic car mission were found through trial and error. The failure of TÜBİTAK's initiative for domestic vehicle production turned eyes into private sector organizations again. However, this time state had played an active role in building a consortium through the Union of Chambers and Commodity Exchanges of Turkey. The compulsory collaboration among the leading capital

owners of Turkey set by the directive of the state has been carried out since 2017 and reached a new stage after the launch of the domestic electric vehicle prototypes at the end of 2019. It is not technically appropriate to comment on the size of the share that the electric domestic automobile project can grab from the global mobility value chain, but it is evident that the story will become one of the most interesting cases for the mission-oriented industrial policy.

3.2: The Locus of the Study

The city group Bursa, İstanbul, Sakarya and Kocaeli (BISK) is defined as a multi-centred functional region, which is the industrial centre of Turkey and constitutes the primary production hub of the automotive and automotive components industry. The multi-centred functional region BISK does not have an official representation and it is delineated according to the practical concerns of the research. The necessity of defining such a territorial unit comes from the practical convenience to differentiate a group of territories in order to their economic base. In terms of the mobility ecosystem, the purposeful region defined as BISK, which is represented by the intense interaction among the actors and institutions of these territories.

The functional regions as sub-national levels attract attention primarily of the researchers, policymakers, and international organisations who seek to understand interactive economic and social relations beyond the official statistical and administrative regions. Emerging purposeful regions provide a base to understand the dynamics of territorial interaction within a particular conceptual framework, which is not possible to realise at the urban or regional levels. On the other hand, limited national and international benchmarking opportunities due to the lack of statistical data constitute the primary problem of delineating a purposeful region. According to the definition of OECD a functional region is “a territorial unit resulting from the organisation of social and economic relations in that its boundaries do not reflect geographical particularities or historical events (Cattan, 2002, p. 3).” They are generally outlined according to the single variable: labour mobility. The commuting conditions within and beyond the borders of the territories are the main conditions in defining functional regions. As integrated territories, functional regions have to have a positive balance in terms of the labour mobility. In other words, the necessary condition for being a functional region low level of external labour mobility to the other territories (Cattan, 2002, p. 4). Countries

define the functional regions in order to perform socio-economic territorial analyses and policy design more accurately.

The intensity of the intercity commuting is the primary source of data in determining a functional region. Unfortunately, the commuting statistics are not collected officially and systematically in Turkey; accordingly, it is not possible to reach a detailed commuting mapping between the cities of BISK. According to a survey study that is conducted by Municipality of İstanbul in 2007, the only meaningful intercity commuter flows occur between İstanbul and Gebze, which is the most industrially developed district of Kocaeli. The 7 percent of industrial employees who are working in the district of Pendik (İstanbul) are commuting between Pendik and Gebze. On the other hand, 38 percent of industrial employees in Gebze commute from the various districts of İstanbul. Beside the labour flows between Gebze and İstanbul, it seems that there is no meaningful intercity commuting between İstanbul and the other cities of the BISK. Although there is no statistical evidence, with an educated guess there might be another commuting route between Kocaeli and Sakarya. However, in terms of labour mobility BISK cannot be labelled as a functional region. In that sense, we need to find some other commonalities among the cities of the BISK region in order to define this imaginary region as functional.

The objective of delineating the BISK multi-centred functional region is to perform an analysis on mobility ecosystem. From this perspective, the borders of BISK are determined according to the intense agglomeration of automotive industry in that region. The functional regions have to be self-sustaining in terms of job opportunities created in the region. In this regard, the net migration statistics might be realised as supporting evidence on the functionality of BISK region. The net migration to the BISK during the course of ten years between 2007 and 2017 is around 800.000 people and nearly half of them belong to İstanbul. However, between the years 2017-2018, the net migration of İstanbul was negative and the net migration to the external territories is counted as more than 200.000 people. The escape from İstanbul and the barely positive net migration numbers of Bursa and Kocaeli caused a negative net migration for the BISK between the years 2017 and 2018 (TUIK, 2019). From this point of view, if we omit the negative net migration from İstanbul in the last year, we can conclude that BISK multi-centred functional region is a self-sustaining territory, which has an ability to create enough jobs for its population. However, the defining characteristics of

the BISK multi-centred functional region need to be underlined through appropriate data about the region.

The top 2500 R&D companies of the world constitute almost 90 % of private research investment globally. Total annual investment of these companies to R&D reaches approximately €736 billion in 2018 with a growth rate 8.3% comparing to previous year. The primary performers of global business-funded R&D are the US (37%), the EU (27%), Japan (14%), and China (10%). Samsung, Google’s Alphabet, and Volkswagen are the top investing companies to R&D at the global scale. The major R&D investments occur in ICT, health and automotive sectors (Commission, 2018, p. 6). Sectoral distribution of R&D investment of the top performers is shown as follows:

Table 1 - The Sectoral Distribution of Business-Funded R&D (Commission, 2018)

Territories / Sectors	ICT	Health	Automotive
US	51.4	26.7	7.8
EU	20.1	22.4	30.5
Japan	24.9	12.4	30.8
China	44.7	3.4	11.4

Turkey has four companies within the top 2500 performers who have an annual R&D investment at least €25 million. ASELSAN is the top R&D investor in Turkey who spends 31 percent of its annual turnover and invests around € 406 million in 2017. TUSAŞ, Ford Automotive and ROKETSAN are the other three companies who could manage to enter top 2500 global R&D investor companies in 2018 (Turkishtime, 2017, p. 20). Top 41 R&D investors from the automotive industry able to enter the list that make the sector leader in terms of R&D spending. Textile and ready garment, metal, food, and machinery industries are the following sectors who constitute together with the automotive industry more than half of the top 250 R&D performers in Turkey (Turkishtime, 2017, p. 41).

The government of Turkey actively supported and promoted the establishment of private R&D design centres under the framework of Law No. 5746 on Supporting Research, Development, and Design Activities. The industry of Turkey reached the number of 344 design and 1178 R&D centres by June 2019, which have owned by the private sector. BISK region is leading design, research, and development activities in Turkey with 204 design and 683 R&D centres that constitute around %60 of the total number of design and R&D centres in Turkey. As indicated in the Table 8 the dominance of BISK region in the automotive

industry reaches to around 70 percent in Turkey in terms of having an R&D centre and this number shows the level of agglomeration of automotive industry in Turkey.

Table 2 - The Distribution of Automotive Design and R&D Centres in 2018

	Bursa	İstanbul	Sakarya	Kocaeli	Turkey
Design Centres	12	5	0	2	28
R&D Centres	49	17	3	32	147

In terms of patent, utility model, design, and brand registration thanks to İstanbul, BISK region has a dominant position in Turkey. For example, 65 percent of the patents received in Turkey in 2018 were realized in the BISK region. Of course, Istanbul has a significant weight in the functional region in question. More than half of all patents received throughout the country originate in Istanbul.

Table 3 - The Distribution of IP at BISK and Turkey in 2018

Types of IP		Bursa	İstanbul	Sakarya	Kocaeli	Turkey
Patent	Application	4.119	27.161	1.028	2.462	61.503
	Registry	1.152	7.779	221	653	15.112
Utility Model	Application	3.847	20.428	665	1.222	48.462
	Registry	2.355	12.866	372	742	29.353
Design	Application	11.592	61.617	877	1.943	125.305
	Registry	11.011	56.617	821	1.791	115.692
Brand	Application	59598	685566	10688	24453	1365969
	Registry	37833	438701	6591	16571	862382

The regional ecosystem of a particular industry consists of a group of institutions that are supposed to be functioned in order to improve the conditions of value creation process. The close relations between apparatus of state and economy have been studying at the regional level and named as *spatial alliances* or *growth coalitions* (Healey, 1997, p. 290). Table 4 shows the tangible institutional elements of the regional mobility ecosystem that constitute the universe of the study. The samples for semi-structured interviews are selected according to my prior experience in the field and the suggestions of the interviewees. According to the response of the interviewees' new samples has occurred as new questions raised and until the theoretical saturation, I have conducted 24 interviews. The interaction among the BISK regional mobility ecosystem is going to be analysed at the institutional level through tangible elements in Table 4. Trust, collaboration, and coordination relations among and beyond the

institutional elements of the BISK mobility ecosystem constitute the invisible nets made from intangible elements of the mobility ecosystem.

Table 4 - Institutional Elements of BISK Mobility Ecosystem

Industries of Mobility	Business Associations	Academia	Government Institutions
OEMs Industrial Automation Robotics Raw Materials Moulding Processed Materials - Steel - Plastics - Aluminium - Composite Electronics Transport Engineering & Design Software Service	Association of Automotive Parts and Components Manufacturers Association of Composite Manufacturers Association of Industrial Automation Manufacturers Software Industrialists Association Association of International Transporters Port Operators Association of Turkey	Universities Research Institutions TTOs Entrepreneurs Start-ups Spin-offs	Central Government - Ministry of Industry and Technology - Ministry of Economy - Ministry of Development Regional Institutions - Istanbul Development Agency - East Marmara Development Agency - Bursa-Eskisehir-Bilecik Development Agency

The events, related projects, strategy development workshops, social media accounts of critical stakeholders, my personal email history related with strategy building and my existing contacts as a regional development professional are going to be used as the other sources of data. For instance, the event “Regional Development Agenda: Global Value Chains and Competitiveness Policies” held on May 2017, was a turning point for the involvement of East Marmara Development Agency as an active player into the automotive assemblage. It was an excellent example of building trust and collaboration among the stakeholders that turns to a voluntary coordination activity in time and space. Projects and operations are going to be analysed as the sources of data because in our case, the development of my viewpoint on strategy building processes has been evolved while I am designing and conducting a series of projects and finally an operation on the automotive value chain. The projects are also significant in building relations among different types of stakeholders, and each party has a chance to observe the other partners on work. The emergence of trust and collaboration

relations into the practice among the partners has been observed into the projects more clearly. The discussions in a strategy development workshop for a particular industry are another source of valuable data. For instance, I was an attendee of “Strategy Development Workshop on Autonomous Cars,” which is held by Okan University in January 2018. The workshop provides a wide range of information about the strategy development processes, especially in terms of the interaction between the participants. Another supportive data source for the field study comes from social media accounts of the stakeholders. These types of data have provided valuable information, especially before the interviews. The sources of the data that are mentioned above are analysed in a synchronized way with the in-depth interviews. The data gathering and analysing processes have been conducted simultaneously. The analysis of data will guide the researcher for further data collection process. The cycles of data gathering, and analysis process have continued through a data saturation process until reaching the core categories of the theoretical approach. There is no specific time to give up the data collection and analysis cycles; the researcher is going to decide where to stop the field study. However, the saturation point of the field study needs to be demonstrated through a set of criteria, which are going to be explained by the researcher.

3.3. Constructing a Framework to Analyse the System of Interactions: TCC Cycle

The interactions among institutional and non-institutional actors associated with spatially agglomerated automotive industry are organised around some practical goals to sustain the system of value creation. This system of value creation based on mutual interactions enables to form patterns, layers, and clusters of subsystems through trust, collaboration, and coordination cycles (TCC cycle). TCC cycle is an iterant process that enables the system of value creation within a time frame and particular location of a global value chain. The system contains several overlapping and crosscutting subsystems. These subsystems construct competitive and collaborative milieu within an industrial value creation process which is a part of a complex and continuously re-shaping inter-institutional interactions at the regional level. TCC cycle is a technical framework, and its components trust, collaboration and coordination are predetermined categories to trace the transformation of a specific regional interaction system. The predetermined categories of trust, collaboration and coordination that constitutes TCC cycle are expected to render the primary features of dominant and emerging systems of interactions at the regional automotive value chain. As monolithic repeated flows,

TCC cycles are constructed for making explicit how the system is transformed through the interaction of the institutions within a particular industrial agglomeration.

Observing the transition within a particular socially constructed value creation process requires a structured analysis method that enables to understand the relational aspects among the agents and institutions of the ecosystem. In that sense, the transition from automotive agglomeration to mobility ecosystem is observed from a particular framework that will simplify the complex interactions among the ecosystem players during a transformation process. Trust, collaboration, and coordination cycle (TCC) is a relational framework on the spatio-temporal organization of value creation. The framework provides an analytic tool to explore the nature of the value creation processes consistent with the changing dynamics and increasing complexity of the today's contemporary socio-economic system. The framework presupposes that most of the value creation process intrinsically contains implicit or explicit social interaction based on trust, collaboration, and coordination cycle. However, each value creation process has its own spatio-temporal characteristics that have been defined socially. It constructs and reconstructs the dynamics of TCC cycle for each of the particular production process again and again. The changing characteristics of trust, collaboration and coordination over time and space enables us to compare basic features of the conventional value creation processes with the dynamics of emerging ecosystems.

The first piece of TCC cycle and in many cases the starting point of any collaborative value creation process is trust. It constitutes the foundation for any social or economic interaction among people and organizations. Research on trust within the context of management studies have become popular especially in the field of organizational theory since the last decade of the twentieth century. The main reasons for this increased interest in trust studies is generally associated with “increased competition in global markets; the disintegration of production processes; the availability of advanced communication technologies and systems; and post-bureaucratic forms of work organization (Bachmann & Zaheer, 2006, p. 1).” Trust is also precondition for any type of collaboration to some extent.⁷ However, the meanings of these terms vary from person to person. These diverse connotations attributed to the terms of trust, collaboration and coordination have complicated the process of research in terms of data

⁷ For a detailed study addressing collaboration with or without trust in the automotive industry, which I encountered during the postponed literature review phase of the research, please see (Macduffie & Helper, 2006).

analysis. At one point, data gathered from the field have swayed the process of analysis to define two different systems of regional dynamics within the automotive industry. In that sense, the distinction between automotive agglomeration and emerging mobility ecosystem at the BISK region comes from categorization of the meanings attributed to trust, collaboration, and coordination. Obviously, the tools and mechanisms of coordination to sustain and improve the value creation process within the fields of automotive industry have also characterised according to these two systems. The conventional automotive industry agglomerated at the BISK region is certainly constituted the prevailing value creation model and this model is constantly growing around the domestic OEMs since more than half a century. Although, this specific type of value creation system is sometimes degraded and labelled as assembly industry, it is evident that automotive industry has been flourishing the industrial base of Turkey and able to hold the export championship for 13 years. However, some people think that automotive industry has to realize its next jump to the mobility ecosystem and some of the features of the current automotive agglomeration have created obstacles in front of this transition. The second system is defined as regional mobility ecosystem which has been emerging through functional sprawl of the actors both from the conventional automotive agglomeration and the other fields of industry. The research aims to explore the interactions among the actors within these two distinct systems through the analytic framework of TCC cycle. Specifically, the research has been knitted around the question: how the actors of the automotive industry react to the emerging regional mobility ecosystem?

3.3.1 Trust

Trust is a non-economic factor which catalyse relational exchange within and between the individuals, groups and organizations (Zaheer & Venkatraman, 1995, p. 375). Although it is defined outside the economic sphere, the dynamics of trust constitute a slippery base for any kind of collaborative value creation process. These dynamics need to be constructed and reconstructed again and again both economically, socially, and culturally which require repetitive practice of interaction. The increasing complexity of value creation process requires mastery on the dynamics of trust as a practice. In this regard, the characteristics of trust-based relations within a regionally agglomerated industry might provide valuable information about the level of value creation process. Accordingly, trust is a predetermined category to explore

the transforming nature of the industrial base of BISK region regarding to automotive manufacturing.

Questioning of trust and trust-based relationships among the actors of a regionally agglomerated industry is actually a sensitive issue. It is really hard to obtain information about trust in business and extra-business relations. The research is mainly relied on semi-structured in-depth interview method which provides valuable qualitative data to the theory building process. Unlike many research studies based on grounded theory, I did not barge into the field without any prior knowledge to rephrase it “tabula rasa”. My prior knowledge on the automotive industry and the personal relation that I have developed over the years with the actors of the regional automotive industry agglomeration as a regional development professional has enabled the field study to jump to the second stage of the grounded theory which contains a general understanding on the issue. I have designed the qualitative study around the three concepts of TCC cycle which are trust, collaboration, and coordination. However, at the beginning of the research, these concepts are not realized as a part of cycle which constitutes the primary method of analysis of this inquiry but as separate regional dynamics of automotive industry. The semi-structured in-depth interview covers three set of questions that aims to explore the concepts of trust, collaboration, and coordination relations among the actors of automotive agglomeration.

The trust section of semi-structured in-depth interview aims to obtain information about the formation of trust relations between the actors in the BISK automotive agglomeration and emerging regional mobility ecosystem⁸, the effects of these relations on the functioning of the ecosystem and possible strategies for creating a trust environment. At the beginning of the process trust section located in the first part of the interview guideline as pre-sorted trust, collaboration, and coordination cycle. However, after a couple of unofficial test interviews, I have realized that the questions about the trust relations paralyzed the interviewees at the beginning of the interview. I observed that the people I interviewed during the field work were generally more comfortable expressing themselves after a certain period of time. Thus, I decided to reorder the interview guide and moved the trust section to the final part. I have

⁸ In interviews, I defined the focus of the study as the regional mobility ecosystem at BISK. However, at the later stages of the study, I defined two systems and named them as regional automotive agglomeration and emerging regional mobility ecosystem. When I mention about regional automotive agglomeration, I mean the conventional automotive industry at the BISK region. On the other hand, regional mobility ecosystem refers to the second system of value creation.

determined three key word sets and five probable questions about the trust relations among the actors of regional automotive agglomeration. The formation, effects and development strategies of trust milieu was selected as key word sets for the in-depth interviews. The questions regarding to the trust relations are given at the Table 5.

Table 5 - Preliminary Questions about the Trust Milieu

1. Which institutions do you trust most in your business relations? Why?
2. Can you evaluate the impact of the current trust environment in your regional mobility ecosystem on your activities?
3. What institutions are most likely to contribute to or create a climate of trust in the regional mobility ecosystem? Why?
4. What are the steps to be taken to develop an environment of trust in the regional mobility ecosystem?

Although, rearrangement of the sequence facilitated breaking the ices, providing information about the relations of trust was the hardest part of the field study. The interview questions are designed to be simple at the early stage of research project to explore the relations of trust among the actors of value chain. However, the simplicity does not help to open the interviewees' opinions about the trust relations at their industry. It was even harder for the case of introvert interviewees who were trying to skip questions with generic opinions. The questions defined under the trust section did not work as I expected prior to the field study. These questions are clearly insufficient to extract the necessary information about the regional trust environment. I did not insist on these questions. I decided to take a step back and ask a more general question about trust because trust relations were the least known category of the study among the other predetermined categories collaboration and coordination.

Table 6 - Revised Questions about the Trust Milieu

1. Can you evaluate the current trust environment in the regional mobility ecosystem?
2. What are the steps to be taken to develop an environment of trust in the regional mobility ecosystem?
3. What are the obstacles to the development of an atmosphere of trust in the regional mobility ecosystem?

Fortunately, grounded theory methodology provided enough room for openness and flexibility of the research design. As soon as I realized that the interview was blocked in the light of the answers given to the previous questions, I started to request from the participants an ontological assessment about the regional trust environment. Once they began to talk about the trust environment, I just tried to encourage the interviewees by gestures and short unclaring

statements or questions to talk about their personal experiences and overviews on trust relations.

3.3.2 Collaboration

The second element of TCC cycle is collaboration. In the first stage of the field study, the concept of collaboration, as well as the other elements of TCC cycle which are trust and coordination, was tried to be understood without loading to the concept any prior meaning. This approach has provided important clues about the meaning attributed to the notions in different settings and contexts. Although I did not directly ask the people I interviewed, I identified six questions regarding the collaboration relations that I aimed to understand. Table 7 shows the preliminary questions about the collaboration environment in mobility ecosystem⁹.

Table 7 - Preliminary Questions about the Collaboration Environment

1. What are the institutions (persons) you cooperate with intensively?
2. Could you give information about the concrete collaborations carried out by your institution?
3. Can you evaluate the effects of the multilateral collaborations you have developed on your activities?
4. What are the obstacles to establishing collaborations aimed at producing innovative products or services in the regional mobility ecosystem?
5. Which institutions have contributed or can provide the most to the development of collaborations? Why is that?
6. What are the steps to be taken to develop a collaborative mobility ecosystem?

Mapping the collaborative relationships between the automotive suppliers and the other actors within the cluster constituted the hidden agenda of the research that I quasi-consciously developed in my mind. Additionally, as the second preliminary question indicates I was searching for concrete collaboration best practices to analyse, categorize and map the collaborative relations. As a regional development expert, I had made efforts to reveal strategic collaborations in various sectors and thematic areas. The Figure 3 shows the research

⁹ I did not make any distinction between the automotive industry and the mobility ecosystem in the process of creating the thesis setup and organizing fieldwork accordingly. This is because, at that time, among the leading representatives of the industry, there was a narrow approach that the industry needs to be defined as the mobility ecosystem rather than the automotive sector. I think this definition became widespread after a visit to the United States of America in order to understand the transformation in the industry under the leadership of a public institution at that time. For this reason, I used the concept of mobility ecosystem in place of the automotive industry until I set the theoretical framework and define two intertwined systems of automotive industry and mobility ecosystem.

design about the mapping processes between industry and academia from a broader perspective. The design represents the logic of thinking about the nature of collaboration relationships. Eventually, I came to a conclusion that “no plan survives contact with the enemy.”

Survey Set I: Exploring Collaborative Network between Industry and Academia (I)

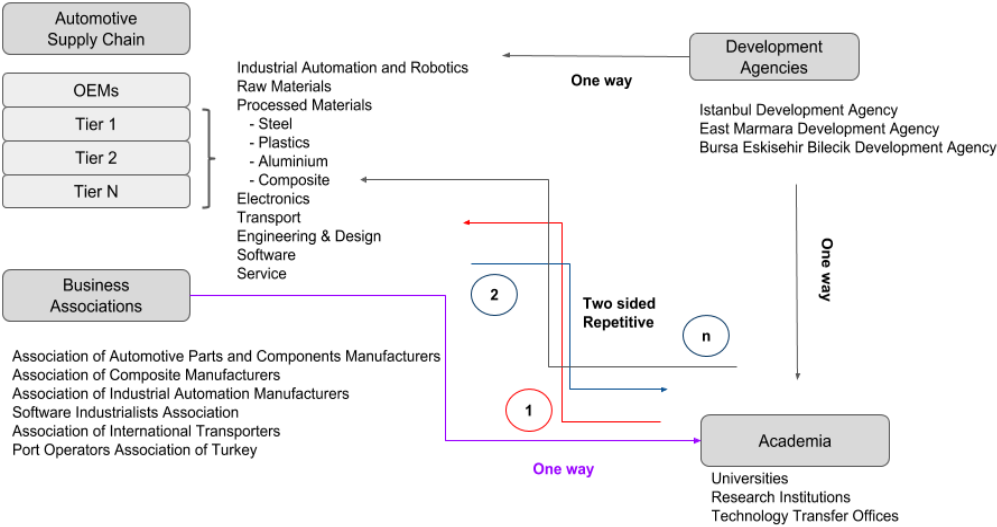


Figure 3 - The Repeated Mapping Strategy for Collaborative Relation

I could not find any satisfactory answer regarding to the strategic collaboration between the institutions, neither in the professional life nor in the first part of the research process. None of the narratives described as practices of inter-institutional cooperation in my interviews were capable of affecting regional development dynamics. While conducting the second phase interviews, I shifted my perspective on collaboration from personal and corporate experiences to interpretation of the collaborative environment. As I expected, the participants, who were hesitant to talk about their personal experiences when asked directly, did not hesitate to tell their personal experiences while conveying their comments on the questions I asked about the cooperation environment. Table 8 shows the revised questions about the collaboration environment.

Table 8 - Revised Questions about the Collaboration Environment

1. Is it possible to talk about the existence of a cooperation environment specific to the automotive supply industry?
2. What do you think is the reason for the emphasis on cooperation in business relations in recent years?
3. What are the obstacles to establishing collaborations aimed at producing innovative products or services in the regional mobility ecosystem?
4. What are the steps to be taken to develop a collaborative mobility ecosystem?

The contradictory responses to questions regarding the existence of trust and collaboration in the automotive value chain made a significant contribution to the formation of the theoretical framework. I realised that the answers were context dependent and the position in the value chain of the actor has directly affected the direction of response. There was not a difference but a complete contradiction between the answers given to the questions regarding the ontological existence of trust and cooperation relations. After realizing that there were two different systems, one sprouting inside the other, I decided to base the theoretical framework on the differences between these two systems.

3.3.3 Coordination

At the beginning of the study, I perceived the concept of coordination as a process has to be planned at regional level outside the supply chain. However, within the scope of grounded theory, I tried to somehow suppress this perception arising from my past experiences and readings. Investigating the meaning of coordination into the TCC cycle for the automotive industry was a challenging process because of the different meanings attributed to the concept. The preliminary questions were designed from an industrial planning perspective. It was like searching water into the desert. I was asking questions about the industrial planning or strategy building processes to an irrelevant target group.

Table 9 - Preliminary Questions about the Coordination

1. What are your views on the plans and strategies prepared for the automotive main and supplier industry?
2. Can you evaluate the next 20 years in terms of regional mobility ecosystem?
3. What are the steps to be taken to manage transformation in the regional mobility ecosystem?
4. Do you think there is a need for new institutional structures to coordinate the transformation process in the regional mobility ecosystem? Why is that?
5. What are the corporate roles you undertake or can undertake in the transformation process?

During the second wave of the study, I try to focus on the characteristics of industrial relationship among the institutions of mobility ecosystem. The data provided from the section of coordination enables me to clearly distinguish the two systems within the automotive cluster of BISK. The difference between the perspectives based on two systems has paved the road to the theory of transformational change in the regional automotive industry. The coordination among the supply chain and within the ecosystem are grouped into the two different mechanisms that are composed of different actors. Table 10 shows the revised questions of the semi-structured in-depth interviews on the coordination process.

Table 10 - Revised Questions about the Coordination

1. Is it possible to evaluate the relationship between the automotive main industry and the supply industry from the past to the present?
2. What are your predictions as to how this relationship will take shape in the future?
3. How do you plan to keep up with changing conditions institutionally?
4. What are the steps to be taken to manage transformation in the regional mobility ecosystem?
5. Do you think there is a need for new institutional structures to coordinate the transformation process in the regional mobility ecosystem? Why is that?
6. What are the corporate roles you undertake or can undertake in the transformation process?
7. What does the "domestic automobile" project mean to you?
8. Why are clusters, technology platforms, centres of excellence needed as interfaces?

The coordination of automotive supply chain has been managed by the vehicle manufacturers and in some cases by the Tier 1 suppliers. There is generally a closed loop between the suppliers and customers along the supply chain and all the actors related with the industry have been positioned as supportive institutions. However, the meaning and the mechanisms of coordination are completely dissimilar in the emerging regional mobility ecosystem. While the coordination ability of the customer within the ecosystem decreases, the opportunities of the actors outside the supply chain to create value by increasing the interaction between the institutions increase. The increasing importance of interfaces in accelerating regional development processes and supporting regional innovation systems can be evaluated in this context.

3.4 The Two Systems: Automotive Industry and Mobility Ecosystem

Trust, collaboration, and coordination (TCC) cycle is an analytic framework that enables to understand and compare the nature of interaction among the organizations of the value creation systems. It is designed to capture the transformation through focusing on how trust,

collaboration and coordination processes occur within a value creation process. The framework is useful to explore the interaction among the actors within a broader context without losing positional perspectives of each stakeholder. In that sense, the research clarifies the changing nature of interaction within the automotive industry through using TCC Cycle analytic framework. The reactions of the organizations cannot be separated from the actions of the others, and they usually act with or against each other by forming inter-institutional temporary or permanent coalitions. TCC is used as a secondary analysis to explore the transforming nature of inter-institutional interactions.

The research-generated core categories are derived from the field research through employing the tool of TCC cycle to the analysis of data gathered from the field. In our inquiry, unlike many grounded theory research studies not single but a couple of core categories emerged at the end of the coding process because two systems have been defined to distinguish dominant and emerging systems of interaction within the same regional ecosystem. In this respect, while the core category that defines the regionally agglomerated conventional automotive industry is *orbital motion*, the core category of the emerging mobility ecosystem appears as *(functional) sprawl*. Both of the core categories define the dominant and sometimes conflicting strategies of the regional automotive agglomeration and ecosystem actors. Defining two systems of interaction enables us to distinguish the limited reactions of the regional automotive agglomeration actors to the upcoming disruptive transition of automotive industry. A small number of institutions, although increasing day by day, continue their traditional activities which constitute their ontological substance, while developing new strategies to keep up with the new situation. These strategies have transformed trust, collaboration and coordination relations to a new sphere which is strongly related with the formation of emerging mobility ecosystem. The transition to the mobility ecosystem triggers the formation of new types of interactions which will be observed through TCC cycle. The features of the two systems have been traced throughout the research by observing the transition of interactions among the actors. The categories and sub-categories that define the basic characteristics of two systems of interactions are shown in Figure 4.

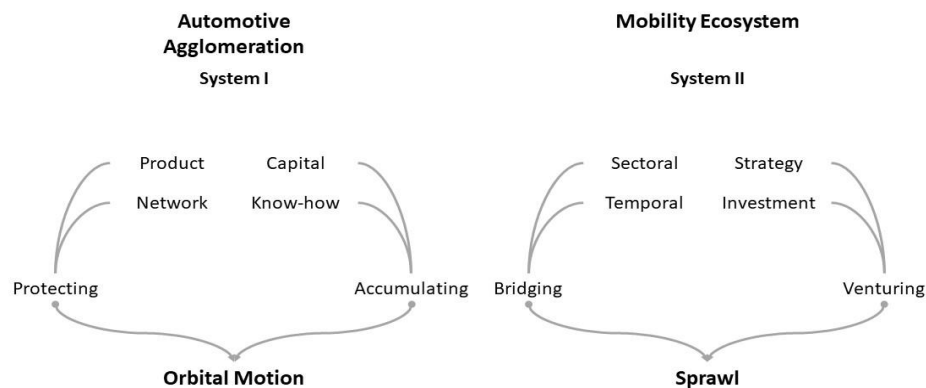


Figure 4 - Regional Dynamics of Two Systems of Interactions

The first system that represents automotive agglomeration at the BISK region is defined through the term *orbital motion*. The category of *orbital motion* represents the value creation process in the automotive industry which is organized around and by the main vehicle manufacturers. In this system the whole supply chain coordinated by the main industry. Although, the type of relation is strongly related with the character of the OEMs, TCC relations are occurred within the relatively close loop of supplier and customer relations. According to the first-hand data gathered from the actors of BISK automotive cluster, the relationships in the system of orbital motion from the perspective of supplier industry are designed around two concepts *protecting* and *accumulating*. The supplier industry in the BISK automotive cluster has been formed their relations with the actors through protecting and accumulating their business relations and product characteristics in order to sustain capital and know-how accumulation.

On the other hand, the quadruple transition has forced the organizations within the BISK automotive cluster to change their attitudes against the other actors operated both within and outside of this cluster. The response of the organizations within the automotive clusters is categorized under the concept of sprawl¹⁰. The functional sprawl represents the reactions of some of the automotive cluster actors to the quadruple transition and the category divided

¹⁰ The term of sprawl has been borrowed from the urban studies literature. Urban sprawl refers to an unplanned spatial enlargement of cities.

into two strategy that are named as bridging and venturing. According to the bridging strategy first some of the organizations are trying to establish bridges between their present positions in the value chain and the potential areas of value creation in the future. These institutions are trying to assess and analyse the consequences of the emerging mobility ecosystem on their activities in the traditional automotive industry. The second bridging strategy aims to build new connections between the automotive industry and the other relevant industries mainly software industry. Venturing is the second concept that constitutes the category of sprawl. The strategy facilitates the transformational change of organizations through establishing new institutions that have natural born suitable mind sets to the milieu of mobility ecosystem and addressing new instructional goals and objectives that shows their willingness to adapt their institutions to the upcoming transition in the automotive industry.

3.5 Core Categories: Orbital Motion and Sprawl

Usually, like the other theory building methodologies, grounded theory methodology produces a single core category that explains the situation on the research topic. The core category is defined as “a concept that is sufficiently broad and abstract that summarizes in a few words the main ideas in the study (Corbin & Strauss, 2015, p. 193).” Contrary to the tradition, the dissertation on the inter-institutional interaction in an automotive agglomeration was concluded with two core categories that define two different systems within the same agglomeration. The traditional automotive supplier industry and emerging mobility ecosystem are two co-located systems that have different dynamics in terms of trust, collaboration, and coordination relations. Defining the mobility ecosystem emerging from the automotive agglomeration as a different category gave the opportunity to reveal the dynamics of the quadruple transformation more clearly within the framework of the analysis. The following sections are dedicated to open up the core categories of the research study.

3.5.1 Orbital Motion

Orbital motion is defined as the core category to describe the current situation of BISK regionally agglomerated automotive industry. The term is constructed to define a number of dependencies that shapes the regional dynamics of within the BISK automotive agglomeration. The systemic dependencies of automotive industry in Turkey have been

analysed starting from the dependency of national industrial policy of a peripheral country within the global division of automotive production. The responses and reactions of the actors to the current situation of the industry in relation to disruptive technological developments in that area constitute the main concern of the study. However, the interactions among the actors of the regional automotive agglomeration need to be constructed on the current situation of the system. The picture emerged by analysing the comments on the current state of the automotive industry may seem more pessimistic in terms of trust, collaboration, and coordination dynamics in the first place. However, the main aim of the study is not defining weaknesses and obstacles of the system but opening the system through analysing the interaction among the actors to show the emerging options of transition paths.

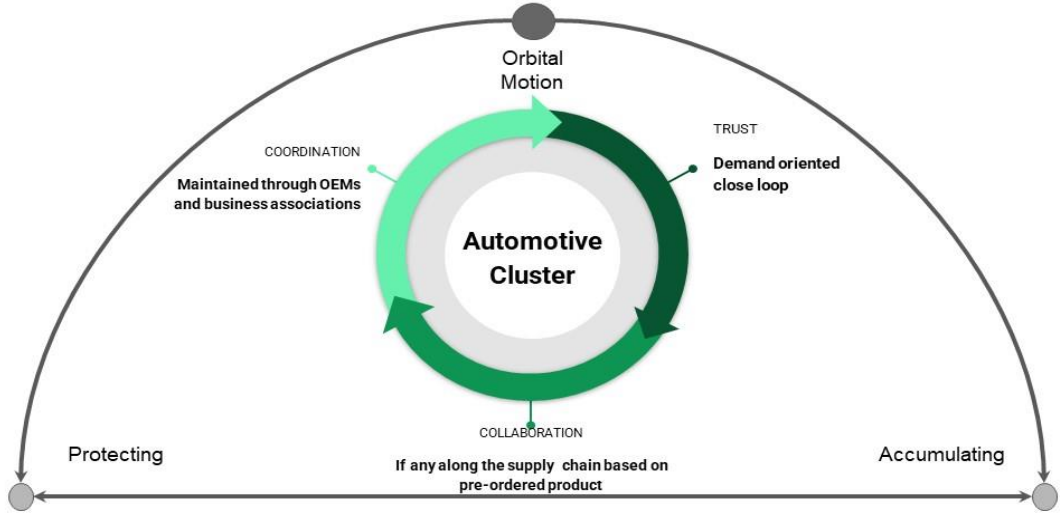


Figure 5 – The System of Automotive Industry at the BISK Region

The interaction among the actors of automotive industry agglomeration at the BISK region around the domestic OEMs¹¹ is defined under the core category of *orbital motion*. As at the *Figure 5* indicated the core category is defined by the categories derived from the field study of research which are denoted as *protecting* and *accumulating*. These two categories are derived to explain the nature of the dominant behaviours of the regional automotive industry actors from the application of the predetermined framework categories trust, collaboration, and coordination cycle (TCC cycle). The framework of TCC cycle is employed to analyse the structure of regional automotive value chain and emerging mobility ecosystem to

¹¹ The term domestic OEMs describes domestic automotive assembly plants which are operating under the licence of global multinational automotive companies. Unless otherwise stated in the thesis, the terms OEM and main industry are used to describe facilities producing under the license of global automotive companies in Turkey.

understand beyond-business relations among the actors. The interactions among the actors, their behaviours and experiences are analysed from the framework of TCC cycle which enables to focus on the processes and meanings comparatively. Each component of TCC cycle which are trust, collaboration and coordination are used to explore the features of transition process through comparing the current situation and emerging ecosystem. However, the cycle also signifies a holistic approach in terms of understanding the process and meaning of the two system. The differentiation of the dominant and emerging systems enables us to explore the transition process both in terms of the whole system and their parts. Automotive industry is traditionally organized around the finished vehicle manufacturers that are called as Original Equipment Manufacturers (OEMs). The concept of orbital motion is derived from the hierarchical structure of automotive industry around the OEMs. The automotive assembly plants of the well-known vehicle brands at the peripheral economies are also called OEMs and the mode of production of these assembly plants is mirrored the hierarchical supply chain model at their place of manufacturing. However, the decision-making processes of the local plants are bounded with the strategies of headquarters especially on innovation. Dependence on foreign partners or headquarters is not limited with innovation activities, high value added branches of value chain such as design and marketing are also conducted outside the borders of host countries (Abylkassymova et al., 2011, p. 2). The term of *dependency* is a significant and one of the primary parameters that defines both the automotive supply chain and builds boundaries around the development opportunities. The dependency occurs in a couple of ways and stressed in an annoying recurrence at the interviews, workshops, reports, and strategies on the automotive industry in Turkey. It generally emphasises a primary restriction on the development of automotive industry but on the other hand the emergence of automotive industry in Turkey has been built on these dependencies. The contradictory nature of the OEMs central position in the traditional automotive value chain has become permeated to the interviews and workshops with a strong emphasize on dependency in different forms. The foreign assembly industry, which creates the conditions for the existence of a regional automotive industry agglomeration in Turkey has also constructed an obstacle to the progress of the automotive industry. Let it not be misunderstood, the contradictory relation of the value chain actors with domestic automotive assembly plants (domestic OEMs) may analogically associated with *the father-complex* which is a specific aspect of Freud's theoretical approach. Freud discusses contradictory feelings of savages and neurotics against the father figure which have some resembling

features for *hub and spoke* type of organization of the automotive value chain at the passage below.

The model upon which paranoiacs base their delusions of persecution is the relation of a child to his father. A son's picture of his father is habitually clothed with excessive powers of this kind, and it is found that distrust of the father is intimately linked with admiration for him. When a paranoiac turns the figure of one of his associates into a 'persecutor', he is raising him to the rank of a father: he is putting him into a position in which he can blame him for all his misfortunes. Thus this second analogy between savages and neurotics gives us a glimpse of the truth that much of a savage's attitude to his ruler is derived from a child's infantile attitude to his father (Sigmund Freud, 2004, p. 58).

The attributed excessive power to the OEMs which is associated with their ability to create demand is overwhelmingly repeated as a threshold in front of the value-added production. The inability to create advanced systems is directly reflected to local OEMs and their dependency to the central management structure of multi-national companies (MNCs). In that sense, OEMs have become a scapegoat in front of the advanced automotive component and system manufacturing. The dichotomy of distrust and admiration feelings against the OEMs has dominated mind sets of regional automotive value chain and hinders the possibility of any collaborative action to overcome the low value-added fortune of Turkish automotive industry. On the one hand, an attitude that judge and criticize the abstinence of local OEMs from upcoming automotive technologies magnifies OEM related problems at the value chain. Blaming local OEMs as the sole inhibitory actor in front of the industrial upgrading is a reflection of excessive power attribution to the local automotive assembly industry. If we had the opportunity to ask Kant to interpret this behaviour, his description would be "childish". The dependency of local OEMs to the headquarters abroad is used as an excuse for the inability to transform the automotive production base according to the high value-added segments. The vicious circle created by this idea between demand and high technology production inevitably leads to a deadlock.

Let us follow the traces of the dependency parameter, which is a structural feature of the regional automotive value chain, through the data we obtain from the field. The passage below provides a general overview on dependency of the automotive industry in Turkey from the perspective of a high-tech mobility industry entrepreneur which was codified as I11.¹²

Yes, we are here, so somebody uses us, so in automotive, we say come, use us, so it is, I have cheap labour, I don't have environmental awareness, I have cheap land, here is ecosystem, air

¹² The interview took place when VW announced an assembly plant investment to Turkey which will produce conventional cars with internal combustion engines. It was expected that VW will invest between 1.3 and 2.0 billion euros to the assembly plant which will create about 5,000 jobs. However, the investment decision of VW has been postponed several times (Mihalascu, 2020).

pollution is not as much of a problem, we do, now we even *roll over ten times to convince* Volkswagen to come here, because they will establish a production facility *in here*, Volkswagen will not bring R&D here, it will bring production...

It was one of the direct and toughest comments on the dependency of Turkish automotive sector to the actions of the global players. The comment does not leave any range of motion for the national and regional industrial active policy options apart from the tax cuts and incentives. According to this view, Turkey is a dependent variable for global automotive industry, and she does not have any option or policy alternative to change its position at the global value chain. Producing simple parts and components at the cheapest possible price for the local and global assembly lines seems the destiny of Turkish automotive supply industry until the extinction of conventional vehicles. We have to state that there are many supporters of this extreme view. But those who advocate this view are not as pessimistic as they seem. They think that a transformation strategy should be developed to increase the added value in production beyond the short-term employment and export targets in a rapidly transforming industry. It would be appropriate to share another comment that supports this upper-scale perspective, which we can define as national commitment to the global production system. I16 is a reputable government official who has developed an expertise on automotive industry for several years.

[...] it has been attributed a role to Turkey in this global automotive industry, I call it as *winter garden*, the problem is about business approach originated, they [automotive supply companies in Turkey] have developed certain capacities into their company, or much less developed or underdeveloped, because they did not need it (I16)...

I16 provided another supportive view that stressed national commitment to the global production system of Turkey. The term “winter garden” is particularly thought-provoking to define the position of the Turkish automotive supplier industry. The term denoted the privileged safe positioning of the automotive supplier industry which is granted and secured through long term contracts by the global players. However, by staying in this safe area bestowed on them, they are actually jeopardizing both their business positions and the industrial survivability of the region and country in the medium and long term within the global automotive supply chain. The analogy “winter garden” also indicates the vulnerability of the automotive industry’s current position. This analogy becomes even stronger when we think of upcoming disruptive technologies that will drive the transformation of global automotive industry. Visualising a group of people celebrating the success of the day in the winter garden made of glass in the upcoming storm creates a feeling of restlessness and knowing that the destiny of a larger community is strongly dependent upon these people may

provoke a deep panic attack. Meanwhile, recognising the neighbours trying to get ready for the incoming storm enthusiastically triggers a feeling of helplessness at home.

The category has been derived from the analysis on the nature of TCC cycle in BISK automotive agglomeration. Although the dominant characteristics of the inter-institutional relationships will be analysed in the next section, the conditions of TCC have provided invaluable feedback about the dominant value creation system in the automotive industry. The relationship of trust has been emerged into a closed loop of supply chain system between customer and supplier. The dominance of the customer in such a relationship occurs in a system where the power to maintain or end the relationship works unilaterally. In most cases the customer tends to use the power of demand excessively. In this context, the balance between trust and power tends to be continually disrupted by a relationship of dependency, often driven by power.

The collaboration under the system of orbital motion is likely to be occurred between the actors of supply chain. The relations of collaboration only occur with mature suppliers who have an ability of design. The co-designing process has been proudly announced as a collaborative capability for the suppliers. The design capability of the supplier enables them to make small interventions to the product in terms of weight reduction and quality.

In the automotive industry, vehicle manufacturers have a historically established coordination power under the framework of customer and supplier relationships. The mechanism of coordination in order to maintain the value creation process along the supply chain has been coordinated by the OEMs. Business associations have also played an important role in coordinating the relationship between the industry and the government.

3.5.2 Emerging Mobility Ecosystem

It is apparent that automotive industry is at the edge of disruptive changes. In order not to mention each of the transformative winds in the automotive industry again and again, these changes are stocked under the term of quadruple transformation. These transformational changes have created as well as threats and opportunities for the actors of automotive industry. Automotive industry in Turkey has been agglomerated in the BISK region and has created an established inter-organizational complex system in order to maintain the value

creation process along the supply chain and supportive areas. The quadruple transformation in automotive industry has diverse effects on both the automotive supply chain and the transportation industry as a whole. The focus of the dissertation is the effects of these transformation on the relationships among the actors of BISK automotive cluster. In that sense, the changing patterns of trust, collaboration and coordination has been analysed throughout the research process. The behaviours of organizations operating within the automotive cluster against the transformative change has been defined under the category of sprawl. The term sprawl is derived from the data to explain the functional expansion of the organizations within the automotive cluster. Although the majority of the organizations do not have any strategy, bridging and venturing are defined as the dual strategy of some actors to confront the upcoming transition in the automotive industry. Those who ignore this transformation, and its possible devastating effects continue to work to raise their efficiency in their traditional markets. The data enables us to consolidate the response of limited number of actors to the mobility turn that are mainly gathered under the strategies of bridging and venturing. The Figure 6 shows the institutional response of the actors of the automotive cluster to the quadruple transformation in terms of the dynamics of trust, collaboration, and coordination.

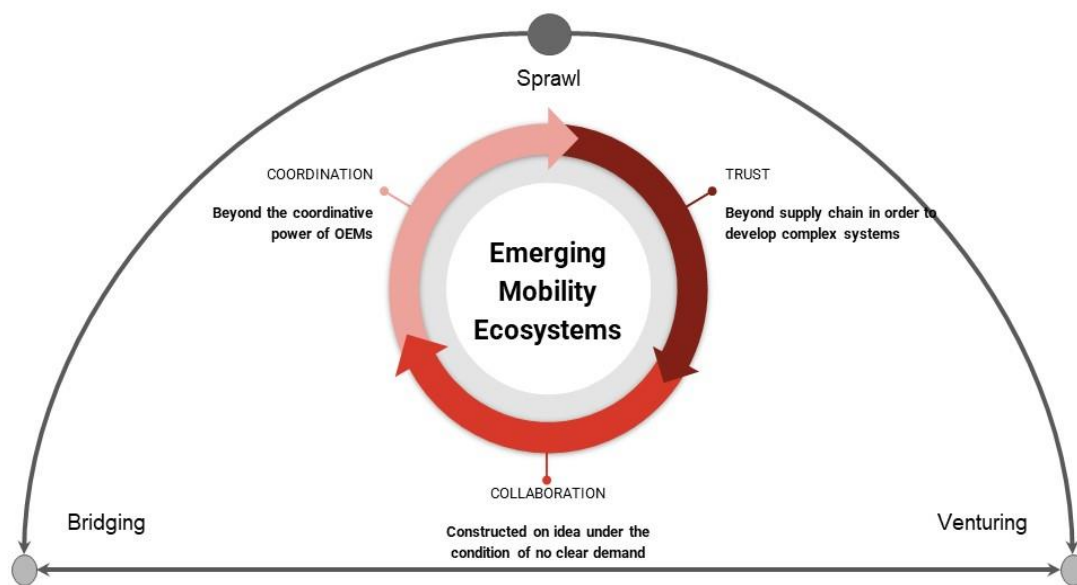


Figure 6 - The Emerging Mobility Ecosystem in the BISK Automotive Cluster

It would be appropriate to start with an example that summarizes the general approach of those who underestimate the possible effects of transformation to the subject. When an OEM

representative I interviewed told me that traditional parts such as seats, body parts and interior trim would continue to be produced, I reminded her/him the anticipations of some commentators that the share of these parts in the total value of the car would decrease.

It is also speculation, these parts will continue too, as a result, the seat is the seat. Can there be a house without an armchair? That is, if the whole house is automated, it does not mean that there is no seat, so there will be seats and it will still maintain its value, there is no such problem now... But new areas will enter, it is a bit exaggerated by some people, I am a bit old-fashioned, that is, I cannot fully understand the issue that the connected vehicle will constitute 60% of the vehicle. So, at the end automobile is a mobility vehicle [...] (I12, Location 56)

The majority of institutions within the BISK automotive cluster have an understanding to deal with the transformational change by increasing efficiency in current production processes, either out of denial or despair. The technological level of current production in the automotive supply industry seems far from being able to produce the value-added systems needed by the mobility ecosystem. Suppliers, who cannot find a development area other than material quality, features, and cost, are trying to maintain their competitiveness by achieving economies of scale. At this point, digital transformation is at the top of the possible breakthroughs that will increase their efficiency. Those who are optimistic about the effects of quadruple transformation are relieving themselves by stating that “if I can't sell it to Germany, I'll sell it to Africa (I13).”

3.5.2.1 Functional Sprawl of the Supporting Institutions

There are also a few institutions that try to develop different strategies against the possible effects of transformation. Although automotive suppliers are determined as the focus group of the dissertation, the functional sprawl category which has been constituted from the bridging and venturing strategies is also relevant to the supporting institutions such as business institutions, universities, and government authorities. Starting from the periphery, it will be useful to reveal how these institutions manage their own corporate transformation processes in order to facilitate the transition to the mobility ecosystem. Both bridging and venturing strategies are evident at the corporate level in business associations, universities, and public authorities especially regional development agencies in the form of flashing activities beyond their traditional missions. Representing the automotive supply industry organizations in particular, Automotive Suppliers Association of Turkey (TAYSAD) is working intensively to increase the productivity of its companies on one hand, on the other hand, it makes a serious effort to ensure that its members do not fall behind the

transformation. TAYSAD contacts groups that it has not interacted with before, within the scope of the bridging strategy, and is even preparing to accept companies operating in the industrial automation and software sector as a member with an internal regulation arrangement. Starting from 2016, TAYSAD has carried out a series of workshops, meetings, and reports on the possible effects of future automotive technologies on the supplier industry within the framework of financial and technical support of the development agency. These studies were the product of a mindset that transcended TAYSAD's mission that pushed their members to reflect on the dynamics of transformation. The functional sprawl of TAYSAD has been supported by some of the pioneers from supplier industry representatives, public authorities, and universities. TAYSAD in collaboration with a number of institutions applied to Instrument for Pre-accession Assistance (IPA) which covers financial and technical support for the “enlargement countries.” The aim of the project was to establish a decentralised research and application infrastructure on the mobility technologies. AutoCUP was designed to upgrade Turkish automotive value chain according to the emerging technologies through strengthening collaboration among the agents of ecosystem. One of the main purposes of the operation was to transform the existing research infrastructure of the 5 universities/research institutions to common use facilities around the advanced vehicle technologies (AVT). In that sense, a smart specialization strategy was planned to be implemented with a unique way of creating a government-backed, competitive, research-driven, and future oriented eco-system. Unfortunately, the project proposal has been disqualified at the final stage of the grant process. In collaboration with the same institutions, TAYSAD made another application to the IPA programme and after one year of project maturity process the project was also removed from the list. This struggle carried out by TAYSAD for the technologies of the future with the participation of many regional actors constitutes a good example of the venturing strategies of supporting institutions.

Another example for the functional sprawl of the supporting institutions is Okan University. The university has been trying to specialize on the autonomous and electric car technologies consciously. Pioneering clustering process in the fields of electric and hybrid vehicles and smart vehicles with the support of the development agency, Okan University has established an important infrastructure in the field of advanced vehicle technologies, especially with the Open Innovation Autonomous and Connected Vehicle Development Test Platform Project. Technical infrastructure, close relationships with ecosystem actors and breakthroughs in automotive sector strategy development have enabled the university to participate in many

research projects. They have been organizing meetings and workshops to develop transformational change strategies for the automotive industry. The issue of strategy development is an important manifesto which is used as a way of achieving a central position in the future mobility ecosystem. Although the automotive supply industry seems to be at the centre of the emerging mobility ecosystem, an association that approaches the subject from the energy side pioneers sector strategy development studies in the field of electro mobility. This situation strengthens the belief that a new interdisciplinary field of the electromobility ecosystem will begin to emerge. An association representative I interviewed expresses her/his discomfort about trying to build the mobility ecosystem solely based on automobiles.

When you say mobility, the automotive sector comes to your mind, that is, transportation, train, ship, aviation, whatever they are all under the concept of mobility, but the subject of e-mobility is not only a vehicle, but also a transition to a green economy. The common context of the renewable energy sources and the automotive essentially, why because we know right now the world has a serious problem with climate change and the new green economy is something that was born from here, renewable energy sources, solar energy, photovoltaic, wind power plants were born out of this need, that is, converting energy production from fossil fuels to natural resources as much as possible, in fact, this is the core of the business, and this is exactly the goal in the mobility part, so we want to turn fossil fuel-using vehicles into electric vehicles [...]. There is a point, the source of the produced electricity is important because if you generate the electricity consumed by electric vehicles from fossil-based fuels, this business has not actually achieved its purpose, that is, you are using the same electricity as a result, but you have used fossil fuel with that electricity, so it does not help a climate change, even research shows that you will see it in your work, It can even add a reverse momentum, that is, it can even get worse (I17).

Finally, as an example of the sprawl strategies of the supporting institutions, we can give an example of the diversification of government support mechanisms in a way that supports the transition from the productivity economy to the innovation economy. Presidency of the Republic of Turkey Investment Office has organised a series of workshops to determine innovative and disruptive technologies in automotive industry in Turkey and USA in 2019. The last workshop of the last series was held in Istanbul under the title of "Identifying Priority Actions to Improve the Mobility Sector". Such strategy development workshops provide significant benefits in developing cooperation between institutions and ensuring a common vision for the future. Another workshop series were held in the maturation process of the AutoCUP project, which was designed under the leadership of the East Marmara Development Agency with the participation of 10 other non-profit organizations, in order to identify innovative technologies in automotive and put forward a supply industry-based transformation strategy. In 2016 within the scope of the guided financial support mechanism of the East Marmara Development Agency (MARKA), Automotive Supply Industry

Specialized Organize Industrial Zone (TOSB) established a "Vehicle and Parts Endurance, Life and Performance Test Laboratory". The transition from the automotive test centre, which is an infrastructure that supports the efficiency economy to the AutoCUP project designed to support the technologies of the future, constitutes important evidence that the supporting organizations carry out various activities beyond their traditional scope for the adaptation of developing technologies. Efforts to invest in technology infrastructures whose demand conditions have not yet matured by the public institutions can be handled within the framework of the venturing strategy.

3.5.2.1 Functional Sprawl of the Automotive Supply Chain Actors

There are significant obstacles for the supply industry companies in the BISK automotive cluster to reach the upper levels of the value chain by doing R&D in an area where demand conditions are not mature enough within the regional ecosystem. The major reason for this is that the automotive part manufacturing facilities are serving as the manufacturing plant of global brands focus on quality and management rather than innovation and R&D. Global automotive main and supply industry companies generally carry out their R&D studies in central countries. R&D centres in the peripheral countries generally focus on efficiency within the framework of manufacturing and material technologies. For this reason, groundbreaking innovations often take place in core countries. The domestic Turkish automotive supply industry maintains to increase its exports continuously by improving its competitiveness through conducting constant improvement processes. Although the Turkish supplier industry does not operate at the higher segments of the value chain, the industry has continuously improved its engineering and R&D experience especially for the last two decades. The industry is still able to be competitive in terms of speed, flexibility, quality, and price in the segment of conventional and low value-added products.

The assumption that the automotive supplier industry will gradually switch from simple part to the complex systems production has been largely confirmed invalid in terms of historical development of automotive industry in Turkey. Although the amount and variety of automotive parts produced by the sector has increased, the automotive supply industry in Turkey has not been able to have a say in the production of value-added parts and systems. The assumption that the automotive supplier industry can jump into more value-added areas

with pre-competitive cooperation is too irrational to be emphasized. A large part of the automotive supplier industry in Turkey operates in an area based on material shaping. Therefore, the know-how of many companies operating in the sector is limited to the ability to understand and process the material well. In that sense, it is not possible to form a team from 11 goalkeepers to play the championship, in a game where there is only one goal post. An equation with a single goal post and 11 goalkeepers creates hurtful competition, not collaboration.

Bridging and venturing that have resulted to a functional sprawl are two main strategies for the automotive agglomeration. It is observed that these emerging communication patterns develop, albeit slowly, in an industry traditionally founded on the behavioural structure of orbital motion. First, bridging refers to an action that aims to build communication channels with the extra-supply -chain actors. As mentioned earlier, the interaction along the supply chain mainly occurs around the relations of production. In that sense, the parties in that type of relationship are operating within the realm of buyer-seller dichotomy. On the other hand, all actors who want to take part in an emerging mobility ecosystem have to step out of this dichotomy and build a sustainable relationship with those who represent different value-creation system. In a regional agglomeration dominated by short-termism which stuck in the buyer-seller duality, it is not easy to form interinstitutional interactions outside the supply chain. Bridging is a phishing strategy. In order for this strategy to work, an ever-expanding regular interaction environment must be formed.

The companies are trying to establish bridges between present and future that is to say with their current positions and the possible future market segments. The first step to make a comparative analysis between current production of the company and the upcoming technologies. Reflecting on the transformations in the automotive ecosystem is the first step towards estimating the firm's future position. At a stage where the possible effects of the transformation begin to disturb the firm and the feeling of missing the opportunity sprouts, the firm begins to think about its future options. At the intellectual level, bridges between the present and the future are starting to be built at this point. I3 is a representative of such a firm indicated “we are trying to get ourselves used to this change. At least what different technologies are there, what can we do about it, when we start this transformation in our own production processes and how can we change our direction without missing the train in a strategy plan.”

Aforementioned, bottom-up strategy development projects under the leadership of associations, universities and public institutions are one of the most important tools that enable companies to understand the transformation processes. A significant part of these strategies has been led by the actors who have no power to carry out actions within the framework of the targets set forth. In order to ensure the applicability of the strategy, legislators, implementers, and facilitators should carry out projected studies together after the strategy was designed in a collaborative manner. In this respect, collaborative strategy development processes, which are built from the bottom up within the framework of participation strategies, constitutes a base for both companies and central government institutions who have the power to implement the transition strategy.

The bridging strategy has created new types of communication dynamics that go beyond the boundaries of the industry. It is observed that the relations of trust, collaboration, and coordination, which are generally formed on the basis of the customer-supplier relationship on the supply chain, are tried to be rebuilt with new actors at different levels. Advanced technology companies are the new actors that are involved into the traditional network of the automotive industry. Government institutions, associations, universities, and intermediary institutions are trying to design a number of events in order to foster networking activities between the traditional automotive industry players and the newcomers. An automotive supplier industry representative expresses the role of TAYSAD and TOSB in bridging functions between the automotive suppliers and technology companies (I13).

It is necessary to reveal the differences of the two languages or the technological fields, certain accelerators or catalysts try to bring them together, in fact, this is exactly what TAYSAD and TOSB is doing right now... It represents a group that cannot reach everywhere, and in that sense, it offers them the threats or opportunities that may arise as a service to them again with the logic that unity comes from power. I think it is very costly and long for them to go and meet that [mobility] ecosystem one by one and rediscover the world, that is, we waste our resources, whereas in such a management model, what will these accelerators, new actors, some platforms do, with much less effort, much faster companies will learn from each other.

Another strategy that constitutes the sprawl category is venturing. The term venture is used in its vocabulary definition “to risk going somewhere or doing something that might be dangerous or unpleasant (*Cambridge Dictionary*, 2021a).” There is a hierarchical link and a gradual transition between bridging and venturing strategies. In other words, in the bridging strategy, establishing new connections and obtaining information about the future of the industry without risk is the primary concern. On the other hand, as the name suggests,

institutions that have entered the venturing stage take various initiatives by taking financial and intangible risks.

After all, the structures within TOSB regarding autonomous vehicles, the establishment of an innovation centre, help to increase this awareness, [...] maybe it is not just the return of the existing automotive supplier industry. Do we actually add new sub-industries, I mean new sub-industries, can we add new software companies, new hardware companies, and make room for those groups to sprout in the automotive industry? (I13)

The venturing strategy is not peculiar to the companies who are seeking for profit in exchange with a certain amount of risk. The infrastructures that will contribute to the transformation of the automotive industry, such as the advanced technology laboratories established by universities, the autonomous vehicle test track and the innovation centre created by TOSB, constitute the field of this strategy carried out by non-profit organizations. Establishment of almost all of these infrastructures by benefiting from financial support programs reveals the interest shown by the public to the transformational change of the automotive industry as well. However, the fact that the companies that make up the BISK automotive cluster operate in less value-added areas in the global value chain, this kind of infrastructure is in danger of being idle. For this reason, it is of great importance that the automotive industry's strategy to build bridges between the traditional supply industry and technology companies supports the collaborative research and development of these infrastructures. These infrastructures also offer significant opportunities for the development of desired tangible university-industry collaborations. Of course, numerous networking events are organized to pave the way for all these parties to cooperate in advanced technology fields. Some of the parties who met each other and established a mutual trust relationship at these events started to establish cross-sectoral collaborations on a common strategy. Although there are some variations in the transformation strategies of the automotive supplier industry and main industry companies, collaboration with technology companies is at the forefront in all cases that turn their transformation motivations into applicable actions. At this point, there is a huge difference in dependency from the headquarters between the main industrial company that produces passenger cars for a global brand and the main industry companies that produce products such as trucks, buses, and tractors. In this context, it has been observed that the main industrial companies producing passenger cars work together with start-ups by using various methods in the digitization of their production processes, instead of product and system-based cooperation. For example, Toyota is a main industrial production facility that focuses on digitalization processes within the framework of the notion of leadership in production and has declared that it is open to cooperation with universities and start-ups in this field, at least

as an intention.¹³ Collaboration of the main automotive industry with start-ups and universities in order to transform the production processes are not distinguished as an adaptation action to the quadruple transformation. The digitalisation of the production process is the outcome of the efficiency target which belongs to the automotive agglomeration. In order to continue to compete in the low value-added product area, the digitalization investments made by companies are a necessity of the efficiency economy, not the innovation ecosystem. In this framework, as the academician working at one of the leading universities of the country stated in the interview, the thesis does not deal with digitalization in a holistic way, covering both the production processes and the product. Our main claim here is that the digitization of production processes is the subject of the efficiency economy, while the digitization of the product or service is related to the innovation economy. It is observed that bus and truck manufacturers with R&D independence, who can implement a venturing strategy, are collaborating with engineering companies and start-ups to transform their product. The platooning technology, which Ford Otosan applies by adapting the know-how of AVL on autonomous systems to be used in Ford Trucks vehicles, is an important example that can create a product-specific added value leap. Another important collaboration in this regard was realized between KARSAN and ADASTEK which is an academic start-up company in order to provide autonomous capabilities to buses of the company. Collaborations with engineering companies and start-ups within the scope of the venturing strategy have also started to develop among automotive supply industry companies.

First of all, it should be noted that there are few companies among the automotive supply industry that have acted in terms of taking advantage of the opportunities created by the quadruple transformation. However, despite their small number, these companies are attending and organizing many events as the leading companies in the transition to the mobility ecosystem. It is thought that these companies, which implement the venturing strategy in the automotive supply industry, that is, trying to produce products and services for the mobility ecosystem apart from the product group in which they operate, will set an example for other companies with their success stories. The main features of these companies

¹³ Although we have mentioned in different parts of the thesis, the different strategies implemented by global brands producing in Turkey in the context of trust, cooperation and coordination relations are outside the scope of this thesis. It has been observed that there are serious operational and structural differences between the main industry companies with different cultures in terms of their relations with their suppliers and other ecosystem actors. However, an analysis has not been made based on these qualitative differences among the main industrial companies producing in our country.

are that they cooperate with start-ups in order to enter high value-added product markets apart from their existing product ranges. They have been simultaneously maintaining their production process while providing tangible and intangible sources to the venturing activities. The venturing strategy, which emerged as a result of the cross relations established between start-ups and the automotive industry, is realized by building concrete collaborations within the framework of a certain product or service category. The collaboration in the field of electric vehicle components between ECOPLAS and Eatron Technologies, a start-up working on autonomous technologies, is one example of this strategy. Another example in this area is that an automotive supply industry company named MND Isolation established its R&D centre in a structure that works in the field of advanced technologies, not in the current production area. The company responded to the quadruple transformation process with an unconventional strategy by acquiring a start-up company and placing its owner as the head of the R&D unit. As a result of my research, it would not be wrong to say that FARPLAS is the only representative of the automotive supply industry that looks at the most distinctive and quadruple transformation process within the framework of a holistic approach. The company pursues an aggressive venturing strategy to become the champion of transformation and the leader of the mobility ecosystem with the collaborations it has developed at different levels. The firm is looking for value-added areas in the mobility ecosystem of the future with its venture capital company, in-house incubation centre for mobility ecosystem entrepreneurs and activities for ecosystem development.

3.6: Conclusion

In this chapter, I tried to define roughly two different systems, one of which sprouted from the other and living in the same body, in their geographical and sectoral context. The chapter begins with a discussion on how these two systems, which are distinguished as the automotive industry and the mobility ecosystem at the relational level. While conducting this discussion, we tried to explain the reaction of companies and supporting organizations operating in the automotive value chain to the quadruple transformation with the concept of *sprawl*, starting from the factors that reveal the difference. In the following sections, the concepts revealed will be tried to be elaborated through the relations of trust, collaboration, and coordination.

CHAPTER 4

UNDERSTANDING INTER-INSTITUTIONAL RELATIONSHIPS IN TWO SYSTEMS

4.0: Introduction

Welcome to the most prolix, condensed, and pompous chapter of the thesis which covers an in-depth analysis of key research findings. The transforming nature of interactions based on trust, collaboration, and coordination among the institutions of the industry-specific regional innovation system constitutes the core of the chapter. In other words, the analytical framework of trust, collaboration and coordination is used to explore and compare the varying primary structure of inter-institutional relations in two systems. Within the scope of the chapter, trust, collaboration, and coordination relations for both systems will be discussed separately in three different sections.

4.1: Inter-institutional Trust in Two Systems

“Do you think there is an environment of trust at the regional automotive value chain?” This was the question of the second wave of interviews that saved the day.¹⁴ It was a humble “yes” or “no” question, but it has a power to illuminate the sharp difference between the perspective of automotive industry and emerging mobility ecosystem. I must state that first I was surprised by the contradictory answers I received during the research process. For instance,

¹⁴ The questions about trust in the first wave of interviews were more complicated and directly related with the personal experiences. Unable to get satisfactory answers to my first set of questions on trust relationships, in the second wave I decided to shift the question set from personal experience of the attendees to an upper level of understanding. This experience justified the constructivist grounded theory methodology's suggestion that when starting field studies, one should start with a very general question.

an OEM representative (I12) states that “We are good at it, we can say this, to such works or the business owners in us are really visionary people ...” (S)he is sure that there is a trust environment within the automotive ecosystem. The people involved in this ecosystem defined as “visionary” and in that sense having a vision was stated as one of the conditions of trust. Operating within a trust and collaboration environment is defined implicitly as an upper level of value creation activity. Choosing to operate within the automotive value chain is directly associated with farsightedness of the company owners and this attitude is defined within the realm of trust environment. Another supportive opinion about the ontology of trust environment came from an automotive supply company owner (I18) who had been senior manager in the different automotive OEMs for many years:

Of course, we do not have any problems, we have individual cases in automotive but there are no leaks [*financially*], no words are left behind, everyone trusts and goes to everyone, except for a few minor events, this is a great advantage, [*and saves*] our energy. For example, we do not think if we billed or if the money will come, or the man gave to me [*an order*], I do not think if I will be taken for a ride, we will go...

S(he) associated the trust environment with the existence of contractual relationships among the value chain of automotive industry. S(he) stated that there is a strong trust relationship between the parties to the contract. Contract is defined as a mechanism for control which could substitute and/or complement trust relations between the parties. However, some of the scholars denoted contracting as a measure of lack of trust which “typically reduce incentives for opportunistic behaviour of the trustee and provide some compensation for the trustor if trust is abused (Barrera et al., 2011, p. 208).” Contracts are also defined as a type of intermediary mechanism among the others such as letters of credit and technologies which validates trustworthiness (Murphy, 2006, p. 429). Both as an indicator of lack of trust and as an intermediary mechanism of trustworthiness, contracts are seen critical and controversial elements of trust in business relations. If we go back to our discussion, we can assert that some of the actors of automotive value chain consider long-term contracts as an element of trust in the automotive industry. These participants claim that the actors in the value chain have built a well-established strong relationship around the OEMs at the automotive industry. According to this particular view, the structure established by OEMs through long term contracts seems to ensure trust environment among the automotive value chain.

The trust and collaboration base of the relationships between OEMs and suppliers in B2B transactions has been managed by mainly through contractual regulations designed by the customers. It is evident that the trust, collaboration, and coordination environment are mainly

established among the actors of value chain hierarchically and orchestrated by OEMs and partially Tier1 suppliers which provide parts, equipment, and systems directly to OEMs. The hierarchical relationship has been knitted around OEMs that creates asymmetries among the independent parties and relations of trust structured around the power of OEMs. The power-trust equilibrium among the value chain is carefully managed by OEMs. Due to the fact that the corporate strategy or culture of the OEMs have also structured the relations of trust.

[...] whatever the culture of the main industry is, it is spread across all departments, its communication with the supplier is *[managed]* within this framework, some are very positive at work, some are always built on tension, it is obvious that the ones built on tension cause trouble in the long term, [...] these are the *[business]* approaches that must come from the top ... (I20)

In an environment where the main industry's business culture is so dominant, we can easily claim that trust, collaboration, and coordination relationships within the automotive value chain are created and managed by OEMs that are functioned at the top of the hierarchical structure. The number of local OEM plants operating in Turkey is 15 and it can be clustered into three groups in terms their origin: USA; Europe and Far East. In terms of management structure Toyota has a unique position within automotive industry in Turkey. The owner of an automotive part supplier and former Toyota white-collar employee (I20) clearly indicates the distinctive characteristics between Toyota and other OEMs while establishing business relations among the value chain.

Toyota sees its supplier as a partner and sees it as a long-term partner and actually sees it as a little brother, sometimes sees it as a child. Toyota suppliers in Japan (in some projects even in Turkey) the price is not spoken, "began to work" they say, it is an impossible thing for the European and the American OEMs, because there is a relationship of trust on the other side *[Toyota]* and everything is transparent [...]

As indicated I20 a fair relationship between customer and supplier needs to be constructed on trustworthiness of the parties. Although the strategy of Toyota on building long-lasting relations with its supply chain enables more room for the local suppliers, at the end, the value-added equipment and systems required to build the finished vehicle is generally imported or provided by Tier1 suppliers which are directly owned by the company and established around the main Toyota automotive plant in Turkey. The approach of Toyota regarding the organization of the automotive production chain has probably made a significant contribution to the brand in terms of profit margins. The figure below shows the five-year average net profit margin of the major car companies. The average net profit margin of the major companies is calculated 3,94 percent. However, the average net profit margin of Toyota for the last five years is much higher than the average profit margin of the industry.

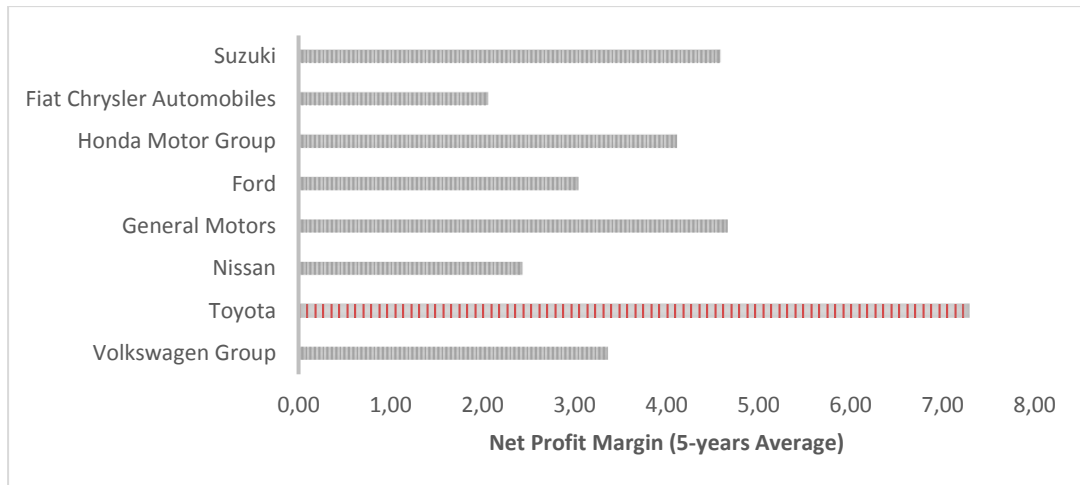


Figure 7 - Car companies' five-year average net profit margin (Statista, 2020)

The trust, collaboration and coordination relations constructed by OEM do not foster the local suppliers to explore new technologically advanced market segments within the automotive value chain. This issue is crucial for our analysis because it gives us an important clue on why the answers to the question of the existence of trust relationships at the regional automotive value chain are positioned in a contradictory way. Regardless of the balance between trust and power, the trust, collaboration, and coordination relations in the automotive industry are organized by the main industry. In that sense, from the point of the OEMs, if the suppliers can sustain the manufacturing process according to the pre-determined conditions, the supplier is labelled as trustworthy. On the other side, if the supplier gets the order according to the long-term contract and gets paid on time, the customer is realized as trustworthy. However, this type of trust among the actors of value chain does not create a regional mobility ecosystem that requires a new type of trust outside the realm of the conventional product-based commercial relations.

Some of the respondents gave negative answer to the main question of the trust section which was “do you think there is an environment of trust at the regional automotive value chain?” I think that the main element shaping the answers given about this question are assumptions regarding the subject and purpose of trust. The subject of the trust relations for the first group who gave positive answer to the existence of trust environment is apparently their business partners at the supply chain. The ground for trust was built on product and service provided to customers or procured by suppliers. On the other hand, we need a more abstract notion of

trust that enables the creation of a regional innovation ecosystem. It is subject is not limited with the value chain of a product or service. It is a feeling that need to be fulfilled by the general atmosphere of the value creation process and supportive activities that enables an innovative milieu. The creation of value is no longer subject to the concrete business interactions among the value chain. If we are talking about such an understanding of trust, it should not be surprising that the answer to the question asked about the existence of the trust environment is negative.

A respondent (I3) who is an owner of an automotive supplier company stated the bedevilment among the actors of industry as follows: “it seems there is trust, but it is always like that, I think you have to be careful, everyone should be careful to open something to some extent, to some extent, to keep it private and not to share that information or technology.” The fear of deception seems to prevent the flow of information among the actors and beside the sheltered area of supply chain, it is not possible to talk about a trust environment. The instinct of protecting information about the products, processes and networks of the company seems to be one of the most crucial factors that prevent the establishment of an environment of trust. I have heard a lot of anecdotes about the behaviour of actors in the sector to hide ordinary information about their economic activities. I8 is a talented networker and personal interface among the sectors of quadruple helix told a story about this behaviour of the company owners:

One company, I tell every time because I can't believe it, a rather young manager from the second generation, so his mother or father who created the company is more intellectual, I don't know for what he is sitting at the table, he produces something, I don't know what he produces, a hook or a hinge producing something, he did not even sit at the same table with us for the fear of stealing his data.

I16 is a government agent who has been specialized in the automotive industry described a very similar anecdote about knowledge sharing.

I'll give you an example, we are working together with companies in Izmir, so the firm with me, [...] whispers what (s)he's going to say to my ear on the same table so that other company representatives do not hear, which trust environment [are you talking about], it is one of Turkey's weak muscles.

This behaviour might be a manifestation of anxiety on losing their fragile competitiveness, in other words, the fear of losing everything s(he) and/or her parents have built up to now. The protection of tools and methods related to capital accumulation processes against the outside world emerges as the dominant behaviour of these enterprises growing under the wings of the main industry. It is quite natural that industrialists trying to survive in this system should focus on their relationships with their customers and suppliers while identifying regional trust

environment at the automotive industry. They have to be reliable in terms of quality and price to establish long term relationships with their customers. The only way to maintain their position within the value chain is to sustain accumulation to improve the quality of the product without increasing the cost. Constant renewal of their machinery and equipment infrastructure is the shortest way to improve the quality of their product. In that sense, these companies have generally demanded support from the government to finance investments on the renewal of their capital infrastructure.

The conventional automotive supply industry in Turkey is built upon the instinct of hiding their business activities from the eyes of others to sustain their competitiveness at the low level of value-added activities. This approach does not only prevent them to jump to the next level in the global value chain, but also creates a potential threat for their being and can be resulted to be pushed out of the market in the medium and long term. It might be asserted that the conditions of the automotive supplier industry in Turkey do not allow a serious attempt of transformation through showing an intrinsic attitude, motivation, or capability to establish an innovative mobility ecosystem based on trust. In that sense, the respondents who asserts that there was no trust environment at the automotive industry based their perspectives according to their observations on the attitudes of business owners regarding information sharing at the sectoral meetings and events apart from the routine business relations.

So far, we have tried to construct an understanding on the distinction between the trust relations at the traditional automotive supplier industry and the required trust base by the mobility ecosystem. Now we need to define this distinction we have made within the context of trust relations in a more concrete way. The variances in the perception of trust relationships between these two systems in the light of the information we have obtained from the field are presented in the table below.

Table 11 - Trust Base of the Two Systems

	Automotive Industry	Mobility Ecosystem
Context	Procurement Process	Supra-industrial Relations
Conditions	Cost; Quality; Capability; Punctuality	Openness; Credibility
Objectives	Competitiveness	Entrepreneurial Discovery
Actors	Supply chain	Ecosystem
Expected Outcomes	Product	Solution
Impact	Growth	Sustainability

Trust relationships built within the framework of both systems have different characters. The base of trust relations is fundamentally distinct from each other for automotive industry and mobility ecosystem in terms of context, conditions, objectives, actors, expected outputs and impact. Of course, while we show the differences between these two systems on the basis of trust relations so clearly, we do not claim that there is no transition between systems. In this context, many of the differences we have revealed intend to explore how the relationships based on trust differ at two extremes. It is worth noting that in many cases these two systems exist at the same time, and the level of transiency between the systems determines the pace of the transition. Defining the differences between the two systems is imperative in determining the areas of intervention for policies designed with the desire to manage change. Now, we can begin to examine the properties of these two systems in the context of trust relations under five different headings.

4.1.1. The Context of Trust Relations

The first and most fundamental difference about the relations of trust between two systems can be observed by analysing where these relationships take place. In this sense, understanding the context within the framework of trust relationships contains important evidence about the nature of the relationship among the actors of an industry. Before we begin examining the context of trust relationships, we need to clarify what we understand from the concept of *context*. In the most general sense, the term context is used to describe “the set of circumstances that frames an event or an object (Bazire & Brézillon, 2005, p. 29).” Based on this definition, what we need to do to understand trust relationships is to focus on where the incident happened. We can start by trying to answer to the question, what situations, events or objects respondents associate their trust relationship with.

Trying to understand the context in which questions about trust are perceived by the respondents can provide a leverage point to identify key points of divergence between the two systems that we are trying to describe. The relations of trust are generally defined from the perspective of procurement process by the respondents that have an established position within the automotive industry. I3, I16, I18 and I20 interpreted the trust relations between the main industry and the supply industry in terms of purchasing relationship but they have arrived at different conclusions. Defining the relationship between the main industry and the supply industry within the framework of purchasing processes naturally emphasises the importance of power rather than trust relations. In that sense, the respondents who have a more powerful position at the procurement process do not see any problem of trustworthiness between the parties. However, even under the conditions of imbalanced power relations, suppliers might try to protect their production process even from the representatives of OEM. Owner of an automotive supplier company (I18) stated that “we hide non-existent” referring to the automotive supplier industry in Turkey. (S)he tells the story behind this proposition as follows:

For example, I was at TOYOTA at that time, there was a company doing a pattern job, our friends had a problem, they will go there, the man said that I do not show the process. However, this is the rule at TOYOTA [*we must see the process*]. He doesn't show it, he's doing it in a tent or something, so it's such a simple thing that the man is afraid to show, if you're hiding something, it's either not there, or it's a very simple thing. For example, how do we know, let's say you are a visitor to TOYOTA, go to Japan, the best factory of TOYOTA, they have built a ladder above the factory, let you walk, if you look and understand it, what is the man doing, it makes no sense, [*there is no*] such a thing you can understand the process, solve it, understand the spirit, understand technology, there is no such thing [...]

Hiding the information about the production process is even occurred between supplier and OEM during the production process. This information retention phenomenon expands to include not only the production processes but also the produced product when procurement relationships are left out. In that sense, another interesting point in terms of contextual perception of trust relations arises from the stakeholders who are exogenous to procurement process. These people tend to read the relationships of trust in the automotive sector through the attitude of the representatives of automotive suppliers at various meetings. By observing trust relationships in a context outside of the purchasing process, they have constructed a negative judgment about the nature of these relationships. In other words, when the trust relationship established between unequal parties in the purchasing process goes beyond the framework of direct business relations, the base of trust has been sacrificed for the sake of protecting the products and production processes.

So far, we have defined two distinct contexts that the relations of trust occurred between and among the actors of automotive industry. The procurement process is the first context that we defined between suppliers and OEMs where the trust relations have occurred unevenly. Stating that trust relationships can also be defined outside of purchasing processes, we defined a second and much broader context. Inspired by the concept of *supra-national* used in the international relations literature, the term *supra-industrial* will be used to define the context of network-based relations in which trust is built and became widespread in the mobility ecosystem. Unlike the automotive industry, where trust relationships are defined in terms of price, payment, quality, and punctuality within the scope of purchasing processes, the context of trust relationships in the mobility ecosystem is defined in a much wider but blurred area. The term “x” has been coined to describe the area where trust relationships emerge, form and mature in the context of the mobility ecosystem. One of the most difficult issues to be overcome in the transition from the automotive sector to the mobility ecosystem is to adapt to a multi-layered ambiguous area of mutual communication where occurs beyond the strictly defined relationships. This new situation has provided evidence about the necessity of developing a new mental and cognitive understanding beyond the technical dimension to the industrial transformation. One of the most important features that will determine the adaptation to this new system is the ability to deal with ambiguity which requires a comprehensive industrial transformation plan at the supra-industrial level.

At the context of supra-industrial level, system improvement problem has become a complex one to solve with conventional decision-making approaches. As we have mentioned before, there is no single solution that offers a guarantee of success for complex problems. An engineer living abroad for nearly half a century shared the opinions of his wife who is a kindergarten teacher on the pre-school education in Turkey.

In kindergartens, children are raised in a very template-like manner [*in Turkey*], that is, the child is given a picture of an animal, that child stays within the boundaries of that animal picture and paints inside of the animal picture, [...] the children’s creative abilities were not supported much (I19).

The radical change of the trust context from the sectoral to the supra-industrial realm has pushed the manufacturers, start-ups, academics, and the other related parties of the emerging ecosystem to an ambiguous and complex environment of value creation. The creativity begins at the stage where the actors are trying to figure out to construct their purposeful interactions. In this regard, developing a strategy to overcome the challenge of finding appropriate

collaborators to improve their position within the emerging ecosystem has a vital stage for the supra-industrial agents. Of course, it is unlikely that this issue can be solved only on local level. It requires continuous and conscious sustainable interventions in a wide range of policy areas starting from education policies to industrial policies. The shifting context of trust base from a restricted interaction area of purchasing process to an open supra-industrial space has been transforming the characteristics of trust relations radically. In the following section, I would like to analyse the changing appearances of the trust-based relations in terms of their conditions, objectives, actors, expected outputs and impact.

4.1.2. The Conditions of Trust

John Maynard Keynes has carefully analysed the quantity theory of money which claims the general price level of goods and services is strongly bounded to the money supply and the monetary expansion does not have any effect on the level of consumption in the long run. He stated that the long run is an inadequate guide to understand the current public behaviour and expressed his famous aphorism: “In the long run, we are all dead (John Maynard Keynes, 1923, p. 80).” However, building a trustworthy environment both for business and current affairs of citizens takes too much time for a society. It is constructed and sustained by many tiny steps over time. A trustworthy business ecosystem provides an insurance function for the actors in their relations and reduces the amount of time required for building trust-based relations. In this section, I am going to examine the conditions that make up trust within the scope of the two systems I have defined previously.

The transition from automotive industry to the mobility ecosystem is not just a technological issue and it requires a mental transformation rather than an industrial upgrading. The necessity of mental transformation is not just related with the industry, it has to cover and influence the whole ecosystem actors. One of the areas where the transformation of the mindset might be visible and can be observed is the shift in the conditions of trust. As far as I can trace from the interviews, one of the areas where the difference between these two systems that I have been trying to define has been most clearly revealed at the conditions of trust relations. The issue of trust has been interpreted by some of the interview participants in terms of cost, quality, capability, and punctuality. They have been used these terms while they are defining the current trade between the suppliers and OEMs. On the other hand, the conditions

of trust have been described by some of the interview participants as openness and credibility. The second group has been defined the trust relations within a broader context which cannot be confined into the procurement process between suppliers and OEMs.

4.1.2.1: The Conditions of Trust in Automotive Industry

In the previous section I have concluded that the trust relations in the automotive industry have generally been formed and maintained within the context of procurement process. In that sense, the conditions of trust have been determined by the bargaining process between two sides and the conditions of bargaining have also become the conditions of trust. The negotiation between the suppliers and OEMs are mainly focused on cost and quality of the product, capability, and punctuality of the supplier side. I am going to analyse these elements of negotiation as the conditions of mutual trust.

As in all bargaining processes, cost or price of the target product constitutes the main subject of communication between the parties and the issue of price has often contained a potential node of conflict.

[...] the relationship between OEM and supplier is like those who are pulling from both ends of a rope. In terms of OEM there is an approach that can be defined as ‘the more I push, the more profit I get.’ In such cases, both parties protect themselves and a very different level of relationship emerges. (I20)

Trust is built on the expectation that the potential actions of the other party will behave faithfully not opportunistically. When people believe that the decisions or actions of the other party will not harm them, they might take a step towards establishing a relationship of trust (Gulati, 1995, p. 92). However, the negotiations on the cost of the product or service might harm the supplier side if the cost has become the main criteria in a procurement process. The fact that the pressure exerted by the OEMs in the direction of price cuts might reach a level that threatens the existence of the counterparty is the most important factor that damages the trust relations between the parties. In an environment where there are enough suppliers that can offer the same product under similar conditions, it is usual that some suppliers to be thrown out of the market. The bankruptcy of some suppliers producing low value-added products and going out of the market will not have devastating consequences for the sector. At the last sentence of I20, (s)he is implicitly trying to emphasize something about the consequences of the pressure of the bargaining by stating that “both parties protect themselves

and a very different level of relationship emerges.” It is a known fact that the instinct to protect oneself from the other side harms the trust relations. If both sides take a step back and protect themselves, a new type of relationship between OEMs and suppliers has emerged outside of mutual trust. I20 defines this new type of behaviour as "very different level of relationship." This vague statement does not describe the underlying form of relationship. Let's go back to the data and trace this new type of relationship created by oppressive bargaining.

Now, the people we call the new generation Y, they don't perceive much from something. For them, this is 5 liras, and this is 5 liras, they see the same. You get 6 liras, if this is 5 liras, they go and get 5 liras. They also sign the contract, and the job is done for them. After that, quality control, planning, [they don't care] whatever problems the [other departments] may experience (I4).

I4 explicitly blames generation Y because of their cost-oriented purchasing policy. However, it is not a very fair approach to calumniate the Y generation and to evade the responsibility of the pressure on the price in intermediate goods procurement of OEMs. The efforts of the automotive main industry to increase the profitability rates may have increased the pressure on costs, especially in recent years. For instance, VW announced that they set a goal “to raise the annual pre-tax profit margin from the level of 5.6 percent to 10 percent by 2018 (Schmid & Grosche, 2008, p. 31)” in order to catch pre-tax profitability of Toyota which is around 9 percent. On the other hand, high production costs of parts in markets that do not rely on economies of scale such as bus, minibus and truck manufacturing may cause to increase the dose of bargaining. I am going to retrieve a long part from the interview with I3 to support my argument on the cost as a condition of trust.

If the producer does not appreciate his price, can be called as ‘Mahmutpaşa¹⁵ bargain’, if he is engaged in a struggle on the basis of price, in a very common sense, when he enters directly from the price, regardless of the actual value and quality of the product, this time the supplier on the other side [...] reacts or thoughts about the times he is facing, that is, if it the actual time spend is 100 hours, they report 200 hours of labour, if its material is 1 ton, it says 1.5 ton [...]. He says this is not that much, maybe then it turns into insincerity and a non-transparent business relationship. Why because he says he's not trying to buy the right item from me at the right price, he's trying to kill me. Then he goes to protect himself this time. He tries to protect himself with different calculation methods that he can keep within his own knowledge and experience and that the other party cannot understand, cannot determine.

The overemphasizing on price in a procurement process has negatively influenced the base of trust and has probably resulted with a zero-sum game. All those negotiations made, on the one hand, damage the trust relationship between the parties, on the other hand, possibly they

¹⁵ A historical bazaar in Istanbul specialised on cheap textile products.

do not change the cost of the procurement process radically. In case the price falls below the costs, the supplier also makes moves to increase the sales price per unit by cheating in different ways. This situation has caused the procurement process to be built on the ground of mistrust, where both sides deceive each other and the over-bargaining on price has created a vicious cycle which is hard to break.

The over-bargaining may also have resulted in sacrificing product quality under price pressure. This leads us to the non-hierarchical second condition of trust in the automotive industry which is the quality. The cost related with quality has two sides which are defined as cost of good quality and cost of bad quality. Maintaining the balance between cost and quality is crucial for any supply chain management process. Because of this, “management must understand these costs to create quality improvement strategies. An organisation’s main goal is to survive and maintain high quality goods or services, with a comprehensive understanding of the costs related to quality (Teli et al., 2014, p. 22).” In this context, it would be more correct to perceive quality as a function of cost. A constant requirement of quality improvement from the customer has pushed the companies to improve their production process constantly. The low price and high-quality expectation of OEMs have caused the industrial policies to be designed within the framework of these factors after 1980, when the export-oriented growth strategy was implemented. After that period, ensuring the price and quality at the international level formed the basis of the policies designed for the development of the sector (TÜBİTAK, 2014, p. 6). Currently, 72% of TAYSAD member companies have been conducting projects to improve quality and productivity and 60% of them have been focusing on flexibility and speed (*Ar-Ge’de Rekabet Öncesi İşbirliği Projesi*, 2017, p. 23).

It is a job that requires low price, high quality, high productivity, [...] yes, the level of technology of the product is important but productivity is more important, the industry has said it many times that if you are not able to be productive and if it is not cheap, "forget about it" (I10).

So, at the most fundamental level, customer expectation focuses on price and quality in the procurement process. The trust-related expectations have formed the relations within the procurement process. OEMs play a central role in questions about trust relationships. In this sense, it is very difficult to distinguish between power and trust relationships. In the traditional automotive industry, the balance between trust and power relations seems to have shifted to the power side over time. In the past, of course, these negotiations were much more

rational, it was not about power, now you [OEMs] are always justified in negotiations using that power, so the main industry is right, it wants to use the limits to the end, to meet its short-term goals... (I20)

The increase in the number of companies operating in the automotive supplier industry seems to have shifted the balance of power towards the OEM side quite unevenly. When we compare it with the first decades of the automotive supplier industry, it can be said that the sector has made a significant progress in terms of cost, quality, capability, and punctuality, which are the elements of manufacturing efficiency. While the automotive supplier industry was still in its formation phase, it was ordinary that the main industry had faced difficulty in finding a qualified supplier, has established a trust-based relationship with its supplier industry. However, many companies in the automotive supplier industry have gradually improved themselves to meet the compliance of OEMs. Automotive supplier companies that had to improve both their production and managerial competencies in order to meet the demand from the main industry, achieved a great success in the field of productivity. If you do not see a problem with quality, competence, and time management, it is a very understandable reflex that the cost element comes to the fore in your purchasing processes. In short, this situation has generally enabled the main industry to repress the prices of parts by using their power that comes from demand.

4.1.2.2 The Conditions of Trust in the Emerging Mobility Ecosystem

The transition of the context in which trust relationships are formed from procurement processes to beyond automotive industry has also influenced the conditions of the trust relations within the emerging mobility ecosystem. Within the realm of the supra-industrial context, the conditions of trust have built upon the notions of openness and credibility. It would be appropriate to begin by stating that the boundaries of this new trust zone have not been fully formed yet. Most of the trust-based relationships in this field have been formed gropingly and in an unstructured way of interaction between and among the related parties.

As trust relationships move beyond purchasing relationships, the most basic terms of mutual trust seem to change radically. For the development of trust relationships that develop outside of purchasing relations, there should be an active and operational ecosystem which covers

universities, research institutions, start-ups, manufacturers, public institutions and supporting interfaces. In that sense, the existence of the ecosystem itself appears as a precondition for the formation of trust relationships.

It has been emphasized in various studies that information sharing throughout the supply chain has also an important effect on establishing commitment in relationship (Abdullah & Musa, 2014; Cengiz & Aksoy, 2017). Trust and sharing information among the actors have become more important beyond the supply chain and these two factors have created the condition of relationship commitment. However, when we go down a layer deeper, we observe that the conditions of trust change radically within the ecosystem approach. It is apparent that some of the automotive supplier companies have realized the transition earlier than the others. These early adopter companies have changed their attitudes against the milieu they are creating value. With the humblest explanation, the ecosystem is defined as the milieu that makes possible the desire of creating more value. Comparing to the supply chain, the conditions of trust within the ecosystem is defined by the features which are openness and credibility.

4.1.2.2.1 Openness

As trust-based relations move out of the supply chain, the assumed linear link between means and ends overshadows by the multilateral and multifunctional character of the ecosystem and the linear thinking loses its validity. The term openness is often used to describe a mindset that embraces a continuous challenge against the boundaries of what is known by the actor. Rather than expressing a situation, openness represents a level of consciousness and awareness that need to be fed by the praxis of interaction. In that sense, openness is considered as an important condition of building trust-based relations in the ecosystem. On the other hand, an open system is instrumental in the emergence of innovations by providing an environment that enables and encourages information flow and entrepreneurial vitality. In this section, I will try to express what I understand from the openness that I put forward as one of the conditions of an environment of trust, based on the obstacles to the formation of an open ecosystem.

Knowledge is important in hierarchical systems, but it is the main and the crucial source of power in an ecosystem. The trust-based relations which are reinforced by the purchasing power of large companies cannot be easily transferred to the ecosystem level. In some cases, a supply chain that is clustered around large businesses is among the most important obstacles to create a trust-based ecosystem. These power relations formed within the framework of purchasing power may cause local information channels to block against technologically progressive firms and entrepreneurs. On the other hand, utilizing the entrepreneurial vitality at the highest possible level appears as a prerequisite to build an innovation ecosystem at the regional level. Entrepreneurs and technically progressive firms tend to be open to get and share internal and external information through using communication channels efficiently. Unfortunately, the local ecosystems which is dominated by the large companies are not prone to utilize the entrepreneurial vitality. This inference is partially attributed to a problem in the flow of information from large to small firms (Malecki, 1989, pp. 71–72). In a region dominated by branch plants like especially the Anatolian side of the BISK region, the likelihood of weaker interfirm communication is also quite high for the same reason.

During my interviews, I had the opportunity to hear many expressions of praise, mixed with envy and jealousy, regarding the structure of the automotive sector in developed countries. I would like to state that I take this situation very natural. There is nothing more acceptable than observing good practices abroad and forming an opinion about the general functioning of the industry. What was surprising here was rather than the level of technological development of advanced countries, most of the best practice examples were related with the open communication channels among the actors of the mobility ecosystem.

For example, companies come together in America, there is a professor about our field there, he has been working for a university in America for many years, companies come together, the main industries [and] sub-industries, they pay a certain amount of money, the university is doing research on their behalf. After a good practice, only the university shares its results with these companies, and they also benefit from that technology. We had spoken [with our friends] when he arrived [to Turkey]. Can we create something like this in Turkey? In my opinion, it is very difficult, something like impossible, we want it very much, but ... (I20)

What s/he is looking for was an open communication and collaborative innovation system. S/he has defined a research-oriented university-industry cooperation environment and dreamed whether such an environment could be created in her/his own country. The main point of the participant here was that in addition to the universities, the togetherness of the main and sub-industry companies within the organization. What really surprised her/his was

the possibility of creating an environment that the companies come together, especially the possibility that main and sub-industry companies could have an open communication. In her/his last sentence of the quote, in terms of his company, s/he stated her/his desire for such an open communication environment, but also indicated that it is difficult for Turkey. At this point, I would like to stay for a while and evaluate the argument that the existence of large companies prevents sharing of information among the actors of ecosystem.

At first glance, the first evidence for the above-mentioned hypothesis might be found at the institutional level. The separation of supply and main industries in Turkey under two different business associations as Automotive Manufacturers Association (OSD) and Automotive Suppliers Association of Turkey (TAYSAD) provides a reasonable suspect on a deliberate set-up operation in front of the flow of information by the automotive OEMs. By making an international comparison on the organizational model of the automotive industry, we can take the validity test of the argument one step further. It would be useful to look at the organizational agglomeration of the automotive industry in Germany, where the automobile was invented. In Germany automotive manufacturers, suppliers and other vehicle manufacturers are organized under the same institution which is the German Association of the Automotive Industry (VDA). These three manufacturer groups are represented under three division. National Association of the Automotive Industry (ANFIA) in Italy is also representing both automotive manufacturers and suppliers. However, Japan is another country which adopts the duality perspective in terms of the civil business organizations for the automotive manufacturers and automotive suppliers. In summary, it seems quite difficult for us to conclude that there is a problem in the flow of information between the automotive main industry and the supply industry just by looking to the mode of sectoral organization of the industry.

I would like to share a long story that will shed light on the relationship between the main industry and the sub-industry. The story is about the efforts of three associations of the automotive industry to facilitate manually the flow of information between different parts of the supply chain.

OSD, TAYSAD and National Mold Manufacturers Association (UKUB), that is to say, all the rings of that supply chain actually came together [and initiate a collaborative study]. Those studies show that the sectors, I should not say the sector, more precisely, the rings of the supply chain do not know each other, they do not know each other. No one knows what kind of mold can be manufactured in Turkey, what kind of mold cannot be produced. Let me give you an example, we said that our suggestion to fix this situation was the following. Then we

said that we should choose 20-25 companies of different types and sizes altogether. First, we said, let's create an audit delegation with representatives from OSD, TAYSAD and UKUB. Let an impartial AUDIT delegation identify 20-25 companies that make molds of different types, sizes and scales. Let's try it, visit it, check an inspection plan and reveal the real situation of the Turkish mold making industry. [...] In other words, from the marketing and sales of the company, the design, production capability, measurement, verification, assembly, customer relations, delivery to the customer, foreign language knowledge of staff, included everything. [...] On one of these visits, we visited a company, and they gave us a presentation. [The company representative] said that we did this [mold] for this company, we did this for this company, we made these molds for Renault. There are two buyers of Renault in the audit team. We did not buy these molds from you, said Renault's purchasing manager. The man [who was making presentation] turned and said "Yes," and continue, "We did this not to you, but to Renault in France." We said that this is exactly the point we want to catch, the man cannot work for the branch factory here, the factory here is not even aware of this, maybe he does not even know it, [because] the mould manufacturer can't get inside the factory door of the OEM (I3).

The above excerpted part provides an opportunity to evaluate the principle of openness, which we have determined as a precondition for trust relations in the mobility ecosystem. First, the leading civil society institutions of the automotive value chain observed that there was a problem in the flow of information among the companies in different tiers of the value chain. This determination made by three associations operating in the automotive sector is especially valuable, because it supports the proposition we made in the previous section. In this context, the lack of open communication among the different types of companies in automotive industry emerges as a critical source of entrepreneurial vitality waste. In other words, associations operating in different rings of the value chain had to come together and intervene in order to resolve the congestion in the flow of information between companies. In short, there is no open flow of information system that enables the creation of a mobility ecosystem based on trust. The last but not least, the final sentence of the interviewee is really striking that asserted the existence of a caste system in automotive supply chain. The inequality in power relations in the automotive supply chain feed the unilateral flow of information that constantly flows towards OEMs and probably stifle entrepreneurial vitality even before it emerges. The anti-democratic structure of the automotive sector, which constitutes an obstacle to the flow of information, hinders the level of interaction both with the suppliers and the other actors of mobility ecosystem.

At the individual level, openness does not require any qualification that have been earned through a formal or informal training. However, it is a quality that shape our way of seeing the world around us. It is strongly related with the cultural background of the society but also can be transformed through constant practice of result-oriented interactions. The relationship

of openness with trust is not one-sided. They feed each other and facilitate the establishment of research-driven entrepreneurial eco-system. Examining the quality of openness as an element of trust relations from a wider perspective which overflows beyond the supply chain will allow us to make an analysis specific to the mobility ecosystem. A communication obstacle we often encounter in my meetings with industrialists stems from the hidden evasiveness behind "trade secrets." I24 who is an academician at an engineering department of a leading university in Turkey emphasized the notion of "trade secrets" as follows: "we need to teach what pre-competitive cooperation is, what is a secret, what is not a secret [...] Now the secret is what another man cannot find in any open source, what you can find in any open source is not a secret, so what I tell in a textbook is not a secret (I24)."

Is it possible to talk about the existence of an open innovation ecosystem in an environment where the issue of information retention is at the centre of the agenda? The fact that this situation has become one of the most prominent points of complaint can be shown as a proof that a mobility ecosystem has started to form in the area that covers Gebze and the Anatolian side of Istanbul. There is nothing more natural than increasing complains about the current environment through the process of emerging awareness. The striking determination made by Peter Drucker in the following paragraph contains important clues about the social foundations of innovation.

In mathematics there is no difference between "The glass is half full" and "The glass is half empty." But the meaning of these two statements is totally different, and so are their consequences. If general perception changes from seeing the glass as "half full" to seeing it as "half empty," there are major innovative opportunities (1984, p. 99).

Innovation requires options that sprout out of the barren land of pessimism. It is a problem driven process that seeks a better option. In order for the innovation ecosystem to form, a large number of people need to address the same problem and try to solve it. Barriers to the flow of information make it difficult to identify problems by the masses. For this reason, shaping the mutual relationship between openness and trust in a vigorous manner has been defined as one of the prerequisites for the formation of a mobility ecosystem.

So far, we have talked about two factors that prevent open communication in the automotive value chain. As I have mentioned earlier, the anti-democratic caste structure of the automotive industry is the first obstacle in front of the flow of information among the actors of the mobility ecosystem. Additionally, apart from the many positive externalities created by the production facilities of global automotive companies in Turkey, in the following parts of the

study, I will also discuss the disabling effect of global automotive companies on the burgeoning of innovation processes. As stated before, another factor that files the development of entrepreneurial vitality through preventing the flow of information in the automotive sector is the introverted nature of automotive supplier companies. In order to strengthen the second argument and triangulate¹⁶ our position, I am going to consult to another interview participant.

Let me give you an example, we are working with [automotive supplier] companies in Izmir, there is a company next to me, I am sitting here, another company representative is sitting on the other side of the table, whatever the man will say, he says to my ear, what trust atmosphere are we talking about... (I16)

So far, I have tried to determine apparent problems in the flow of information on both vertical and horizontal planes. I have already determined that there is a structural problem arising from the way the automotive industry is organized on the vertical plane and this hierarchical structure creates various obstacles in front of the dissemination of knowledge. As can be seen from the above passage, we observe that there are very deep crevices that obstruct the flow of information among automotive suppliers. After determining that the openness, which I have defined as one of the elements of building trust relationships at the ecosystem level, is not at a sufficient level among automotive supply industry companies, I am going to identify the possible reasons for this situation.

The parts of motor and drive train constitutes one of the main cost factors in internal combustion vehicle production. Locality rate in the mentioned parts in Turkey is extremely low rate of domestication (T.C. Kalkınma Bakanlığı, 2014, p. 66). The obsolescence rate of this determination made in the 10th Development Plan, of which preparations were completed in 2013, reveals the magnitude of the transformation in automotive industry. The complexity of the design and production processes of automobiles is increasing day by day (Kamp & Tözün, 2010, p. 214). Accordingly, the value of electronic components and software in automobiles significantly reduces the share of traditional systems in production costs. Today, an average upper segment car has 100 million lines of code. If we compare it with an example from the aviation industry, the Boeing 787 has only around 7 million lines of code (Cornet et

¹⁶ Glaser and Straus strongly recommended “triangulation” of the data for the grounded theory studies. Simply, triangulation means to gather information from different sources of data in order to reinforce the hypothesis and theory of the research. Employing the process of triangulation into the research certainly increases the credibility and trustworthiness of the study (Bryant, 2017; Corbin & Strauss, 2015; Locke, 2003).

al., 2019, p. 13). The automotive supply industry has a competitive advantage only in low value-added products, even in fossil fuel vehicles. In the Eleventh Development Plan: Automotive Industry Working Group Report, the SWOT analysis for the automotive supply industry clearly stated that the sector has a competitive advantage in the production of low value-added parts (2018).

The specialization of automotive supplier industry is based on low value-added products that means the complexity levels of the products produced are low. The structure of the automotive supply industry in Turkey is based on the simple and easily imitable products. In an industry based on simple part production the barriers to entry must have been low. This situation has resulted a destructive competition of many companies clustered in a certain area.

Let me give you an example. Explain to me, as I said, 5 million 600 thousand vehicles are produced in Germany, according to the records, the total number of companies registered in the vehicle manufacturing industry according to the records of EUROSTAT is a figure like the end of the 2000s and the beginning of the 3000s. Such a figure might be a little above or under, you know that the number of vehicle production in Turkey [is about 1.5 million], there are about 4000 vehicle manufacturers registered in Turkey, [...] because those who find some capital start their own firm, which is constantly growing, I do not believe that this structure can be transformed at all, this is a cultural thing (I16).

First, I have to state that I do not fully agree with this conclusion. This is not a result of the cultural structure, but a situation arising from the low value-added production area in which we are confined. An entrepreneur with sufficient capital can easily enter the market that is uncomplicated and has production techniques that can be implemented by applying a specific recipe. The main barriers to entry at the lowest level of automotive supply chain is the capital and being a part of the network of main customers. At this point, depending on the area in which they operate in automotive supply chain, the basic competitive strategies of the companies are either to reach the capacity to produce larger parts, or to reduce costs by achieving economies of scale. Of course, it is obvious that such a strategy has also its limits. Until now, I have discussed the lack of openness in the automotive supply chain in Turkey, which I have defined as an element of trust relations, and the reason for this absence. As I have argued in previous parts of the study, the existence of trust anchored in the purchasing process is defined as the condition of the continuation of low value-added production. On the other hand, openness represents an opportunity seeking entrepreneurial mind-set that needs to be built brick by brick with passion. In other words, it has been defined as one of the prerequisites for the automotive supply chain to get out of the command chain of the main industry and produce unique and value-added products. The relationship of trust mentioned

here occurs in an environment that needs to be established within the open innovation ecosystem beyond the automotive supply chain.

The trust environment is very important, why is it important because when you are developing a new technology, where IP rights, namely, how much of the work your partner will finance, which party and what know-how will receive at the end of the day, first of all, in this new generation technologies, these are the things that are spoken and agreed upon at first, especially the biggest obstacle is actually in the investor's mind about the companies abroad to invest in partnerships or inside Turkey, the number one thing, trust and communication, what I understand from trust , at the beginning of the work, to discuss everything clearly, the risks, opportunities and threats to be documented, written down, and shared... (113).

The key group of words here is “new technology development” which is not an easy option for the automotive suppliers in Turkey. The question of where and how the research and development processes for the new technology in the automotive sector have taken place is an important question in terms of the subject we are dealing with. However, since this issue will be discussed in the next sections, I will skip the question and leave it ambiguous for now by stating that the process of developing new technology has taken place within the framework of long-term projects in international R&D centres of main automotive companies and their international Tier 1 suppliers. Start-up companies have been increasingly emerging as a new source of technology for mobility solutions, including automotive industry.

On the other hand, the main function of R&D centres operating within the production facilities of car manufacturers focuses on perfecting production processes rather than developing new technologies. Similarly, production facilities of domestic manufacturers or foreign manufacturers operating in the automotive supply industry also carry out R&D studies on efficiency in production by improving the quality and cost of existing parts. As a matter of fact, within the framework of the traditional organization of the automotive sector, the expectations of the main car companies from the countries of periphery are based on ensuring the production plans designed in the centre are implemented in the most efficient and effective way possible. Although we have main industrial production facilities that go beyond this restrictive structure and make innovative moves outside of central control, the new technology development approach of traditional automobile production is generally structured in a very central way.

When we look at the automotive supply industry, we can easily say that a small number of technological product development activities take place outside of the traditional supply chain. I have observed that these pioneering companies are trying to create a new area for

themselves outside the supply chain and they carry out trust and cooperation activities at different levels in terms of developing technological products outside their routine activities. Although limited success has yet been achieved, the open communication strategy developed by these companies with other actors of the ecosystem within the framework of mutual trust environment that they try to develop outside the traditional supply chain has set an example for other companies. It is worth emphasizing once again that the open communication strategy developed by these leading companies has developed outside of the traditional production areas. Only two of the companies I interviewed within the scope of the research are working on the future of the mobility ecosystem, apart from their current position in the supply chain. As a matter of fact, I could not get any information about the existence of other companies that openly share their work within the mobility ecosystem.¹⁷

The realization of an open innovation strategy based on trust relations have taken place outside the supply chain. Even the innovative automotive supplier companies who are willing to take part into the future of mobility ecosystem, have not been trying to establish their trust-based relations in their current business. They have not been adopted the open information policy to their conventional automotive part manufacturing business. This observation is contradictory to the assertion that binds the issue of not sharing information to the cultural superstructure. In other words, no matter how innovative these companies are, they cannot adopt an open communication strategy related to their position in the current supply chain. In terms of the automotive supply industry, it is not a cultural superstructure that determines their openness policies, but their position in the supply chain and their absolute dependency to the main industry companies.

It is also true for the branches of automotive main industry in Turkey. They have been generally finding some room to work on new technologies not on the products but also on the production process. They have been focusing on digital transformation to improve efficiency and effectiveness of their production processes. They are open to share information with the universities and other companies to develop their production processes. For example, in a meeting I held with one of the top executives of one of the automotive main industry

¹⁷ The cooperation between Adastech, a technology start-up, and Karsan, developed specifically for autonomous driving systems, can also be evaluated within the mobility ecosystem in a broad sense. It should also be noted that Ford Otosan is working on autonomous fleets in truck production. Therefore, this determination applies only to the supplier industry that produces parts for passenger vehicles.

companies, s/he stated that they identified 44 problems and asked for the help of universities in these areas. When I asked her/him about the areas and topics of these projects, I got the answer that they were all in the field of production technologies. Additionally, s/he stated that they wanted to be a global player in the field of production technologies (I12). This preference can be seen as an implicit acceptance of the dependent position of the automotive main industry's production facilities located in peripheral countries within the global automotive value chain.

4.1.2.2.2 Credibility

In addition to the existence of an open ecosystem that facilitates the flow of information between the actors, the credibility of the circulating information has also been identified as another element that creates an atmosphere of trust. First, I will try to deal with the credibility factor in the context of the reliability of information. It is worth remembering that while determining the conditions of trust that I have highlighted different factors for the automotive industry and the mobility ecosystem. Trust-based relations have been emerged within the boundaries of automotive supply chain have for conditions, namely cost, quality, capability, and punctuality. Trust defined here is a minimum condition of a legal market that occurs within the framework of the trade relations. On the other hand, I felt the need to distinguish and define the conditions for the establishment of an atmosphere of trust necessary for the development of a multi-actor ecosystem, apart from commercial agreements.

Since I am trying to examine the transition processes to the mobility ecosystem of the automotive industry, starting to present the credibility issue from the field of change management seems a very reasonable entry point to assess the process of becoming. In his highly cited article, John P. Kotter (1995) lists eight errors regarding the reasons for the failure of transformation efforts. I intend to initiate an analysis for the concept of credibility that we have defined as an element of trust atmosphere by listing these eight errors. The transformation from automotive industry to mobility ecosystem is conceptualised under the framework of managing change under the pluralistic setting. Even though the errors identified by Kotter are based on the company-specific change process, a targeted change across the ecosystem gives serious clues for a transformation under pluralistic conditions. The eight errors that Kotter (1995) has defined are below:

Error 1: Not Establishing a Great Enough Sense of Urgency

- Error 2: Not Creating a Powerful Enough Guiding Coalition
- Error 3: Lacking a Vision
- Error 4: Under-communicating the Vision by a Factor of Ten
- Error 5: Not Removing Obstacles to the New Vision
- Error 6: Not Systematically Planning for and Creating Short-Term Wins
- Error 7: Declaring Victory Too Soon
- Error 8: Not Anchoring Changes in the Corporation's Culture

If it is appropriate to use Drucker's analogy about those who see half of the glass as empty, I can state that this group can be labelled as the trigger of change. Kotter (1995) underlined the importance of step-by-step approach in change management. Basically, all the stages listed above are more or less related to the notion of credibility, especially the credibility of the leader. In that case, it would be appropriate to examine how the individuals and institutions leading the transition from the automotive industry to the mobility ecosystem have been managing the transformation.

I am one of those who think that the desired success has not been achieved in instilling a sense of urgency throughout the ecosystem for the transition to the mobility ecosystem. The basic dynamics of mobility transformation on a global scale have been forming while the automotive industry in Turkey was breaking export records, one after the other. In a period of noticeable increase in the production of conventional vehicles and parts in Turkey, it has become quite difficult to hear the voices of those who want to lead change loudly enough. In fact, pro-transition leaders of automotive industry positioned at the level of complaining and could not offer meaningful exit suggestions for the companies in automotive industry. The efforts of building research driven mobility ecosystem based on trust relations requires the existence of institutions that have a certain degree of prior credibility. Informant 1 was a senior public official in a central administration unit described the need of credible information for the SMEs.

How do you close the information gap? First, one must have accessible information. Two, this information should be credible. When the man receives this information, he will trust this information. We neglect this credibility part. So, we say, the information is there or why don't you use it. The man replies, I do not trust. But he doesn't tell you directly. We are Turks, we know the need to see the farmers to apply [any new technology]. They would not apply in life without seeing them, the need to see stems from the need to trust because we usually have 1 or 2 cartridges to shoot a bird. We are not that rich.

In here accessible information refers to the openness which is the first condition of a trust-based milieu. It appropriately stated that, as we have demonstrated in our model, it is not enough just to have information accessible. The actors who will engage in an innovation

activity by using this information want to make sure that the information in question is applicable. As Il points out, one of the most important facts feeding the scepticism in question is the scarcity of resources. This issue is very important because it implies that it is easier to build trust in an environment of abundant resources. In an environment where resources are relatively scarce, trust can be fatal. For instance, venture capital investments are at the top of the areas where trust relationships are very important. In addition to the many success stories, we have observed in this area, there are also failures that have been left behind the scenes, somewhat deliberately. A hyperloop start-up Arrivo was a venture failure which was started at the end of the 2017 by former SpaceX engineer Brogan BamBrogan. The futuristic transport company mainly funded by Plug and Play and failed within a year. Similarly, the amount of commitment of only a single global automotive company to the new technologies can be much higher than the total amount of annual export of the Turkish automotive supplier industry.¹⁸ The scarcity of our resources compared to the countries we compete with, increases the need of ecosystem actors for credible information while establishing horizontal relationships based on trust.

The first two steps of initiating a transformation process are described by the Kotter (1995) as establishing a sense of urgency and gathering powerful guiding coalition. The powerful coalition is especially necessary for the transformation at the ecosystem level for creating a collective credibility. In order to build an atmosphere of trust based on research and entrepreneurial vitality, it is necessary to take advantage of the contagious effect of the collective credibility as effectively as possible.

At this stage, it is worth to mention to a project design process called AutoCUP that took place in 2017 which did not have the chance to be implemented. The project aims to create a mobility ecosystem based on autonomous driving technologies around the research infrastructures of leading universities. The capacity of each of the research centre would be upgraded according to the trends in automotive industry. The already functioning infrastructure of the universities (Boğaziçi, Okan, Koç, Sabancı), a research institution (TÜBİTAK BİLGEM) and an organized industrial zone (TOSB) will be upgraded according to the needs of automotive value chain and the whole infrastructure related with automotive

¹⁸ For instance, Ford Motor Company declared that they will spend 29 billion dollars to the technologies related to electric and self-driving cars till 2025 (Baldwin, 2021).

value chain would be integrated through an online system. The brain of the network will be established at the heart of the automotive component industry, TOSB. The design process of the project has been taught the project team that an interface needs to be established in the automotive value chain. The project team has been conducted a series of meeting with the main stakeholders of the automotive value chain. According to the interviews and meetings, the majority of the stakeholders have recommended the establishment of a specialized interface that catalyse the innovation linkages within the value chain. The de-centralized infrastructure that would be strengthened through the project would be orchestrated by the interface. The designing phase of the project had been coordinated by East Marmara Development Agency with the active attendance of ten other leading institutions of the automotive value chain. In short, the project intended to create an ecosystem in autonomous technologies by creating collective credibility with the participation of prominent representatives of the automotive value chain.

After the project was shortlisted within the scope of IPA II, it moved to the phase of maturing the operation identification sheet (OIS). To provide a solid rationale for the project and to elaborate the mechanisms of the decentralized centre of excellence, 8 workshops were held with a total of 65 people. In the consolidated report of the workshops the lack of trust among the actors of different kinds of institutions was identified and explained as follows:

The uncertainty and risk inherent in new technologies is higher for Turkish companies. Likewise, as our country is not a technology developer, new technological developments, innovations in the markets and related regulations are not followed, and adaptation to innovations is delayed. In this context, the cooperation between companies, the public and the university is insufficient, visions for the learning and use of new technologies, related project portfolios, stakeholder structures that need to work together, and supply and demand strategies for new technology remain incomplete. Because of these root problems, all stakeholders are approaching to new technologies and possible collaborations with a greater risk and uncertainty perception. In the next paragraph, we see that the insecurity against the studies to be carried out on new technologies is due to lack of knowledge, lack of knowledge and the inability of possible studies to focus on certain priorities. It is observed that this distrust is also present among companies, institutions and universities in the context of the insufficiency of past collaborations (Analiz Sentez, 2018).

In this long excerpt, besides the reasons related to peripheral conditions for the inability to establish mutual trust relationships between institutions, the insufficient experience of collaborative working has been one of the strongest reasons that prevents the establishment of trust-based relations. In that sense, the relation between trust and collaboration is not positioned a rationally constructed one-way linear means and ends. In that sense trust and collaboration relations feed each other through collaborative practices. The credibility that

has been risen from the actual experience of collaboration in research and development has a stronger convincing power than hearing or examining best practices on collaboration. The practice of collaboration enables to construct a solid base for trust-based relations. While the transformative effect of cooperation practices feeds the process of building credibility for at the individual and institutional levels, on the other hand, it creates an environment that allows these practices to become widespread. Collaborative research and development practices among the relevant actors make a permanent understanding on trust-based relations and help to build a collaborative milieu. Thus, developing a mutual understanding framework by enrolling the practice of cooperation personally is one of the most valid ways to provide credibility.

Why do we need interface institutions to facilitate the emergence of a research-driven ecosystem? And why do we need them now, not 20 years ago? These questions will come up repeatedly in various chapters of the thesis. However, in this section, I will discuss the functions of interfaces in knowledge-based regional development within the framework of their role in credibility building processes. The interfaces are generally working as a resource allocation institution which are collecting and redistributing credible knowledge among the relevant actors of ecosystem. In that sense, the credibility of the knowledge that they are distributing is strongly tied with the credibility of the institution as an interface. With a rough perspective, the actors within the ecosystem need to co-construct the credibility of the interface through one-to-one and group interaction of the related stakeholders. Here, it is very important not to lose different voices and thoughts to encourage open knowledge sharing.

I think this is the thing that will provide the most trust. People should see the comments, texts, strategies, and policies that bring the voices of different stakeholders to harmonious synthesis. Something like this is when a person comes to a meeting, says something different, feels unheard of, does not see him in policy strategy afterwards, he does not want to come again and he is getting out of hand, so it is supposedly easy to embrace people, it is supposed to be able to be done in mind, and it is necessary to turn it into a discourse. [What is important] is the discourse should be transformed into a common strategy, [constructing] a win-win strategy, I think we attach little importance to this (I10).

In an ecosystem, the target groups of interfaces tend to get smaller and smaller to make everyone's voices heard and to ensure the flow of credible information among the stakeholders. Their main duty of the interface organizations has become to democratise the sprawl of credible information which will create a trust environment. The tendency to specialize both in terms of thematic focus area and the target groups has caused some automotive supply industry businesses to play an interface role in an area that they found

vacant in this process. I think this trend will continue in the coming years and that the main industry or supply industry companies can function as an interface between the start-up ecosystem and traditional industries, especially in the sectors in which they operate. Although it is not a new phenomenon that the bilateral information flow between the start-up ecosystem and traditional industries is being provided by businesses, it seems inevitable that this trend, which we can define as the privatization of the trust-building process, will create new obstacles to the flow of information. In other words, while the free movement of credible information through localization and specialization by the relatively neutral interfaces creates important opportunities for the open innovation ecosystem. On the other hand, supply chain elements that want to transform this situation into a competitive advantage are likely to create negative externalities in the medium and long term. Nevertheless, the entry of businesses operating especially in the consumer electronics and automotive supply chains into this area creates an important resource for nurturing entrepreneurial vitality at the regional level.

At this point, especially the credible information demand of the OEMs from the start-up ecosystem and *vice versa* are sometimes trying to be fulfilled by the supplier companies. Some of the supply industry enterprises that want to be a pioneer in industrial transformation are looking for ways to constantly reproduce entrepreneurial vitality within the company by loading themselves with many different functions beyond their traditional roles. These types of companies adopt an untraditional approach to manage the flow of information between different ecosystems and to turn this role into competitive advantage. In addition to gain a competitive advantage with the system they have built on creditable knowledge in certain areas, these types of companies which adopt the interface function, rise to a more equal position in their relations with OEMs. Thus, they take the first step towards transition from the manufacturing sector to the service sector in a more risk-free way. The following passage contains several clues to elaborate the functions of private interfaces.

As an industry that knows their expectations, expectations of quality and their conditions such as on-time delivery, [the start-ups] who run very fast and also know the technology, it is possible to take them and translate it into the language of the main industry and bring it to them as a solution package. But it is generally much more difficult for a two-person company to come together and work with a main industry [that are employing] hundreds of people. But we can also work with a three-person entrepreneur, we can absorb them over time, develop solutions, provide service and [institutional] sustainability. Because the main industry, whether it is [purchasing] software, hardware, or component, ultimately what it wants, is continuity. The main industry wishes to find a counterpart in 5 years or 10 years, but it is not clear, how long that two or three people company you are talking about, will survive (I15).

Their entrepreneurial vitality and advanced knowledge on technological solutions make the start-ups attractive for the OEMs and the automotive component manufacturers. They are agile because they are just a team of few people. They have the ability to fall and stand up quickly. These features provide them with the flexibility to adapt quickly to the changing conditions. We are talking about a species that both accelerates the creative destruction process and has the ability to survive in this turbulent environment. Their most important weapon is their ability to use new technologies. However, like all the living creatures, they have also some weaknesses. First, they are not familiar with the bureaucratic processes and red tape within the OEMs. They do not have a cultural habit to work with OEMs. The second handicap of start-ups for OEMs is their unstable conditions. They can easily jump another industry, form a different kind of partnerships, or shift their focus of technology. Stability is one of the most important conditions, for a traditional manufacturing industry. The representative of an automotive supplier company asserted above that they are providing a temporary protection for the start-ups while teaching them how to deal with the automotive OEMs. They are acting like an incubation centre for the start-ups. They are building trust bridges between start-ups and OEMs. Unlike an ordinary incubation centre, the company also provides hands-on information to the start-ups on how to work with OEMs. While improving the credibility of start-ups in the ecosystem, the company uses its corporate identity as an element of credibility, on the other hand, equips start-ups with practical knowledge that will make them credible in the medium term.

In this section, I tried to address credibility as an element of trust in the mobility ecosystem. Based on field data, I evaluated that there is a mutually reinforcing interaction between trust and credibility and that this mutual relationship is one of the basic conditions of the mobility ecosystem. In the first part, I attempted to have a discussion on the credibility of open knowledge that allowed the ecosystem to thrive. Considering that the value of creditable information is much greater in developing countries where resources are less scarce, I emphasized the importance of making successful collaborations visible. However, it was revealed that one of the most important conditions for creating an environment of trust based on openness and credibility throughout the ecosystem is to experience it in person. Starting from here, I tried to handle the credibility building processes of the actors in the ecosystem through the example of an automotive supply industry company that also functions as a start-up incubator.

4.1.3 Objectives of Trust within the Two-systems

The processes of building mutual trust relationships basically differ in terms of their purposes in the two systems that I have defined within the scope of study. The objectives in here are defined as an ultimate or overall level which define the long-run expectation of the actors. Unlike the specific objectives which aim to specify the results of a group of action within a period, the general objectives, also called as outcomes, are defined the long run open or tacit intend of the institutions. In that sense, the trust-based interactions within the supply chain of the automotive industry have an overall objective to establish and maintain competitiveness at the institutional level. Each institution along the supply chain struggles to capture resources to create a meaningful value according to the expectations of their customers. As I have discussed before, the trust-based relations occur around the procurement processes within automotive supply chain. I have previously argued that the cautious trust relationship formed within the framework of procurement processes is tightly linked to cost, quality, capability, and punctuality. Their long-term goal on both sides of the procurement process is to maintain their competitive positions. On the other hand, trust-based interactions among the actors of the mobility ecosystem have completely different and ambiguous overall objective. The overall objective of the institutions in mobility ecosystem is to explore something valuable but unlike in the procurement processes there are no defined rules to capture the value. However, there are some guidance principles mostly derived from the best practices. In that sense, the outcome of the trust-based interactions within the mobility ecosystem can be defined as the entrepreneurial discovery. At first glance, it is quite natural to get the impression that it is wrong to define entrepreneurial discovery as a general purpose. The entrepreneurial discovery process is defined as a process or method in essence. However, I have been consciously chosen to define the concept of entrepreneurial discovery as an overall objective. Under the conditions of uncertainly, the overall objective of an institution that cannot be set easily. Positioning the company into an unknown future and setting the vision around a concrete objective might not be a good decision. We live in an age where means and ends are intermingled, and all corporate visions blur under the gravity of the uncertainty. Because of these, the overall objective of the trust-based relations under the conditions of mobility ecosystem is defined as a process, namely entrepreneurial discovery process. That is to say, entrepreneurial discovery is a must-have capability for companies that want to take part in the economy of the future.

The entrepreneurial discovery is a key tool or process of regional innovation smart specialization strategy (RIS3) which indicates a place-based exploration for new market niches and technologies. According to the S3 strategy, regional authorities as the main policy designer are the primary actors who should seek to uncover the regional tacit knowledge to explore the competitive areas through an entrepreneurial vitality. In here, “entrepreneurial means a large category of actors in the innovation process, based not only in the region but also elsewhere; and ‘discovery’ means really discovery and not an ‘ex post’ qualification of a predetermined set of goals (Dominique Foray, 2016, p. 6).” I am aware of the risk of using a known concept in a different sense by installing new functions. On the other hand, there are some advantages of using entrepreneurial discovery as a concept of transformation strategy development process. Instead of a process, I define entrepreneurial discovery as a constantly renewed goal in establishing trust-based relationships within the scope of change in a particular supply chain. In fact, I am talking about the socialization of an entrepreneurial discovery as a goal of an ecosystem actor through the collaborative regional strategy building process. The collaborative regional strategy building is an iterative process that seeks to mine the embedded tendency of the regional economic actors repetitively. On the other side of the equation, entrepreneurial discovery is a level of mindset for the companies who are always seeking possibilities of value creation. In that sense, entrepreneurial discovery as a mindset is described as the objective of an ecosystem actor who are operating within a trust-based interaction environment. There is fundamentally a serious difference between goals which are chasing a situation or an outcome and the objectives aiming to reach a mental point of view.

In shaping trust-based relationships in the mobility ecosystem, actors need to gain the ability to think a longer period and widen their perspective beyond the current market conditions. At this stage, the goal of maintaining a competitive position within the current product range is transformed into a mind-set based on entrepreneurial discovery.

So now there are several ways [trend setters] and SMEs might think on the same direction about future of the technology. One of them is that big companies have predictions about this scenario and make SMEs apply it when the time comes. This is a script. In other words, it is an extremely anti-democratic scenario, that is, a scenario where the SME must adapt itself when the time comes, according to the needs of the company. A second scenario is to widen the perspective at least a certain long term to a more predictable point by having these companies and SMEs debate on certain platforms. This is how there are foresight exercises to understand future trends in technology or development related to development. For example, big automotive giants use it for themselves at the corporate level. These are futurists, the actors in the market, those who know the market well, those who know the technology, what will be the future trends, how the customer base is formed, how the income distribution is and

how I position myself with which product which technologies should I invest in. [Thus, SMEs gain the ability] to make very basic strategic key decisions such as which technology to exit and when (I1).

The importance of creating an environment based on trust among the actors of mobility ecosystem comes from the need of being constantly up-to-date. Unlike the mutual trust relationship that is formed within the framework of protecting the competitiveness of the actors throughout the supply chain, the multilateral relations of the actors in an ecosystem are the main factor that transforms the difference into harmony. It is very important to create mechanisms that will enable the discovery to turn into a goal with the work of creating a common vision. In this sense, it is of great importance to create an environment where public institutions, universities, non-governmental organizations, different supply chains and start-ups regularly reflect on the future. At the end of these activities, it is aimed that the ecosystem actors are mentally accustomed to the cold waters of the discovery which can be defined as sacred spring.

It can be said that the frequency and similarity of the activities carried out by different institutions to determine the strategic priorities of the sector is strongly related with the aim to keep a continuous discovery process alive. Automotive Supplier Association of Turkey (TAYSAD) is playing a leading through the activities to make the transformation process more understandable for its members. TAYSAD organized a series of workshops to discuss and understand the direction of the paradigm shift for the automotive suppliers. In 2018, TAYSAD organized eight consecutive workshops in collaboration with East Marmara Development Agency to discover the target technologies and collaboration strategies for the automotive suppliers. Only a year later, in collaboration with Presidency of the Republic of Turkey Investment Office, TAYSAD organized four workshops on identifying innovative and disruptive technologies in automotive. As a result of these workshops, documents that do not say much beyond the trends in the mobility ecosystem expressed in many reports were produced. The findings presented in these reports do not say anything different than the information that can be extracted with a short desk study. However, what is important here is not the results report, but the process itself. The discovery process has become the aim of the trust-based innovation ecosystem.

The mobility ecosystem is a regional innovation system formed by the combination of many different economic activities around the traditional automotive sector. Undoubtedly,

software-based start-ups have begun to rapidly transform both the traditional production process and the entire value chain from customer behaviour backwards. On the one hand, automotive software market has been growing steadily due the rising number of electronic components in vehicles and the increasing demand on autonomous and connected vehicles. On the other hand, the disruptive innovations that comes from the outside of the industry has threaten the roots of the automotive industry with a century of deep-rooted practices. This great multilateral interaction in the mobility ecosystem pushes all parties to leave their comfort zones and explore the possibilities of creating a collaborative environment based on cross matches. As one of the primary representatives of automotive industry, TAYSAD seems to realize the opportunity that comes from the emergence of mobility ecosystem.

In the upcoming period, by making a change in the bylaw of TAYSAD, we plan to pave the way for the membership of companies operating in the software and electronics industry, because software and electronics have become a component that is now on the vehicle [...] Let's look at electronic design as software, embedded software developers, the actual software developers are not in us, others are in some way because they produce a plastic part outside, produce a cover, produce something, so it is a complete piece of plastic on top and the software with the electronics inside. So, there is no problem with that type of companies [they can be a member of TAYSAD]. The electronic research and embedded software are not in us according to the current regulation [of TAYSAD], the companies working on digital transformation tools is not the main member for us. The companies working on roboticists are not permanent members for us, therefore, with changing conditions, changing production methods and components used in the car, we will expand TAYSAD's domain, therefore, in the new conditions, we will make more members of TAYSAD in the value chain. In my opinion, there is no difference for me between the raw materials of production and the supplier of IoT systems. One is supplying raw materials; the other is the technology supplier... What is the purpose of both? They both produce something in the most efficient. [...] In other words, changing conditions cause TAYSAD to evaluate its location, yesterday this was the cluster, now it will be that much larger... (19)

Like many other institutions, TAYSAD responds the uncertainty by expanding its sphere of influence. They are preparing to change their institutional bylaw to accept the software developers as the members. The increasing complexity of the value chain and the continuation of this transformation forces business associations organized within the scope of traditional supply chains. As part of the entrepreneurial discovery process, the effort to expand the member base and the activities aimed at predicting the future of the sector are the strong signs of functional sprawl.

4.1.4 Actors of Trust

The automotive supply chain is the place where trust-based relations occur around the procurement processes. The hierarchical structure of automotive supply chain does not

generally allow extra-industrial interactions especially at the peripheral manufacturing bases. The command-and-control mechanisms from the extraction of raw materials to the final customers are managed by the OEMs. A manufacturer which has involved in this chain has to build trust-based relations within the framework of procurement processes. However, the newly emerged ecosystem approach seems to change the equation and the hierarchical organization of automotive supply chain radically. Trust-based relations must be built on a wider foundation of trust perception at the ecosystem scale. The shift from the supply chain to the ecosystem approach has broadened the area where trust relationships take place. As a natural consequence of this situation, the number of actors of trust relations tends to increase over time.

In this section, I am going to identify the different actors of trust-based relations for two systems. But first, it will be useful to go over the definitions of supply chain, value chain and ecosystem concepts in the transformation process of automotive industry. These concepts, which will be discussed in detail in the section of literature review, will be discussed in the context of their scope rather than their basic functions. The concept of supply chain is generally associated with the process of manufacturing and delivering a final product (Lummus & Vokurka, 2000; Quinn, 1997). Lummus and Vokurka have consolidated the definitions of supply chain in the following long sentence:

all the activities involved in delivering a product from raw material through to the customer including sourcing raw materials and parts, manufacturing, and assembly, warehousing and inventory tracking, order entry and order management, distribution across all channels, delivery to the customer, and the information systems necessary to monitor all of these activities (2000).

The popularity of the term has been risen since the end of the 1990s where the globalisation has facilitated the transition of power from manufacturers to the retailers (Min et al., 2019, p. 2). The main reason of increased attention to the supply chain lies at the heart of the changing structure of how the companies operate at the global level. The vertically integrated companies have begun to outsource the products and services which they were producing internally to the more specialized suppliers with low cost. Supply chain management has become very important to provide cost advantage and quality for businesses that have found the opportunity to benefit from regional wage differences in the most efficient way with the construction of a giant supply chain on a global scale. In such an integrated system, the optimization of supply chain networks has become crucial. The increasing global competition has forced the companies to focus more the cost of transport and logistics. Cost of holding

any inventory has eroded the competitiveness of multinationals. Additionally, after the recognition of the positive relation between the efficiency of the suppliers and the cost of final product, the OEMs have shifted their attention to governance of the entire supply chain to improve their competitiveness. Because of these reasons, supply chain management has become the backbone of the companies who have been seeking an efficient end-to-end product flow management (Lummus & Vokurka, 2000, p. 12). However, the disruptive technologies such as IoT, AI and blockchain have a potential to manage the entire supply chain seamlessly. A recent discussion about the effects of digitalisation on the global management of good flows asserted that supply chain management might recently be one of the victims of digitalisation in the near future (Allan Lyall, Pierre Mercier, 2018).

Value chain is another concept that has been emerged to define the process of value creation. The concept is also used as value systems, production networks, commodity chains (Coe et al., 2004; Gereffi et al., 2001). All these conceptualisations refer to a type of global manufacturing organization which is also a product of globalisation. The concept of value chain is a simplification of local networks, webs and grids which represent nested, non-linear and unstructured interactions in the spatial economy. It provides a glimpse of economic value creation processes through focusing on specific type of local economic activities which have been performed by workers, companies, business clusters and a bunch of supporting institutions (Sturgeon et al., 2008, p. 302). However, unlike the supply chain, value chain approach has broadened the perspective from manufacturing and distribution to the entire process of value adding activities from design to marketing. The main problematic of the value chain approach is structured around the governance of value-added activities. The governance of value chains has become an important issue for the regional development strategy building processes. Some studies referred that the proliferation of the relation-specific investments might create productivity gains in the value chain.

Figure 8 illustrates the position of the upstream automotive supply chain within the generic value chain diagram that has been developed by Michael Porter (Porter, 1985, p. 37). The section of operations covers the process of vehicle manufacturing which is defined as upstream part of supply chain. The downstream part of the supply chain which covers the marketing and sales activities of a company to deliver the products and services to the final customers. The downstream portion of the supply chain does not represent in the diagram consciously because it is outside the focus area of this dissertation. The value chain approach

aims to figure out the operations of a single firm in relation with the other actors and value creation processes. Starting from the inbound logistics to services the bottom part of the stream represents primary operations of a firm. The processes of procurement, technology development and human resource management are conceptualised as the necessary supporting elements that facilitate each of the primary operations of the company. Unlike the elements of procurement, technology development and human resource management, the firm infrastructure supports the entire value creation system of the company. General management, strategy building, information system management, finance, bookkeeping, legal & government affairs, and quality management are the supporting activities that represent the firm infrastructure (Porter, 1985, pp. 39–44). In terms of primary activities, the section of operations constitutes the playground of the dissertation which focuses on the vehicle manufacturing operation. The manufacturing activities have been organized around the OEMs. The upstream supply chain of the vehicle manufacturing involves a hierarchical order of suppliers from Tier N to Tier 1 which end up with an OEM. Simply the actors of upstream automotive supply chain can be divided into two broad categories which are suppliers and manufacturers. As we have discussed before the automotive supply chain is also organized according to these two broad categories in Turkey. On the one hand, Automotive Manufacturers Association (OSD), which is formed by OEMs at the top of the supply chain, and on the other hand, Automotive Suppliers Association of Turkey (TAYSAD), which gathers suppliers under its roof, as it was called sub-industry organizations previously.

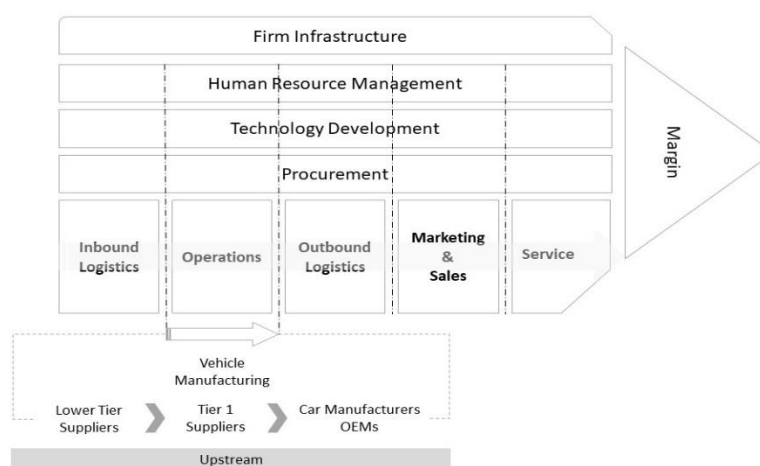


Figure 8 - Upstream Supply Chain of Automotive Value Chain

Another popular concept that defines a group of interrelated actors is business ecosystems. The use of biological, astronomical, and mechanical systems to explain social structures is a well-established but highly debated approach. The notion of business ecosystem is built upon the place-based complex economic systems which resemble natural biological units. One of the early studies that define the economic sphere as an ecosystem claimed that the phenomena seen in nature such as competition, survival, exploitation, and learning are also valid for the capitalist economy. Rothschild also asserted that basic mechanism of change in nature are also valid for the business world (Rothschild, 1990, p. xii). Moore defines the business ecosystem as an “extended system of mutually supportive organizations (Moore, 1998, p. 168)” in a manner closer to the local value chains, business clusters and business networks (Peltoniemi & Vuori, 2004, p. 7).

After providing brief descriptions of the concepts of supply chains, value chains and business ecosystems, I can focus on the actors among which trust-based relationships occur in the automotive industry and mobility ecosystems. The trust-base in the automotive industry has been constructed upon the vertical relations between supplier and customer. As I have discussed before, the interaction between supplier and customer is based on the parameters cost, quality, capability and punctuality which are the main determinants of procurement process. We are talking about a relationship of trust between the supplier and the customer, which is largely embedded in power relations. Mutual trust relations that develop and flourish on commercial relations are carried out under the shadow of power built on the sectoral dominance of main industrial enterprises and Tier-1 suppliers. It would be appropriate to classify the automotive main and supply industry companies in order to understand the trust relationships from the perspective of supply chain actors.

In terms of traditional automotive supplier companies, being a part of a giant global automotive supply chain is a profitable business. The requirements of the being a part of automotive supply chain are set by the OEMs based on long term contracts. In that sense, the base of trust in automotive supply chain has been built upon a limited number of actors who are operating within the supply chain. The upstream automotive supply chain consists of OEMs and suppliers which are categorized as their proximity to the OEMs on the supply chain diagram. Tier 1 suppliers are the main suppliers who are directly working with the OEMs and there is an inverse proportion between the level of the suppliers and their location at the supply chain.

On the other hand, the actors of business ecosystems occupy a broader area than the upstream supply chain. Moore sorted the actors of a business ecosystem as follows:

Business ecosystems are communities of customers, suppliers, lead producers, and other stakeholders—interacting with one another to produce goods and services. We should also include in the business ecosystem those who provide financing, as well as relevant trade associations, standards bodies, labor unions, governmental and quasigovernmental institutions, and other interested parties (Moore, 1998, p. 168).

When we look at the mobility ecosystem specifically, we clearly observe the efforts of actors operating within the scope of different supply chains to create value in an ecosystem. A group of competent start-ups in the field of new technologies have attracted the attention of traditional businesses operating in the automotive supply industry, as they begin to make a difference with their original solutions in the fields of production processes and mobility. Ömer Burhanoğlu, who has recently been the president of the Automotive Supply Industry Specialized Organized Industrial Zone and has been on the board of the same institution as of 2021, said in a statement on the institution's website:

The automotive industry is changing rapidly, 50 percent of the automotive industry in the next 10 years will consist of connected technologies. In order to keep up with this change, we want to gather all stakeholders in the automotive industry together. For now, we are lacking in investor networks. In order to develop these investor networks, we want to attract the attention of both the main industry and the supply industry. Turkish Economy Bank first innovation centre for investors in our target network (TEB) - Turkey Exporters Assembly (TIM) have created a Venture House. We brought the game and test field to TOSB in order to feed the successful start-ups here, to try their products and show them to investors. We are in cooperation with 6 universities to create a scientific infrastructure. We are working with the East Marmara Development Agency (MARKA) to budget our projects and we have funded 1 million Turkish Liras from there. We need angel investors to eliminate the shortcomings of the ecosystem (*Melek Yatırımcılık ve Girişim Sermayesi Paneli*, 2019).

It is useful to take a closer look at the ecosystem actors mentioned in this short passage. It covers automotive main industry, automotive supply industry, investor networks, finance institution, innovation centre, test field and facility for autonomous cars, start-ups, universities, research infrastructure, development agency and angel investors. One of the most important points to be considered here is the future perspective put forward by one of the important representatives of the supplier industry. The sentence starts with a prediction about the future of the industry and then reveals the network of relationships they try to establish and develop with ecosystem actors. He strongly stressed that the upcoming tornado of new driving technologies such as electric cars, sharing economy, autonomous and connected cars have a potential to destabilize the traditional business model of car manufacturers based on linear supply chain. Although the effects of these new technologies have not been felt seriously, sharing economy has already some visible impact on car

ownership. A study found that every car-sharing vehicle in the US displaced 19 car ownership, and each ride-hailing vehicle switches 4 car purchases (Coqui et al., 2018). It is estimated that car sharing will displace 1.2 million car sales in 2020. Over the next 25 years, the emergence of robotaxis based on autonomous and connected car technology could cut 40 percent of the US car sales (De Meyer, Arnoud, 2020, p. Loc 87 of 4831). This data alone shows the speed and magnitude of change. How and with which actors the integration into this transformation process will be managed is of great importance for all countries that take a share from the global automotive value chain. The automotive industry is the industry leader for over 15 years on top of Turkey's exports. From the perspective of Turkey, the coordination of national and regional innovation ecosystem in this transformation process is an issue that needs to be addressed as a national policy. I think that anticipating which actors will play a leading role in this transformation process in the current ecosystem is the key to medium- and long-term success. In order to create an ecosystem based on trust to manage this transformation, the automotive supplier industry can play a leading role in terms of both the level of capital accumulation and manufacturing experience. The automotive suppliers also constitute the target group of Turkish industrial policy based on improving efficiency of the manufacturing industry. Can this manufacturer community, which has accomplished important works in the field of efficiency economics, lead the integration process of automotive industry in Turkey to the upcoming transition? Or will the export champions, automotive suppliers continue to move back and forth on the supply chain through ignoring the shrinking cake and lost opportunities. I16 has a controversial argument about the approach of the automotive suppliers to the upcoming threats of the transition process:

Today, Turkey is the country of cheap supply. So, they [the manufacturers] can buy the same [automotive] part from Germany. However, they sit at the negotiation table here with 70 euros for the piece valued at 100 euros in Germany. [...] The capital side does not want to manage the transformation process. I will give an example from one company owner. S(he) told me that these are the stories of developed countries and developed markets. S(he) said that if I cannot sell my good to Germany today, I will sell it to Africa. This is the logic of capital in Turkey. S(he) will choose not to manage the change anyway. S(he) says that every commodity has a buyer. S(he) has always done this job in that way (I16).

In building an ecosystem based on trust relationships, there is a need for actors to lead and involve the process. It is evident that the competitiveness of the industry in Turkey is mainly based on relative low cost of labour. The passage above emphasized the automotive supply industry does not have a mindset to champion the process of transition. The traditional interaction between OEMs and suppliers occurs within a system of trust relationships built on procurement. This type of interaction requires a high level of concentration on the process

of production that has to fulfil the requirement of the OEMs. The dependency of the automotive suppliers to OEMs has created a threshold in front of thinking out of the supply chain. In that sense, the actors that will lead the formation of the mobility ecosystem should be sought outside of automotive suppliers. At this stage, it is very difficult to speculate about which social segments will have an enough power to demand the transformation in automotive industry strongly. It is clearly observed that different actors make various moves that will determine the direction of the transformation process or accelerate this process. TOGG initiative is a response of the government to break the supply chain dependency of the Turkish automotive industry. On the other hand, the customer demand on innovative environmental mobility solutions is also very low. If we add to these factors, the weakness of the environmental movements that encourage a fossil free market, we can say that there is no actuator with enough power to undertake the pull and push functions of this transformation. Before diving into the issue of transformation leadership, it may be helpful to have a discussion on the features of the ecosystem approach.

A successful strategy, in the future, will depend on how well you proactively lead your ecosystem, by engaging with different partners who bring fresh competencies and capabilities that will fuel innovation and transform your organization. You need to catalyse a deep and vibrant ecosystem of partners around your company. This goes far beyond working more closely with your supply chain, open innovation, or co-innovation with your customers (De Meyer, Arnoud, 2020, p. Loc 114).

The coordination of the decentralized group of networks and providing win-win solutions the actors around the company are key to achieve success in an ecosystem. These types of systems are built on a network of trust which is more fragile and vulnerable against any misbehaviour. It will be a very painful transition process for a group of suppliers to understand and adopt an ecosystem-based approach since they are generally accustomed operating on a linear line that is set to follow the instructions of the customer. It is a naive but common approach to expect companies that produce in this structure to switch from low value-added areas to high value-added products. It may be more correct to use the term bifurcation rather than transformation. It is observed that a small number of examples trying to adapt to change in the automotive supply industry have based their strategies on bifurcation. The gradual transition from low value-added products to medium and high value-added products is not a working strategy. The inability of Turkish automotive supply chain actors to climb the ladder of value-added might be put forward as a proof of this hypothesis. On the other hand, a few examples shows that the disruptive jump to the higher value-added segments has been occurred outside the automotive supply chain. Some of the automotive

suppliers are trying to explore the new areas of value creation while continuing to manufacture low value-added parts and components for the OEMs.

Farplas is a Tier 1 automotive supplier company which constitute an exceptional example for the bifurcation strategy. The company has described the dichotomic strategy as “perfecting the present” and discovering the future (*Farplas, 2021*)” As the traditional automotive supplier companies, the company aims to sustain its competitiveness through improving material quality and production technologies. They are also trying to apply innovative solutions to the production process by employing advanced technological solutions. On the other hand, under the organization Fark Labs, the company aims to develop new solutions to the mobility-oriented urban challenges. The company provides a holistic approach to the mobility ecosystem. They are serving as a business incubator for the mobility start-ups which have been explored by the monitoring system of F+ Ventures. In short, they are acting as a mobility ecosystem leader who designs win-win situations especially for entrepreneurs and intrapreneurs. Of course, there are other automotive supply industry representatives who are carrying out various efforts to become a global actor in the future mobility ecosystem. However, it is not very likely to come across examples from Turkey that take firm steps within the framework of a specific strategy in order to assume leadership and coordination roles in the future of mobility ecosystem. I will refer to other examples in different chapters. In this section, I tried to address the changing actors in the formation of trust-based relationships in the traditional automotive industry and the mobility ecosystem, which I describe as two systems. The trust-based interactions among the actors supply chain have occurred between the customers and suppliers according to the product specifications (specs) which were set by OEMs. This dependency relationship between suppliers and OEMs has prohibited the formation of an open trust-based environment that covers related actors from investor networks, finance institution, innovation centre, test field and facility for autonomous cars, start-ups, universities, research infrastructure, development agency and angel investors. However, I tried to examine the transformation effort led by some supply industry organizations through the case of Farplas. I stated here that I have no observations regarding a strategy of a gradual transition from the current product segment to more value-added areas, but some of the automotive supplier industry companies are trying to implement the strategy that I call bifurcation for radical innovation. These types of companies have tried to separate their current production process from their efforts to explore the opportunities of the upcoming challenges and offer solutions to the problems of future mobility. Although there

are some businesses within the automotive supply industry that can take part in this transformation and even lead this process, it is quite difficult for businesses to lead this transformation as a group which are accustomed operating within the tight hierarchical structure of the traditional automotive chain.

4.1.5 Expected Outcomes

The base of trust is generally constructed on expectations of both parties. The potential of meeting these expectations is one of the most important factors that make the relationship permanent. Expectations of the involved actors on the supply chain within the framework of the procurement process differ significantly from the mobility ecosystem where trust relationships are established in an open exploration milieu. In this episode, I intend to make a brief comparative evaluation of the trust-based relationships formed in the automotive supply chain and mobility ecosystem in terms of mutual expectations and expected outcomes. The formation of trust-based interaction in automotive industry has been constructed through the process of procurement where most of the conflicts and contradictions between the parties have been occurred. On the other hand, main conflicts, or difference among the actors of mobility ecosystem have emerged at the stage of competition for access to information. The base of trust relations has been established through the collaborative solutions of the main conflict areas. Trust relationships can be mostly realized between people and institutions that can develop solutions to these problems, contradictions, and differences, on a theoretical level. The parties who reach agreement on the paper regarding the problems that may arise in the future, expect that when the problems arise, solutions will be found not based on power relations but based on trust relations. In that sense, they have been forming trust-based relations according to their expectations that have been constructed through the prior experience of the actors.

The expectations created by the interaction between the parties on the basis of trust relationships within the framework of the two systems are quite different from each other. At this stage, it is useful to explain the often-confused concepts of output, outcome, and impact. Since, in the next section, a discussion will be made on how the impact created by trust relationships differs under the two systems. According to the result-oriented approach, the intervention logic has separated into two main parts which include implementation process

and results. It is clear that the implementation phase of a project consists of a set of activities and necessary inputs that needs to be provided for the execution of these activities. The main inputs cover financial, human, and material resources. As a result of activities, the inputs turn into outputs which are the visible results of the project. Outputs are categorized as the first step of the results. These are defined as the products and services delivered at the end of the project. On the other hand, the outcomes are considered as the direct effects on target groups and/or beneficiaries. The final component of the result chain that shows the complete scene of the project cycle is impact. Impact is described as the sustainable effect of the project on the target groups in the long run. Impact is more distinguishable from output and outcomes. In terms of temporal measures impact refers to long run. On the other hand, output and outcomes are both represent the results that need to be achieved at the immediate end of the project. The best way to distinguish output and outcome is to figure out the question form of these results. Outputs represent tangible issues and subject to what questions. Outcomes generate connotations, values, interactions, and differences. I am planning to enter orbit again with the following passage, without further moving away from the subject.

Business in the 21st century needs more focus on outcomes than outputs. We all can see where focusing on outputs got us: In education we've focused on test results (outputs) and ended up with some high-scoring kids who don't know how to apply what they've learned to the world at large (outcome) [...] We have a plethora of apps for our smartphones and tablets (output), but how many do we consistently use—and how many actually improve our lives (outcome) (Mills-Scofield, 2012)?

The products and services of our age have become more customer oriented, and the customers of today are gradually transformed into monitoring experts for the companies and their approaches against the global challenges. Being at the lower levels of the supply chain will not be enough to cover companies from these prying eyes. A growing number of customers are looking beyond the label of the company and need to know ethical stance of the entire supply chain. Thus, the focus of customers has been shifting from the material, which is defined as outputs for our purpose, to the inherent meaning of the products and services for their life and for the life of the other species. This sensitivity of customer has a potential to transform many industries including automotive. The pressure of civil society has also forced the national and supra-national legal framework to become more environment friendly. In that sense, the transition from automotive industry to the mobility ecosystem is not a supply driven process. The root reasons of this transformation have lied at the heart of civil society baked legal restrictions that aim to act against climate change.

We can now compare the automotive industry and the trust relationships built within the mobility ecosystem in terms of the expected outcomes. In terms of automotive industry, the expected output and outcome of the trust-based interaction between OEMs and suppliers need to be distinguished carefully. The product constitutes the intersection set of the expected output of the trust-based interaction for both parties. Since the interaction occurs at the procurement process both of the parties focus on the object of the process which is the automotive part or component provided by the suppliers. If the main output of this relationship is a product, what are the expected outcomes for both parties? I have a simple but worth considering answer to this question. The main expected outcome of the interaction between OEMs and suppliers is knotting to an indefinite point. Defining the expected outcomes and results of trust-based relationships established within the scope of the mobility ecosystem is a much more difficult task than defining the expectations of the parties in a hierarchical and linear type of interaction. Since it is very difficult to link the relationships developed by many factors within the framework of different goals and expectations in an ecosystem to an output or expected result. In contrast to the automotive industry, while it is more difficult to base the output of trust-based relationships in the mobility ecosystem, it is relatively easy to define the expectations of the parties within the framework of a trust-based relationship. The output of interaction in the ecosystem cannot be defined because the expectations of the actors within the ecosystem are more abstract and diverse comparing to the automotive industry. On the other hand, the expected outcome of the trust-based interactions in an ecosystem is generally defined as “solutions”.

4.1.6: Impact

The word impact is described as “a powerful effect that something, especially something new, has on a situation or person (Cambridge Dictionary, 2021b).” In that sense, impact is a type of effect that needs to be powerful enough. However, in terms of PCM, impact is related with the overall objective in the log-frame factual hierarchy which describes long term effects of the project on the selected target groups. According to the intervention logic, the meaning of the word impact meets the time dimension which refers to the long run. In this section, the word impact will be used to describe long run effects of the trust-based interaction in the automotive industry and mobility ecosystem.

The long-run effects of the regionally agglomerated industrial production process can be defined within scope capitalist economic rationality which has been constructed on the continuous capital accumulation process. It is worth mentioning from the beginning that this transformation cannot be expected to operate in a way that is contrary to the continuous accumulation mechanism, which is one of the basic assumptions of the capitalist economy. Of course, it is also a fact that the aforementioned quadruple transformation process rises above the long-term expected effects that contradict the basic assumptions of the continuous accumulation process. In that sense, growth is the primary impact of the trust-base consolidation in the automotive supply chain that ensures long-term value creation process. While discussing the basic features of the automotive industry, we discussed that the industry has a structure that forms the basis of economic growth with its backward and forward connections. This weight of the sector in general economic activities makes the automotive industry extremely attractive for growth-oriented regional development models and there is a serious competition between regions that intend to attract global automobile manufacturers. The primary discourse of the short-termist growth-oriented strategy is constructed on increasing the employment. Let's remember the bitter struggle between many regions, after VW announced that it would build a manufacturing plant that will produce vehicles with internal combustion engines in eastern Europe at the end of 2018. VW's manufacturing plant investment process and the way it manages this process is one of the cases that most clearly reveals the difference between the mobility ecosystem and the automotive industry in terms of its desired impacts. This investment by VW is part of its strategy to expand its production facilities for less developed markets such as Africa and Asia out of the central countries of Europe, anticipating that the process of withdrawing internal combustion engines from the market will be gradual. And it is the result of a short-term policy framework focused on increasing growth and employment that many countries seek to attract this old technology, either directly or through incentives. However, this situation contains important contradictions not only for the invested countries, but also for the country and company that will make the investment. Since it cannot be argued that the sustainability-oriented approach of the quadruple transformation is valid only for developed countries, it is not possible to talk about the goodwill of a policy framework that allows limited resources to be consumed rapidly with a growth-oriented strategy in the periphery.

[...] but the problem is that since there is no technological development on the conventional vehicle anymore, it will take place in the market as a product that has completed its depreciation and repaid its technologies, and will be sold for a mess of pottage, so your product will be sold there for chicken feed. The contribution will continue to decrease from

today to the next period, I am very afraid, this transformation is very difficult for the Turkish industry, you know outside, the big global players abandon conventional technologies or sell them to the underdeveloped countries (I16).

It is a fact accepted by nearly all segments that the future will have to be shaped within the framework of a more sustainable industrial development logic. In order to build this future together, it is necessary to approach the issue within the framework of solving global problems with an approach beyond the borders of the countries. The more realistic and applicable your suggestions and practices for the solution of these challenges are, the more it will be possible for you to gain technological superiority in production. In other words, trying to produce policies only to keep their own growth channels open is a hypocritical approach. Such a hypocrisy will also not be welcomed by consumers at a time when power has begun to shift from producer to consumer.

4.2: Inter-institutional Collaboration in Two Systems

The base of trust in a particular system constitutes an enabling environment for the collaborative actions. Since the collaborative actions have been realized on a field that has already been prepared by the trust relations, it is not possible to distinguish the trust and collaboration relations in terms of their characteristics. In this context, the characteristics of the trust relations in the two different systems in terms of context, conditions, objectives, actors, expected outcomes and impacts are also valid for the relations of collaboration. The decision to merge under a single title or separate into two titles of trust and collaboration relations was one of the decisions that I encountered frequently during the writing process of the thesis and perhaps the most difficult one to conclude. Finally, I decided to deal with the trust and collaboration issues into two different sections. At this point, in order to avoid repetition, to deepen our analysis in the context of trust relations by considering how cooperation relations are shaped within the framework of two systems through specific examples.

Collaboration is a voluntary act of working together for the purpose of creating value. While the voluntary character of collaboration necessitates the existence of trust relations, it is not possible to develop collaboration in systems based on power. In systems built on asymmetrical power relations, interactions between actors that look like collaboration relations are compulsory practices of working together based on short-term commercial gains.

The dominance of the power relations between the automotive main industry and the supply industry is inversely proportional to the added value of the parts provided by the supply industry. In regional agglomerations, where the automotive supply industry is stuck in a low value-added product range, the asymmetric power balance in favour of the buyer (OEM or Tier1) is one of the most important factors preventing collaboration. In this context, it is very difficult to realize the expectation that the supplier industry companies will go to the upper steps of the automotive value chain by producing more complicated parts, components and even systems with the collaborative product development projects. The low complexity of the product bundle triggers the instinct of protection of the manufacturers and creates a closed loop between the buyer and supplier. The process of protecting the product and relations in the system of orbital motion has a strong definitive power for the collaborative attitudes in the automotive industry.

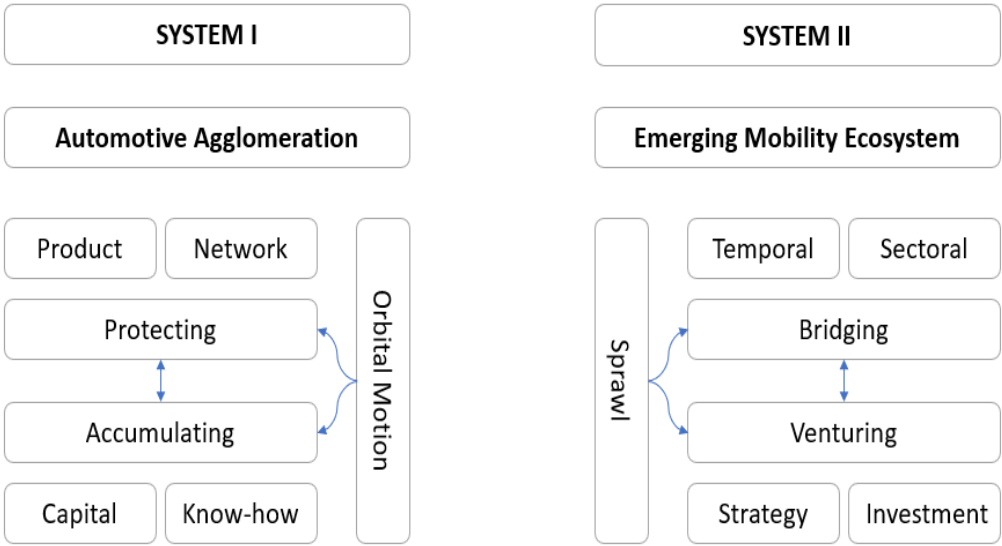


Figure 9 - The Behavioural Dynamics of Automotive Industry in Two Systems

As shown in the Figure 9, there are two basic behaviours of suppliers producing low value-added products in an automotive agglomeration, namely protecting and accumulating. The reflex of protecting has been shaped around the product produced and the commercial relations established by the suppliers to maintain the manufacturing process. This fear stems from the very low barriers to imitate the manufactured product and to introduce to the market with the right connections. In this context, one of the biggest obstacles to the functioning of inter-institutional cooperation mechanisms in the BISK automotive agglomeration is the

sensitivity to concealing products and network. The main focus of the automotive suppliers in the BISK automotive agglomeration is to accumulate capital and know-how on the production processes. On the other hand, the primary reactions of some of the automotive suppliers fortified with the ecosystem actors to the emerging mobility ecosystem are concentrated into two concepts namely bridging and venturing. The actors who are seeking change are looking for action to fill temporal and sectoral gaps. Temporal gap is trying to be filled through reconciling present and future. On the other hand, the gap is trying to overcome the multidimensionality required by the mobility ecosystem by attempting to establish links with other sectors. The venturing behaviour can be conceptualised as the second stage of sprawl which aims to occupy the temporal and sectoral gaps. It is an active strategy that has been putting forward by the actors who have been willing to take risk. Strategy building is a part of venturing behaviour to occupy the emerging mobility ecosystem which can be seen as terra nullius. With the strategy creation studies that follow the exploration studies on this area that does not belong to anyone, it turns into a race to determine a dominance area for both companies and institutions. However, few institutions dare to invest in this emerging field. As the risks and opportunities of the field emerging by these pioneering investments become clearer, it can be expected that many institutions will invest in this field with the support of the public with new collaboration models. In this section, we are going to explore the transforming dynamics of the automotive value chain in terms of collaborative attitudes of the institutions.

4.2.1. System I: Collaboration Dynamics in Automotive Industry

The conceptualisation of two systems lies at the heart of the study. The systems, one of which sprouted from the other, are inherently far from each other which are based on different approaches to the processes of understanding and applying the concepts of trust, collaboration, and coordination. The basic characteristics of collaboration in the automotive industry are similar or parallel to the concept of trust discussed in the previous section. As mentioned earlier, the characteristics attributed to the concept of trust in the automotive industry within the framework of different dimensions have been analysed and compared with the mobility ecosystem. The term trust has been analysed under the dimensions of context, conditions, objectives, actors, expected outcomes and impact. When the necessary conditions for the establishment of the trust element and the expected results and effects of

these relations built between the institutions are revealed, we can have a detailed idea of the conditions under which the collaboration takes place. The extent to which co-working practices meet the elements that make up the essence of the term remains a controversial issue. At this point, within the framework of the theory developed, by trying to understand the general characteristics of the system and its reaction to the transformation, we will try to deal with the meanings attributed to the concept of collaboration once again. As a starting point, the section will start by interpreting the analysis of trust relations in the previous section in terms of collaboration dynamics.

In the previous section, while we were dealing with the issue of trust within the framework of the two systems, we mentioned that in the first system, the basis of the relationship between the supplier and the main industry was determined by power relations rather than trust. The asymmetrical power relations between automotive supply industry and OEMs have shaped a hierarchical structure within the actors of automotive agglomeration in the BISK region. It would be useful to rethink the efforts to build a collaborative innovation system in the automotive industry within the framework of the existence of this hierarchical structure. While this hierarchical structure creates a barrier to innovation processes based on collaboration between different institutions, on the other hand, it ensures the continuity of production due to the effective central organization of the production processes. The hierarchical positioning between the main and supplier industry is based on a product-specific practice of working together in a contract-based area with clearly defined tools and purposes. This structure results in the confinement of collaboration relations within the supply chain. While defining trust relationships in the automotive industry, we stated that the main determining factor is the purchasing power of the main industry. Similarly, when we think about BISK automotive agglomeration, it would not be wrong to state that collaboration relations are also defined within the framework of commercial relations. Working together on the lowest level products between the main and the supplier industry is limited to be defined the characteristics of the relevant part by the main industry and to be manufactured this product at the agreed cost by the supplier. The supplier can make minor interventions to the inconsistencies arising from the design in the production process and initiate manufacturing process in line with the new product features after reaching an agreement with the main industry company. Main industry companies can also implement various programs to improve the competencies of the supplier of the relevant product for the parts that have a critical role in the production of the vehicle.

TOYOTA had localized twenty-odd parts, engineering was in charge of the localization, we dealt with the development of the supply industry and its ability to provide parts to TOYOTA, on the other hand, we localized the parts, at the first stage, we increased it to around 400 parts in 2-2.5 years, yes, we didn't make a big financial contribution to the Turkish industry [...] but we made a great contribution in terms of development, we used all Japanese technology, we brought them here, I established a department called "Technical Support" that aimed to develop companies (I18).

The technical support given by the OEM to the supplier has a limited scope and usually focused on the technical problems that have been faced through the manufacturing processes of the specific parts and components. Although the contribution of the OEMs creates an important area of development for parts suppliers, there are certain limits to such product-based competency development co-working applications. These types of suppliers are constrained to just the manufacturing of the automotive parts in line with design specifications which has been given by the OEMs. The next goal of the supply industry companies, which have achieved sufficient competence in the manufacturing of a certain part or group of parts, is to reach the status of "full-service supplier". The idea of outsourcing the engineering process to the suppliers has been applied in the late 1990s by the vehicle manufacturers. Today many suppliers have assume further liabilities in the development, design, and verification process of the components (Truong, 2001, p. 9). Companies that cooperate more closely with OEMs as a full-service supplier also have significant gains in their learning processes. However, it is clear that this structure, which is built on a product-dependent innovation system, also poses significant obstacles for companies to explore more value-added areas.

Under these circumstances, automotive supplier companies tend to develop stereotypes to maintain their relationship with the OEMs. Naturally, the first condition to make this relationship permanent is to accumulate. One of the two basic elements of the accumulation process is undoubtedly capital accumulation. Capital accumulation is the result of the necessity to create an economy of scale through continuous new investments. A strong capital accumulation is also very important to keep up with the investment plans of the OEMs. Another element of accumulation, which is one of the basic reflexes of the automotive supply industry, is know-how accumulation. Due to the importance given to quality in the automotive industry, the standards of the automotive industry are quite high when compared to other traditional industries. The automotive supply industry is also trying to increase the barriers to entry into the market in the product it specializes in, by using many learning organization techniques in order to meet and improve these standards. Rapid adaptation

comes first among the expectations of the main industry companies that are trying to adapt to the changing market conditions and regulations. In order to ensure this adaptation quickly, the depth of know-how regarding all production processes is of great importance for the supply industry. However, no matter how much it tries to increase the barriers to entry with capital and know-how accumulation, these barriers cannot be the only element of the survival strategy for the supply industry that produces low value-added products. This situation leads us to the behaviour of protecting, which is the second factor that determines the collaboration dynamics in the BISK automotive agglomeration. As we have exemplified many times in the previous section, one of the most dominant behaviour in the relational context in the automotive supply sector is protecting. The protection motive includes product (including production processes) and business networks. The main drive to protect the product and business networks is one of the most important factors preventing collaboration in the automotive industry. The behaviours of the automotive supply industry shaped within the framework of accumulation and protection should be interpreted as symptoms arising from the position of BISK automotive agglomeration in the value chain. We will discuss in detail below the motives of accumulating and protecting, which reflect the objective conditions of the production process.

4.2.1.1. Accumulating

One of the emerging codes from the interviews is related with the accumulation process. It would be appropriate to make an explanation about why all codes are designed in gerund form without going into the subject fully. Following Glaser (1978), Charmaz recommends using gerunds (-ing forms) during the coding process in order to gain a sensation to detect processes and actions within the data (Charmaz, 2006, p. 49). One of the warnings that helped me the most during the coding process of the data is the suggestion of the use of gerunds. But I'm not so sure if using gerunds in the coding process helps me to feel the movement in the data. My coding process was bilingual, and I have to Turkish texts in English. This bilingual coding process may have prevented me from feeling the effect of the use of gerunds in capturing motion in the data. However, it made an important contribution to the analysis phase as it created a benchmark to streamline the coding process. In other words, the fact that all the codes are gerunds made it easier to see the connections between them.

The code *accumulating* emerges from two sub-codes which are capital and know-how accumulation. The type of capital and know-how accumulation can be considered as one of the main denominators of the protectionist motive in the context of the automotive supply industry. It is thought that the unique production relations of the automotive industry differentiate the accumulation processes to a certain extent and this structure forms the basis of the protection reflexes of the supply industry. The basic dynamics of these two accumulation processes will be discussed under two different headings below.

4.2.1.2. Capital Accumulation

The continuity of capital accumulation is one of the indispensable conditions of free market economies. Due to intense competition conditions, the need to continuously improve the cost and quality of the product creates pressure on labour and other cost items on the one hand and creates a necessity to make new investments on the other. In supply industries working with a limited number of customers, the process of reinvesting the capital obtained as a result of accumulation has to proceed in a synchronized way with the investment decisions of the main industry companies. The data compiled within the scope of the 11th Development Plan Automotive Industry Working Group Report sheds light on the aggressive growth of the sector in 20 years (T.C. Kalkınma Bakanlığı, 2018, p. 45). Between the years 1996 and 2017

- Main industry made 16 billion US dollars' worth of investment
- The production capacity has been tripled and the production has increased 6 times
- Export increased from 39 thousand to 1.3 million units
- Foreign trade deficit of 1.9 billion USD turned into a surplus worth 6.5 billion USD

The cycle of accumulation and reinvestment has created an enormous supply chain that succeeded in overthrowing the textile industry, which has been an export champion for many years. This rapid accumulation process triggered a relatively less risky growth process compared to the textile sector. Even though there were fluctuations in automotive demand, supply industry companies that made order-based production had the experience to easily overcome these fluctuations after exceeding a certain level of capital and know-how accumulation.

[...] now we are a supplier, yes you have a dream, but you have to earn money, it is difficult to realize the dream without money, of course, we are not in a family situation with endless money from father and grandfather, so your menu has always been like that, but in the end, we need to do something from the zero point, the money we saved professionally there was,

so we thought we'd start with a simple production for the money to come, we started with plastic, that is, we started with plastic, let's get a job done, if we create a resource from there, we said we should invest it in the future, of course, we didn't just stop at plastic, that is, outside of the normal standard plastic, a little more. (I18)

Capital accumulation and know-how accumulation are two processes that go hand in hand. Capital accumulation and reinvestment cycle requires to explore new customers or new products in order to utilize the idle capacity that has been revealed through capital investment. High levels of idle capacity are always seen as a problem for the industry. In the Automotive Sector Strategy Document 2016 - 2019, it was pointed out that one of the most important problems of the sector is the low-capacity utilization rate: “High levels of idle capacity causes operating costs to rise. This is reflected in the product prices and marketing activities become more difficult (*Türkiye Otomotiv Sektörü Strateji Belgesi ve Eylem Planı (2016 – 2019)*, 2016).” The problem of idle capacity in the sector has been inherent to the very nature of the automotive industry in Turkey. It is apparent that the global and national economic fluctuations have direct and fast effect on the rate of capacity utilization. Figure 10 shows the rate of capacity utilization for automotive and manufacturing industries. The reactions of the automotive industry to the boom and boost periods are more aggressive than the manufacturing industry in general. The global financial crisis in 2008 and Turkish currency and debt crisis in 2018 have created a shock wave on the rate of capacity utilisation of automotive industry. On the other hand, the effects of the crises on manufacturing industry were comparatively moderate.

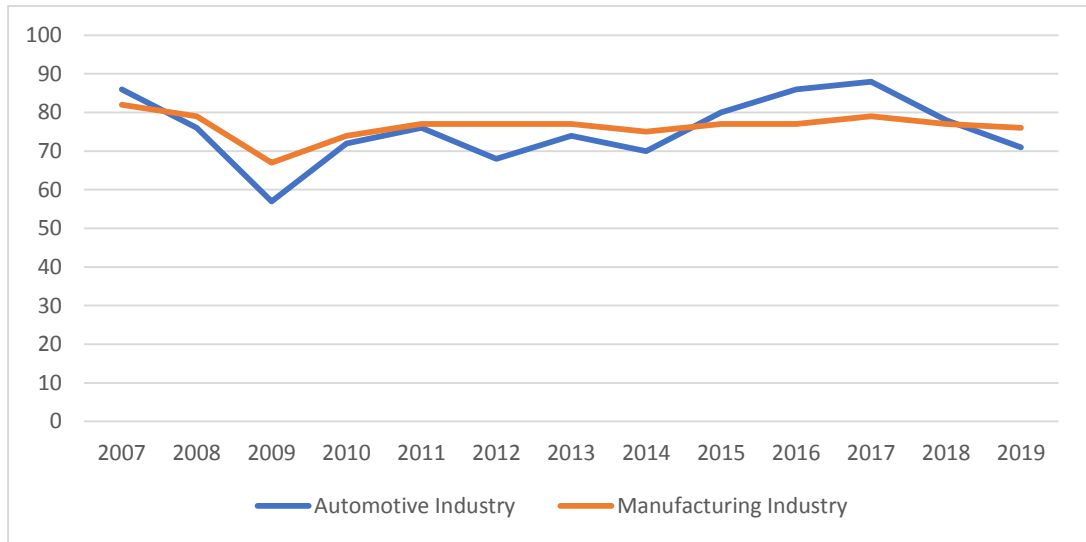


Figure 10 - Rate of Capacity Utilization (TCMB, 2021)

However, the profitability in the field of production in the industry is particularly limited due to extreme competition and it is especially risky for the industry to stay only in these areas (2011-2014 Turkish Automotive Sector Strategy Document, P. 10: 1740). It is true that the profit rates are quite low, but the size of the orders received by the supply industry companies operating especially in the passenger vehicle segment shows that a significant capital accumulation can be made even with this low profitability. However, some actors in the automotive industry argue that comparing to the global companies the accumulation process is not fast enough to finance R&D activities and investments on new complex product development.

The margins of the sector are not high, that is, the automotive sector works with 5-6%, if your margin is 7-8%, it is a great profit, in that case, unfortunately, there is not much savings, there is such a problem, yes, you do conventional work, you do not have much money for the future. You have to prepare, you have no money, you have to spend money, how will this work, here is step by step, good strategy and good coordination are important, our energy is limited [...]
(I18)

The profit margins of the top ten global automotive supplier companies are around between 4.1 and 7.4 percent if we exclude tier suppliers whose margins are around 13 percent ([Table 22](#)). If we exclude Toyota, the profit margin of the main industry companies from production is between 2.06 and 4.66 ([Figure 7](#)). Profitability rates in both the automotive main industry and the supply industry confirm the statement of I18. In order to maintain the capital accumulation process, companies have to achieve economies of scale in the relevant product group or to diversify product bundles with new products with relatively low R&D costs. Since this strategy constantly requires new investments, it causes idle production capacity to occur in periods when demand decreases. It can be said that these boom-and-bust waves spread over longer periods for companies that got rid of dependency on the domestic market and turned to an export-oriented strategy. For this reason, many automotive supply industry companies are overcoming this problem by focusing on exports and making investments close to their main production centres abroad. However, although there are many companies that have responded to this cycle successfully with a rapid growth strategy, it would not be wrong to say that the relative weakness of capital accumulation is the general characteristics of the sector. Among the 40 companies included in the list of "Global Companies of Turkey According to Overseas Turnover", there is Otokar in the 22nd place representing the automotive sector, and Arma Filter Systems, which serves mostly in the main household appliances industry, is in the 31st place (*Global Türk Şirketleri*, 2017). The manufacturing sector of transportation vehicles constitutes only 8 per thousand of the total foreign

investments of Turkish investors. The foreign investment of the sector in 2020 was only 33.6 million dollars (*Yurtdışı Yatırım Raporu*, 2021). However, when we consider the possibility that the automotive supply industry will take place under different headings such as metal and plastic products in the statistics, it would be healthier to comment only on the basis of investment figures. This situation has been identified as one of the biggest obstacles to establish and maintain concrete collaboration relations. As many of my interviewees have stated, it would be wrong to see the inadequacy of capital accumulation and the relatively smaller size of the market as the sole and fundamental factor explaining the dynamics of collaboration relations.

4.2.1.2. Know-how Accumulation

While talking about the transformation into the mobility ecosystem at a meeting I attended, one of the automotive industry representatives said that it is more important for us than anything else to preserve our ability to manufacture, which we have learned step by step over the years. Being a manufacturer in the automotive supply chain has numerous conditions that are not easy to meet. Additionally, working simultaneously with a few of the main industry companies representing different traditions such as U.S.A., Continental Europe, Japan, and South Korea in the organization of manufacturing processes also brings different requirements for their suppliers. As the supplier companies started to develop their engineering skills through modern manufacturing techniques gain a relative independence from the main industry and reach co-designer status which made it possible to accumulate an important know-how in the field of manufacturing.

Currently, 72% of TAYSAD member companies are working on increasing quality and efficiency, 60% on increasing flexibility and speed. While TAYSAD member companies develop 25% of the machines they use in production, 40% of them use standard technologies and 35% of them outsource special technologies. Currently, 36% of companies are working on digital and automation technologies. This shows that the dominance of production technologies in our companies has reached a certain level (*Ar-Ge'de Rekabet Öncesi İşbirliği Projesi*, 2017, p. 23).

The information given within the scope of this study is especially critical, as it clearly shows the elements of know-how accumulation related to manufacturing processes. In this context, it is noteworthy that companies are trying to increase their dominance in the manufacturing processes of the relevant product by carrying out improvement studies on quality, efficiency, flexibility, and speed. On the one hand, the companies are struggling to realize the

investments demanded by the main industry companies through maintaining capital accumulation, on the other hand, they are trying to increase the barriers to entry to the market with the continuous improvements in manufacturing processes. Another striking point is that one-fourth of the companies develop their own machinery and equipment. Thus, while reducing their costs, they also make their production processes unique with their distinctive solutions. The companies who have the ability to construct hat couture machinery for the requirement of their own manufacturing process can rise the barriers to entry. Considering the year 2017, the fact that a significant part of the companies such as 36% have started the digital transformation process is due to the high adaptability ability of the automotive industry. In this context, the interpretation made in the report regarding the maturity of the production processes of the sector based on the data is quite accurate.

Trying to be more competitive in the same segment with perfection in production processes and improvements to be made in the material of the manufactured product significantly increases the knowledge of companies on manufacturing. Digital transformation can be conceptualised as process improvement. In that sense, the twin competitiveness strategy of the supplier companies within their activity area is based on product and process improvement. Excellence in manufacturing processes is generally coupled with a scale-up strategy in order to maintain the overall competitiveness of the company. A supply industry representative summarizes the situation for her/his company as follows:

[...] we focus more on production technologies. Again, how can we shape higher-strength materials more easily, produce faster, produce cheaper, can we produce with less material, focus on different processes, what we can do, of course, there are very serious opportunities here, these are the things we do (I20).

At first glance, it is possible to be tempted by an approach that digital transformation processes should be defined in terms of the "mobility ecosystem". It is necessary to consciously separate digital transformation from the quadruple transformation process in the automotive industry. Because in the theory of the two systems we have defined, excellence in production carried out within the same segment is among the characteristic features of the automotive industry. In this context, it is necessary to distinguish between the use of smart technologies in production processes and the redefinition of the product in a more value-added segment. But there are those who do not hold the same view on this issue.

Both are the same, our point of view is holistic... By transformation we mean the actual technological and digital transformation, it is related to our field, digital transformation, because, keep in mind, we consider the development of a product or a production line [*as digital transformation*] in other words, the development from end to end which is added value

to all processes. We call all the processes of creation, from marketing to logistics, including transformation, all change... (I24)

The accumulation of know-how on manufacturing processes may have some limits. The dependency of the supply industry to the main industry may have paralyzed some capabilities of the companies about the manufacturing process. In this context, it can be claimed that the production ability, which is expressed as a strong muscle in every meeting, does not include a holistic set of competencies. The supply industry, which operates in connection with the main industry in most of the product design processes, is behind the companies that produce final products in terms of design capability. In addition, the know-how about product marketing is also limited. Therefore, the supply industry does not have an end-to-end set of competencies from product development to marketing. This type of partial excellence on the manufacturing process may hinder the innovation and collaboration capacities of the companies. The following e-mail has been sent to me by the Informant 16 provides valuable information about the capabilities of supply industry in Turkey.

Domestic companies that made projects together with the aim of developing products for TOGG were having a hard time making a product from scratch, even though they had been producing the product for years. The customer is waiting for a solution and only submits his request, that is, there is a white page, product demand, but it is not defined. Companies that have been manufacturers for years, let alone designing new products, have difficulties when they have to design the products they have been producing for years from scratch.

I believe that these competency gaps on end-to-end manufacturing processes erode the R&D&I performance of the industry. While the necessary muscles are strengthened related to the manufacturing area, it is still possible for the companies to survive in the automotive industry without any expertise on design, system integration and marketing, which are an integral part of value-added production. It can be said that the source of the ability to survive as a supplier in this unique industry is concentrated within the framework of production activities, and companies falter when faced with situations where the absence of clearly defined specifications. In order for the supplier to make suggestions to the main industry, it is necessary to understand the role of the manufactured part in the basic functions of the vehicle and its relationship with other parts. However, a very large part of the automotive supply industry is far from having such a holistic approach. It can be said that the competence on manufacturing, which is constantly praised, is far from the features that can enable companies to do business in more value-added areas. Being trapped into a specific types of manufacturing activity which has been strictly defined by the main industry restricts the activity areas of the Design or R&D Centres of the supply industry. These centres generally

operate in a limited area of mould design, part lightening or efficiency of manufacturing processes. The striking part of these fields of study is that none of them require advanced collaboration which is one of main determinant of complex R&D&I activities. Because the majority of the improvements made are concentrated around the processes that can be carried out within the company with the trial-and-error method and can get quick improvements. In short, the limited capital and knowledge accumulation in the automotive supply industry is a result of production relations based on the dependent manufacturing of basic automotive parts and components.

4.2.1.2. Protecting

In the automotive supply industry, the most common and descriptive behaviour pattern is undoubtedly protection. In the previous section, we focused on some clues regarding the unique dynamics of the accumulation process on the basis of this behaviour pattern. The orbital motion is a value creation system which creates certain behavioural pattern for the companies that might possibly be related with the position of the company in the value-chain. In particular, these lowest level agents of the value chain which are represented by domestic companies operate within the framework of the constraints and opportunities created by this system. Since the domestic actors of the automotive supply industry produce products based on low technology that can be easily imitated, they follow the protection behaviour pattern as a cultural barrier for their rivals. Automotive parts can be grouped into two large groups: metal and plastic products. Domestic representatives of the automotive supply industry generally produce monolithic plastic and metal parts. Therefore, it is quite easy for a metalworking supplier company to enter the market of its neighbour that produces other metal parts. It can be said that the material conditions of the production processes have fed the protecting behaviour pattern over the years and this pattern has become an industry standard. This behaviour is valid to a certain extent for all supply industry companies that manufacture simple intermediate goods. However, the higher risk of losing the market in sectors where there are few main industry companies such as white goods and automotive may cause protectionist behaviour to be observed more widely.

The code of protecting emerged from the sub-codes product and network protecting that defines two types of protecting. In an environment where competition conditions are getting

worse day by day, protecting the products and business networks have emerged as a natural behavioural pattern for the companies who are operating in the low value-added product segments.

4.2.1.2.1 Product

In one of the strategies prepared for the automotive supply industry, the parts and systems produced by the Turkish automotive industry are listed as follows (TÜBİTAK, 2014). All parts and systems in the list include domestic and foreign supply industry companies that make production in Turkey.

- Engine and engine parts,
- Driveline,
- Brake systems and parts,
- Hydraulic and pneumatic components,
- Suspension parts,
- Safety components,
- Rubber and rubber parts,
- Chassis components and parts,
- Forging and casting parts,
- Electrical equipment and lighting systems,
- Battery,
- Auto windows and
- Seats.

As stated in the same report, when we look at the list, it can be said that Turkey has a serious supply industry agglomeration, including areas with high technology levels. However, this conclusion deserves a closer look and need to be evaluated within the framework of cooperation relations. In the statements made by Automotive Manufacturers Association, it is indicated that localization rates reached in 2019 to 66 percent for passenger cars and 79 percent for commercial vehicles. These figures are a strong indication that Turkey has rapidly increased its share in the global automotive value chain, especially in the last 20 years (OSD, 2021). However, when we look at the purpose of the thesis, among the actors that make up the ecosystem, basically the domestic supply industry companies constitute the main focus of the research. The main reason for this situation is that the multinational manufacturers operating in the region carry out their decisions regarding their transformation strategies and their R&D activities in their centres located outside the country. Since domestic production is a very problematic concept, it is useful to look at these figures with suspicion.

Taking a closer look at the seat systems, among the parts and components listed above, can provide valuable information about the structure and technological level of the of the automotive industry in terms of manufacturing capabilities. A large part of the seats of the vehicles produced by the main industrial companies operating in Turkey are produced by the manufacturing plants of the global companies located in Turkey. Companies such as Assan Hanil, Magna Seating and Toyota-Boshoku manufacture seat systems for different models of these brands for the production facilities of Hyundai, Ford Otosan and Toyota, respectively. Probably, the seating systems have been counted as domestic production and included into the localization rate of passenger and commercial vehicles. Beside the origin of the capital investment, the components that make the seating system is generally imported. I remember that when I asked the general manager of a large automotive seating factory, about the locality rate, (s)he clearly stated that this rate was around 30%. Considering that this rate will be higher especially in higher value-added systems, it is obvious that the rate of domesticity in the automotive sector need to be subject to a more detailed study.

In this regard, it is seen that automotive supply industry companies that develop a protecting behaviour pattern on their product they produce generally operate at the lowest levels of the value chain. In the processes of establishing and developing cooperation relations, as well as the position of the product in the value chain, the unique historical development of the production processes appears as a hindering factor to a certain extent. In this context, gaining skills by imitation, or to put it more politely, reverse engineering processes played an important role at the beginning of the industrialization process. The level of craftsmanship in the manufacturing is described by the ability to construct a machine just by looking the photo of the machine. Some of these legendary craftsmen of the small industrial sites have become the manufacturers in the different types of industries and constituted the backbone of the industrialisation process of Turkey.

When you look back to the 1960s, even up to the 70s, there was a very important assembly industry. *[Turkey was]* a market for the men abroad because of her population, and for this reason, goods were brought *[and assembled in]* Turkey with foreign partners. We gave them lots of money for their know-how to produce. For example, until the 1970s, a METU graduate, an Istanbul Technical graduate didn't matter much, as an engineer, more like a foreman, the engineers of Yıldız Technical University was more successful because they graduated from vocational schools, they were more accustomed to studying technical painting, that is, he knows the foreman as well, because what the people described was that you had the workers do it and get the result (I24).

We learn that not all of these craftsmen, who played an important role in the early stages of the industrialization process, were uneducated experienced workers. Some of those legendary craftsmen were the product of education system who have a degree from vocational schools or engineering faculties. Another issue we learned from this excerpt is that the ability to read the technical drawing is the most wanted capability of the human resource needed by the assembly industry. It played an important role in the industrialization history of reverse engineering connoisseurs, who were walking around with a calliper besides the craftsmen who made the machine just by looking at the photo.

Now I know the assembly industry well, at first the Turkish engineering world used to walk around with callipers. [When they saw] an equipment comes from abroad, everyone measures it, or we do the same, now, but the factory next door also makes it, they measure also. I can tell that imitation and copying the things were very popular in my very young years. Let me talk about the years of Arçelik, the '90s, for example, we used to do ASIC design at that time, so when you design, when you make the electronic circuit, you hide it in a way, you bury it, so that people cannot open it and see how you put the pieces inside (I6).

I6 and I24 seem to agree that engineering in Turkey gains in value with the spread of R&D activities and this process started with Arçelik. However, another important issue emphasized by I6 is that primitive industrial intelligence processes started in the first years of industrialization in Turkey. In that sense, referring to I6, I have gathered the determinants about the Turkish industrialisation era under the sub-code of "age of calliper". We can conclude that the supply industry, which could not switch to an information-intensive production system, tries to protect the information about the product it produces with the influence of the cultural background of the industrialization experience.

The know-how that automotive supply industry actors hide about their products and production processes do not include advanced manufacturing capabilities. In that sense, I18 defines the process of protecting behavioural pattern of the automotive supply industry as "hiding the non-existent." The low level of complexity of the product and production process dramatically limits resources and information to be shared. This situation is one of the factors that prevent possible pre-competitive cooperation between companies.

4.2.1.2.2 Network

The collaborative attitudes of the supply industry are also strictly dependent the level of relationship with their customers, namely OEMs or Tier1s. Just as trust relations are destroyed by asymmetric power relations, it can be said that the relationship defined as

collaboration is built on a commercial concern. In this context, the protection of business networks and connections defined within the framework of direct business relations is of great importance for the supply industry. The supplier industry derives its competitive power from factors such as cheap labour and geographical proximity and their products can be easily substituted. It explains the effort made to keep business networks undeciphered.

Quality, cost, logistics and design/technology management are common within the supply chain. In particular, vehicle production and raw material and component-part production must be in full harmony. For this purpose, it is necessary to establish long-term strategic cooperation between motor vehicle production and component manufacturing organizations in every field (*Türkiye Otomotiv Sektörü Strateji Belgesi ve Eylem Planı (2016 – 2019)*, 2016, p. 7).

Although it is fundamentally true that a certain long-term relationship should be established between the main industry and the supplier industry due to the nature of the sector, there are serious doubts as to whether its long-term nature decreases as it descends to the lower levels of the value chain and whether the quality of this relationship can be described as collaboration. The lower the value chain, the more likely it is to evaluate the exit strategy by customers. In this context, it should be natural for companies operating at low levels in the value chain to protect their business relations from a wide range of companies that can provide the parts and equipment at the same quality and speed. The fact that collaboration processes do not work among organizations whose products are under the threat of imitation. Another feature that distinguishes the automotive sector from other manufacturing industry sectors is that it works with a small number of customers. Other sectors with similar characteristics are white goods, defence, and aviation industries.¹⁹ The limited number of customers prevents companies from taking part in open communication processes that can decodify their business networks. It is clear that the low position of the supply industry in the value chain is behind the inability to establish the open communication environment required for the establishment of weak links needed for the development of innovation-oriented collaborations between institutions.

Conservation behaviour does not only protect the relations which have been constructed within the framework of procurement relations, but also encompasses public and university-specific relations in a broader sense. When I started data collection to make a network analysis

¹⁹ In terms of economies of scale while the white goods and automotive industries exhibit similar characteristics, it should not be overlooked that there is a production structure based on handcraft in lower quantities in the commercial vehicle, aviation, and defence industries.

within the framework of university-industry cooperation in the automotive sector, I encountered an interesting situation that triggered me to think on the open network environment. I asked nearly 70 people about the automotive industry or university representatives which they are in contact with to help decipher the relations between university and industry in the automotive sector and did not get a single answer. Although as a public authority representative, I have not received a single answer from not only the representatives of the automotive industry but also academic representatives within the sample. The position of the supply industry in the value chain, which we put as the biggest obstacle to the development of weak links that need to be formed for the establishment of meaningful collaboration relations, covers not only commercial relations in the narrow sense, but also other actors that make up the agglomeration. On the other hand, there are also supply industry representatives who try to play a leading role in the creation of a mobility ecosystem by going beyond this closed network of relations. However, this demand for open communication is mostly realized within the scope of future-oriented product or service development processes that are not yet subject to competition. It is worth noting that these innovative companies have adopted the protectionist behaviour patterns of the sector in their traditional fields of activity. I8 stressed that “those who understand the thing that sharing information will not be a risk in fact, those who understand that it is possible to grow more together are flying, [...] you do not even realize that they are already gone, they are going out of that group.”

There is also a belief that the pattern of hiding information has cultural root causes that defines the problem at the social rather than sectoral level. Although there is some grain of truth in this view, it is thought that the dynamics of trust, collaboration and coordination are largely a reflection of material conditions. Within this framework, there are many examples suggesting that collaboration practices can be germinated on a different plane that require the construction of more complex networks of relationships. Therefore, it is considered that there are no cultural barriers that make it impossible to develop a collaborative ecosystem among the actors of mobility ecosystem. I9, who sees collaboration as a practical problem rather than a cultural one, expresses her/his views on establishing a specific infrastructure for the development of collaboration opportunities as follows.

It is not in the culture of business life, of course, it can be broken... "Let it be small, but mine" mentality prevails, but that doesn't mean I won't cooperate. Unfortunately, businesses continue to remain small because of this logic, is it because of not collaborating? Whether it

is due to hiding information, it depends on the situation, but the benefits of mutual cooperation are not clearly understood, or the how the resulting benefit will be shared is not documented.

Behaviour patterns aimed at maintaining their current position are one of the important factors that prevent inter-institutional interaction, which has an important role in shaping the collaborative innovation processes. It is thought that a regional innovation system based on collaboration can be created with the participation of actors from outside the automotive industry, without ignoring the material basis of conservative behaviour patterns developed by the industry over the years. However, considering the basic dynamics of automotive agglomeration, it can be said that the support programs designed to increase the added value of the products produced by the sector are not capable of breaking the basic behaviour patterns of the sector. It is of great importance that the conservative structure of the sector needs to be taken into account in the design processes of the regional innovation system. Necessary conditions for the construction of an innovative ecosystem in the automotive industry will be discussed in the following sections.

4.2.2. System II: Collaboration Dynamics in Emerging Mobility Ecosystem

BISK region represents the locus of an agglomeration on automotive industry which has arose as the heart of Turkish industrial production since 1960s. The locale of the emerging mobility ecosystem is much narrower than the BISK region which have found its ground in expanded İstanbul region including western part of Kocaeli. Mobility ecosystem, which we can define as a complex and thematic inter-institutional functional network, is an advanced technology-based value creation system created to take advantage of the skill pool and demand created by the automotive agglomeration. It requires different types of expertise, knowledge and infrastructure that exceed the limits of automotive industry. The primary threat for the automotive supply industry is the risk of being pushed out of the mobility ecosystem which is building around the advanced technology. Automotive industry representatives have been trying to develop strategies against different scenarios they may encounter within the framework of the quadruple transformation. In this context, there are many strategy studies conducted by the main industry, the supplier industry, and the public sector. As expected, such strategy studies, which lack sufficient financial resources and strong public will, created a certain level of awareness in the sector with meetings and workshops where the parties came together and discussed this quadruple transformation during the process. Of course, there are

many automotive suppliers that approach this transformation process very calmly and prefer to remain inactive.

The thing that upsets me is in today's world, now when we were kids, when I was a kid, going abroad was like going to space, when someone went abroad, they looked like aliens, today you feel sad when someone doesn't go out. Access to that image, information and data is so simple and easy, and in fact, in the world outside of us, it is good that someone compiles and collects the data on our behalf so well that you don't even need to do anything about it, for instance OECD or the World Bank and a lot of other institutions... Despite all *[the information we have]*, this indifference to all this in the country and defining the whole world based on what she knows, that is our biggest problem [...] you touch something, and you are in a reality and the reality you touch is the part of the reality, a part of it is certain, but not the whole, that is, the world you are in as a foundry is something within the moulding world. Well, and your reality of course forms a part of that industry both locally and globally, but you are not all of it, now we define the whole picture based on what we know, but this is very comforting... *[He says]* "wait a minute. What I know is that has enabled me making money for 50 years." He says "what are you saying? What are you telling me? I'm the one who makes money, I'm the one who manages 2000 people." You're telling the truth, but how the game was constructed, a Hans came to you and said to you, if you do these things and do it this way, I will take this from you... (I16).

On the other hand, there are some underestimated efforts that aim to transform the current situation into a mobility ecosystem. However, most of these efforts are not materialised and cannot be observed through official statistics. The quadruple transition in the automotive industry has forced the related institutions in the periphery of global automotive manufacturing machine to respond the transformation through using existing capital, infrastructure, and capabilities. Nevertheless, the automotive manufacturing base in Turkey like in many other countries is a path dependent industry which has been established according to the global requirements. It is very difficult to adapt an industry that was formed within the framework of such a relationship of dependency to the transformation process outside the plans of global actors. In particular, the fact that investment preferences of the main actors in the field of advanced technology are naturally positioned in central countries shows that a technology breakthrough based on foreign investment is not very likely in the near future for the automotive industry in Turkey.

Conversely, one of the important features of this process is the agility and structure of the traditional main industry actors does not fit to lead the process the transition to the mobility ecosystem. It is observed that various threats and opportunities have emerged for system actors within the framework of the predictions that the dominance of the main industry companies over the entire supply chain can be broken. For example, in the workshops held within the scope of the AutoCUP project, which aims to strengthen university infrastructures

that will provide services on autonomous vehicles, it has been determined that there are important opportunities for the automotive supply industry. In the final report of the workshop series the ideas gathered from 75 automotive industry representatives grouped and associated. According to this analysis, the following categories were found which includes some of the processes, technical aspects, trends, and opportunities for the upcoming mobility ecosystem (Analiz Sentez, 2018).

- i. Connectivity abilities of the autonomous vehicles
- ii. Gathering and analysing big data
- iii. Sensor and sensor fusion technologies
- iv. Situational awareness
- v. Action control and coordination (Driving assistance & navigation interaction)
- vi. New modes of transport vehicles
- vii. Travel experience and entertainment
- viii. Optimization applications
- ix. Smart and advanced materials
- x. Customization with additive manufacturing
- xi. Modular vehicle systems and system integration

In order to identify the trends in question, there is no need to bring people together in such workshops and consolidate the information they have obtained from various sources. In many studies published in the last 10 years, trends in the automotive industry have already been determined (Coffman et al., 2019a; Cornet et al., 2019; Frost and Sullivan, 2018; Kahn, 2021). However, it is a fact that it is necessary to focus on the process rather than the result, and that bringing together industry representatives for different reasons can trigger innovative transformation processes. In that sense, the first strategy of the automotive industry to integrate the quadruple transition process through establishing collaboration is named as bridging. The bridging strategy is a soft response of the actors of automotive agglomeration that aims to explore the territory of change and to develop their road maps. The strategy is not simply to gather the institutions of automotive agglomeration to solve the problems of the industry. The strategy has two dimensions which are named as temporal and sectoral. Temporal bridging aims to understand the future trends through the lens of current situation. In that manner, the institutions of the BISK automotive agglomeration have been trying to establish mental connections between today and future. Another dimension of bridging process has been realised between the sectors that define present and future. The formation of new ties between production technologies, service innovators, high-tech start-ups, engineering firms, system integrators and the traditional automotive industry is another dimension of the bridge building strategy. The second stage of the collaborative reaction to

the quadruple transition process was conceptualised as venturing. Unlike the bridging strategy, venturing involves physical investment through mobilizing different type of actors that might create a collaborative impact on the desired solutions. These two strategies together constitute the primary response of the institutions to the newly emerging mobility ecosystem within realm of interactional patterns. The strategies bridging and venturing are conceptualised under the category of sprawl. At its most fundamental level, sprawl refers to the effort to take part in the emerging mobility ecosystem. The ambiguity of the future scenarios has to be built on a structure that is too complex to allow this expansion process to proceed in a planned manner. In this context, these tactical movements represent a behaviour pattern that emerges as a reaction. Bridging and venturing are defined as the primary sprawl strategies for the institutions of BISK automotive agglomeration to respond the upcoming transformation of the industry.

4.2.1.1. Bridging

Bridging is the main response of the automotive industry to the emerging mobility ecosystem. The first aim of the strategy is to facilitate knowledge spillover about the quadruple transition among the institutions of automotive industry. The information disseminated by public institutions, sectoral non-governmental organizations, and the transformation leaders of the sector on the vision allows institutions to link their current situations with future scenarios. The principal bridging tool that aims to urge the institutions of automotive industry and other related industries such as energy and transport to develop a proper reaction to the upcoming quadruple transition is collaborative strategy building. The strategy development studies carried out by different institutions at short intervals and repetitively serve different purposes apart from planning. The gatherings serve as a platform that gathers different types of actors and the institutions who organize these strategy building process have gained an influence area for the futuristic themes. In that sense, the strategy building process becomes a tool of occupation the emerging areas within the mobility ecosystem.

The concept of bridging refers also to the interaction between the sectors which are previously not interrelated each other. Both the individual institutions and consortiums have been seeking to explore the emerging opportunities through expanding their network beyond the defined borders of automotive industry. The institutions who are willing to take risk are

searching for reliable partners to collaborate and gradually have become nodes in a particular area of mobility ecosystem. In that sense, bridging strategy has two types of primary elements which are named as temporal and sectoral bridging.

4.2.1.1.1. Temporal Bridging

Automotive is a cyclical industry. Every 7 to 10 years, new models should be produced and the necessary preparations for the production of these models should be carried out together with the supply industry. This structural feature requires automotive main industry companies to take the lead in shaping the future and organize the supply industry within the framework of these requirements.

Therefore, technological development 30 years later, vehicle technologies are more or less in the repertoire of these giant companies, they are on their agenda, and they determine the future trends to a great extent. Here's how this happens. Even if you have a very innovative engine that does not use carbon, such as an electric motor or a solar cell motor, it is very difficult for you to set up this technology today, since you cannot produce it widely and sell it. It is difficult to enter the market. Therefore, the big giants decide when it will enter the market [...]. Well now there are several ways these citizens and SMEs can think alike about future technology. One of them is that big companies know this scenario and they make SMEs apply it when the time comes. This is a scenario. In other words, it is an extremely undemocratic scenario, that is, a scenario where the SMEs have to adapt themselves when the time comes, completely according to the needs of the big companies through the company (I1).

The penetration of the new technologies to the automotive is not a brand-new phenomenon. However, the quadruple transition has changed the paradigm of mobility deeply. It is no longer a technical issue of adapting the new technologies into the conventional cars. As I13 pointed out, we are witnessing a significant transformation in the function of the car, with the simultaneous use of different technologies with a great variety.

What we will see in the vehicles, as I said, we will see more software, these infotainment systems are more, because now maybe I use the phone at work, what's-up etc. we already see them, in short, we will see more electrical and electronics in the vehicle, we will see more, we will see software in the vehicle, and there is modularity, something like this, a group working in Germany right now, for example SONO Motors, they have designed the surface of the car to generate heat and produce energy with solar power, so thanks to this, they can cover approximately 30% of daily use, what does this mean, we will be able to see more than one energy in vehicles... (I13)

It does not seem possible to predict whether the main industrial companies will continue their absolute dominance in shaping the future in the upcoming period. But it is a fact that we are on the edge of a paradigm shift. The future is more ambiguous than ever, even for automotive main industry companies. In this context, there are many scenarios for the future and many

organizations and individuals advocating one of these scenarios. One of the main ways of putting these scenarios into circulation is the reports published by the specialized teams of international consultancy firms on this subject. Apart from the institutions that follow these reports closely and allocate a certain budget in order to understand the future scenarios, there are also verbal culture representatives who obtain these reports from secondary sources.

We follow a lot, what is being done, where do you start now, for example, where Turkey wants to go from its current situation in the automotive field, we need to do something, where do we want to go, what do we want to become, 5 years after our current situation, 10 years then 15 years later, what we want to become in 2 years, now automotive is changing very fast, it is called mobility, automotive will come to an end, mobility will come, mobility is not only automotive but also micro-mobility, electromobility, air transportation, bicycle, motorcycle, multimodal transport, e-scooters, scooters, autonomous devices, electricity, sharing, that is, the sharing economy, etc., all combine with automotive and turn into something else... (I11)

Although knowledge has been an important determinant of power, it has become the dominant source of power for the emerging mobility ecosystem. The integration of different industries and services into a giant mobility ecosystem creates a huge knowledge gap for the institutions of traditional automotive industry. The necessity to understand is the first condition to design a proper strategy for the future. Any actor or institution in the automotive industry have a power to design a corporate strategy for the mobility ecosystem. The strategy needs to be built and implemented with a bundle of collaborators that represents different expertise within the mobility ecosystem. Finding the right partners to walk with requires a certain level of knowledge about the possible scenarios of the future.

Among other actors, I think it is always very important to consult an expert. Now, both the main industry and the supply industry have expertise in their own fields, but since there is already a low level of expertise in new fields in the world, experts should be consulted here as well. In other words, instead of everyone trying to establish their own structure and walk there, they should go and talk to people who know about these specific knowledge and specific jobs in Turkey and determine how to act with them (I14).

However, the primary contradiction of the automotive supplier industry occurs between maintaining the current industrial production processes and spending to the future of industry. The temporal bridging might also an attrition effect on the current production capacity of the company because understanding the possible scenarios are generally beyond the intellectual capacity of these companies. In that sense, universities, public institutions, and civil society organizations are playing an important role to reshape the future perspective of the sector representatives and the emerging ecosystem actors in general. Moreover, there is a gentle competition among these actors in terms of occupying certain technology areas or the complete future-oriented discussions. Proving a platform to discuss an industrial strategy

building for the mobility ecosystem seems the easiest and most effective way of consolidating the dominance of the organizer. Of course, such future-oriented studies are no longer carried out only by automotive sector representatives. Different organizations also carry out strategy development studies for the mobility ecosystem which has been forming by the coming together of many different sectors.

Everyone is trying to do a piece of work, for example, there are other organizations, for example, they claim that they will draw a road map for the specific business, such as e-mobility... We actually started this business with this intention [...] we held a workshop the other day, nearly 40 companies came, nearly 60 employees and we sat down and put all our thoughts on paper (I17).

Since most of these organizations do not have national or regional coordination responsibility and authority, these activities usually do not exceed the level of mental exercise which is performed collectively. However, the fact that the designed strategy remains obsolete in the implementation phase does not prevent the repetition of such studies by different institutions. Studies that focused on the impact of future technologies on the automotive supply industry and the preparation of a road map bring both prestige and an area of expertise to the institutions. It can be said that there is a consensus that the strategy studies carried out by institutions that do not have coordination duties and responsibilities will not yield any results.

Well, we are like this, we are talking about something like this, we are talking about something excitedly, as a country, this is not just automotive, let's just say the automotive sector is the most advanced sector in Turkey, [...] we act according to the rules, we are systematic, we work with strategy, we always plan the future, we are different as an automotive, but it is a little easier to plan there and elsewhere, it may be easier to plan a little more, maybe we inflate it a little too of course, without going into details, but there is no such thing as follow-up (I18).

As I18 indicates gathering the representatives of the industry, public institutions, and civil society organizations in order to design a participatory planning process is the way to react the quadruple transition. Such strategies are designed to expand the dominance area of the institutions and actors rather than getting results for most institutions. The expansion of an institution's dominance in the field of future technologies places that institution in a sought-after position in the mobility ecosystem. On the other hand, providing platforms for the companies and related actors to discuss the future technologies provides an alignment in the industry in terms of future of the automotive industry. I18 who is one of the board members of Automotive Suppliers Association of Turkey stresses the importance of collective action. He also mentioned the importance of reading the future correctly.

As TAYSAD, we are trying to steer the entire supply industry in the same direction, we see this as a matter of homeland and nation, we exist today, we do not exist tomorrow. This is maybe 100 years later, people will work here again, it's not about us, so I think we should do

the same thing in the whole sector, let everyone see the future correctly and take the right steps for the future... (I18)

The temporal bridging is a part of mind-set building process for the industry. The alignment of the automotive agglomeration actors according to the quadruple transition is the primary and initial phase of building a mobility ecosystem. The early reaction to the transformation of the actors in the automotive industry is to understand the potentialities of the upcoming transformation in the transport system. The agglomeration of the industry in a particular geography enables the flow of information among the relevant actors. Not only the business associations of the automotive industry the process of sharing information about the future scenarios is realised through specialised universities, public institutions and local several interfaces. In that sense, the spatial agglomeration of automotive industry in the BISK region provides a suitable environment to be armed the institutions with the channels of flourishing in terms of the potentialities.

4.2.1.1.2. Sectoral Bridging

The mobility ecosystem covers a set of interrelated sub-systems which forms a complex environment as an enabler of value creation process. Industrial agglomerations and their value chains constitute a certain part of these interrelated sub-systems which are the subjects of sectoral bridging. In other words, sectoral bridging occurs among these sub-systems. Of course, it can be said that the automotive value chain, with its forward and backward linkages, locates at the centre of the inter-sectoral interaction process. Although we do not have enough data to establish a consecutive order between temporal and sectoral bridging, these processes might be conceptualised as sequential processes. It is clear that it will not be possible to get in touch with related sectors without having sufficient information about the technologies and future scenarios that deeply affect the automotive industry. The role of the universities, associations, and the other types of interfaces in sectoral bridging is crucial where the regions have critical mass in the related industries related to the mobility ecosystem. A university representative gives a clear example about the functions of some of the specialised universities on the sectoral bridging process.

YASAD (Software Industry Association) and TESID (Turkish Electronic Industrialists Association) are actually far from automotive, so when we look at them, maybe there is very little about automotive, but we said that if we tell them and invite them to our meetings, they also have know-how in this fields. If they can apply this field to automotive, it would be better. Now the electronics sector in the automotive is weak. That's why we decided to attract them

to this area, so we set up the cluster together with them. We set it up the way they are. Their members also participate. Along with these, this cluster has close to 60 members, and we hold workshops twice a year, we have a website, we make some news there, but we organize workshops twice a year on this subject, and we invite international speakers in this workshop, and we are sure that in these workshops there [the attendants] are also [collaborating for] HORIZON2020 programmes, TÜBİTAK calls, etc. We also provide information about these [programmes] (I5).

As I have discussed before, the position of the Turkish automotive suppliers locates at the bottom of value chain. In that sense, it is very important but tough task to attract the high-tech industries to the automotive industry to constitute a coherent mobility ecosystem. At this point, collaboration becomes a necessity rather than a luxury. Collaboration is one of the indispensable conditions for merging knowledge, experience, and research infrastructures in different fields together and transforming them into value-added products. However, although it is just entering the agenda of the BISK automotive agglomeration, on a global scale, this issue is not so new. There are companies competing on a global scale that have been conducting inter-sectoral collaborations for a long time in order to combine mechanical and electronic systems together and make them functional with software. However, the quadruple transformation of the automotive industry is much deeper and represents a paradigm change. The imperative of collaboration therefore seems more essential than ever. The automotive supply industry is trying to keep up with this transformation, like a student trying to take both the intermediate and advanced levels of a course at the same time.

It is observed that Automotive Suppliers Association of Turkey (TAYSAD), the well-established business association of the automotive supply industry is also trying to communicate with sectors such as electronics and software. The association is working on opening its membership base to both other related sectors and the service sector within the framework of changing conditions. In parallel with the need to expand the dominance of the association, it has started sectoral bridging activities as part of its functional expansion strategy.

In fact, electronic and embedded software developers are not among us according to the current regulation, those who work on digital transformation tools are not permanent members for us, those who work on IoT are not permanent members for us, robotics are not primary members for us, therefore, with changing conditions, changing production methods and together with the components used in the car, we will expand the scope of TAYSAD, so in the new conditions, we will make more people in the value chain become TAYSAD members, or the service providers for that job, that is, the raw material of production. there is no difference, one supplies raw materials, and the other is a technology supplier... (I9)

Institutions that are trying to maintain their weight in the automotive sector have come into contact with the actors that may play important roles in the value chain in the future. Organizations that evaluate their current activities over possible scenarios through temporal bridging try to connect with other sectors that will be included in the mobility ecosystem within the framework of their sprawl strategies. However, the sprawl of the institutions can be read not as a part of a systematic and planned strategy, but as a reaction to expand their sphere of influence randomly. There are also companies that successfully implement the strategy of building bridges with other institutions and organizations within the mobility ecosystem. Among the underlying reasons for companies to contact mobility ecosystem actors outside the traditional automotive sector, it may be to seek credible partners with whom a certain level of cooperation will be developed, as well as to fill the knowledge gap. In order to have an idea in the field of future technologies, it is of great importance for companies to closely follow developments outside of their main activities. The identification of initiative areas that will increase risk appetite, following the development of knowledge on future scenarios, triggers a process that enables the transition from general technology talks to events held in more focused areas. The convergence of different sectors opens-up a new way of understanding and enforce innovative ways of communication and collaboration between the sectors.

4.2.1.2. Venturing

The automotive agglomeration and emerging mobility ecosystem are defined as two separate systems that shape the trust, collaboration, and coordination relations. The automotive industry representatives attempt to build abstract and concrete bridges in order to understand the mobility ecosystem and make sense of it for their own institutions. This attitude has formed the basis of their reactions to transformation. However, there are relatively few organizations that have the desire to respond to this quadruple transformation, at least for the time being. Beyond the desire of understanding, the number of companies that make a result-oriented endeavour to adapt their institutions to this transformation is also very few. These uncommon for-profit and non-profit organizations in this group will go down in history as the pioneers of transformation in the automotive industry in Turkey. In this section, the venturing attempts of these institutions to achieve their own transformation will be discussed from the perspective of their collaborative attitudes.

First of all, it is worth to stress that none of these institutions have radically attempted to transform their current manufacturing and service abilities according to the requirements of the mobility ecosystem. Although this emphasis seems to be too obvious phenomenon that needs to be labelled as given, it has the power to explain the destructive effect of transformations on the current system actors. Naturally, it is observed that even institutions that try to react to this transformation with new initiatives can spend much more time to their daily routines rather than the activities that cover new product and market development processes. For this reason, focused technology companies born during the formation of the mobility ecosystem are much more likely to grow rapidly through radical innovation. It is one of the main reasons explaining that Tesla is far ahead of traditional automobile companies in the electric and autonomous vehicles market segment. Ford is among the key industry companies that realized at a relatively early stage that performing this transformation with the departments of the traditional company would leave them behind in this deadly race. In order to respond to the quadruple transformation, Ford creates a new company in the field of autonomous and electric vehicles and invest 4 billion dollars in this field until 2023 (*Ford Creates 'Ford Autonomous Vehicles LLC,'* 2018). However, forming a new company seems quite inadequate to catch the mobility paradigm for the established companies. Since it is of great importance to adapt the simultaneous technological developments in many different areas in the transition from automotive to mobility, it is essential to establish multi-layered collaborations especially from the companies' point of view. These changes are happening so rapidly and deeply that automotive main industry companies are rapidly losing their ability to have a single authority in the creation and coordination of technological information, as in the past. In this context, keeping up with the developing technologies is only possible with cooperation. Therefore, establishing effective and productive collaborations in the mobility ecosystem has become a necessity for companies to survive. Being aware of this necessity, the main industry companies do not hesitate to invest even in the same start-ups as their competitors. For instance, Argo AI, the autonomous vehicle platform company, which Ford and VW invested, reached a valuation of \$ 7 billion in 2019. The company explained its relationship with Ford and VW in their web site as follows (Argo AI, 2021).

Argo AI is an independent company that has established separate partnerships with two global automakers — Ford and Volkswagen — as the first customers of our technology. Our partnerships allow us to work hand-in-hand to approach the design, development, and manufacture of self-driving vehicles holistically. With Ford and Volkswagen as partners, our self-driving system is the first with commercial deployment plans for Europe and the U.S. Plus, with the ability to tap into both automakers' global reach, our platform has the largest

geographic deployment potential of any self-driving technology to date. Ford and Volkswagen are equal minority investors in Argo.

There are countless examples of the collaborations developed by the main industry companies with suppliers and high-tech start-ups. For example, Toyota Motor Europe (TME) is organizing an acceleration program for start-ups working in the field of inclusive mobility and sustainability, together with ISDI Digital Business School, by considering cooperation with start-ups in a more structured framework. Not only OEMs, but also corporate Tier 1 companies are taking various initiatives to improve cooperation opportunities both among themselves and with start-ups. The strategic collaboration announced by Continental and Pioneer in May 2020 focuses on the rapidly developing infotainment field in vehicles (Continental, 2020). It is observed that concrete interactions based on trust and collaboration have been developed immediately following the stage of contacting companies with the firms operating in different sectors at the global level. It would be appropriate to call this second phase venturing, which is a response to the rapid technological developments in the field of mobility ecosystem.

The process of venturing begins with a decision to design new objectives outside of the regular working area of the institution. Setting a new goal to discover a new market segment is a big step for the institution to upgrade their position in the value chain. Deciding on the entrepreneurial discovery process and starting to lay the groundwork for the strategically targeted transformation is an important pillar of the venturing behaviour pattern. Although all the unknowns in the bridging process have not been clarified, institutions must have taken an important step towards choosing their comrades with whom they will walk in the transformation journey by making a declaration of will. With the strategic maturity and clarity of the targets, the institutions go to the stage of making efforts to realize new investments in order to achieve these targets. Unlike other stages, the main criterion is that the institutions that have reached this level of maturity have invested in new market segments whose boundaries are still not very clear. After this point, action speaks louder than words.

4.2.1.2.1 Strategy – New Objectives

The declaration of will on designing the strategy of transformation is one of the most important clues that the mental transformation has begun in an institution. Increasing knowledge about the direction of transformation and the opportunities it can create, and

mental exercises with people and organizations that can work together are embodied in the decision to prepare a transformation strategy. Unlike corporate strategies that list what needs to be done to produce more for less, transformation strategies are designed to have a say in the future of the firm. In other words, shaping the future of the company in line with the requirements of transformation is the main objective of the transformation strategy. The fact that the company carries out this transformation in parallel with its current business and the weight is gradually transferred to the next foot which slows down and even interrupts the adaptation process. In that sense separating the functions of the companies also emerge as a strategic option for the suppliers. The strategy of separating the functions of the companies seems also valid for the global automotive supply chain:

Separating businesses that need to undergo transformation is likely to become a common strategy. This allows the supplier group to develop the business in a different direction than the remaining entities. In many cases, companies don't separate product groups fully in terms of factories (e.g., zebra plants), reporting structures or financial control. These businesses will need to be "carved out" in order to be separated (Deloitte, 2020, p. 12).

It is of great importance for the Turkish automotive supply industry, which does not have the luxury of continuing its ongoing business and future business under different structures to carry out these two functions simultaneously. In that sense ambidexterity has become a major strategy for the companies. Ambidexterity is a term that defines the ability of using both hands with the same efficiency and effectiveness. The main hand of the industry is responsible for manufacturing current products which are subject to active trade. The main duty of this hand is works and strategies that are related with daily activities. Therefore, it is widely believed that all activities that can reduce the efficiency of this hand are seen unnecessary and even harmful. The inferior hand represents future. It is not possible to focus on areas that are likely to develop in the future while maintaining current competitiveness through the same hand. Ambidexterity requires zebra factories which can have a dichotomic manufacturing structure for different types of components. However, the first thing to do for an ambidextrous company is to set new objectives for the new market segments. In that sense, exploring new market segments that fit the capabilities of the manufacturing companies is the primary objective for the strategizing process. The cluster strategy development processes that have been guided by the civil society organizations, universities and public institutions provides valuable information for the companies who are looking to transform their manufacturing capabilities according to the requirements of the quadruple transition. However, the gap between their manufacturing capabilities and the requirements of the software intensive

electronic components is too big to fill. The strategies developed by the companies to fill the knowledge and capability gap are divided into four broad groups:

i. Stationaries:

It is generally stressed that the transition to the mobility ecosystem is a gradual process. The transformation has begun from the higher income social classes of the first world. The trend of electrification is fastest progressing transformation process among others. The electric car stock got an annual average growth of %65 between the years 2014 and 2019 and reached 7.2 million globally. However, even in the most optimistic scenario, it is estimated that electric vehicles will constitute only 30% of the global automobile market by 2030 (IEA, 2020, p. 19). Therefore, the fact that the conventional vehicle market is gradually being replaced by electric vehicles is one of the facts that the majority of supplier companies who prefer to remain unresponsive to the transformation process take into account when considering their strategies. It can be said that automotive suppliers, who think that the profitability of the sector is still at a satisfactory level for them, are betting that this transformation will take a very long time. An automotive supply industry company's statement "If I can't sell to Europe, I'll sell to Africa (I16)" summarizes the views of those who adopt this strategy in a simple and striking way. The basic assumption of this view is that the contraction in the traditional automotive market is not fast enough to throw its own company out of the market in the short term. Within the framework of this assumption, adopting a strategy to increase the company's current production capability, quality and quantity is seen as the most reasonable option by many automotive supply industry companies.

There is another group of companies who are willing to stay stationary. The reason why those companies ignore the transformation process is their belief that the transformation will not make a significant difference on their products. This group that invests to their present strengths is inactive because they think that their products will be used in automobiles, perhaps with minor modifications, in the future. This group can be defined by the phrase "the seat is the seat (I12)" that emphasize the major parts of an automobile will not be affected by the quadruple transformation. Some of the supply industry companies that produce the interior parts, bodywork and wheel groups of the vehicle are included in this group. However, I think that the behaviour pattern of investing in transformation areas by perceiving the future is relatively independent of the product manufactured by the company. Since I do not have

the data set to analyse this claim in depth, it would be more appropriate to perceive this situation as an observation rather than a scientific result. But it is also a fact that the companies in the BISK automotive agglomeration which are indifferent to the transformation constitutes a significant majority. Their primary response to the changing expectations is to adapt and improve their products in most cases through weight reductions. It would be better to consider these improvement efforts rather than as a reaction to the quadruple transformation process can be seen a move in line with the expectations of the customers. The customers are forced to reduce weight of vehicles according to the increasing pressure of governments on vehicle emissions and fuel economy. Since most of the automotive suppliers in the BISK agglomeration are manufacturing automotive parts from steel, plastics, rubber, and other materials the aim of weight reduction has become the most popular way to response the quadruple transition. Considering that the value of the light materials market, which is 69.7 billion dollars by 2020, will reach 99.3 billion dollars in 2025 (Markets and Markets, 2021), it is quite logical for the automotive supply industry to try to develop an expertise in this field. However, the effort of the automotive supply industry to produce its products from different materials is seen as a strategy developed within the framework of customer expectations, rather than as a response to the quadruple transformation. For this reason, the companies in this group are included in the stationaries category.

ii. Product seekers:

Another group of automotive suppliers are trying to find new products either for the traditional vehicles with internal combustion engine or for the new mobility solutions. The dual strategy of these companies is based on exploring new markets according to their capabilities and discovering a gap that suits their institutional manufacturing capabilities constitutes their institutional survival strategy. It has been observed that a significant majority of the companies in this group produce products such as cardan shaft, exhaust group, internal combustion engine parts that will disappear with the transition to electric vehicles. These companies have adopted the strategy of survival by being at more or less the same levels of the value chain within the framework of the transformed vehicle typology. At first glance, it can be said that this strategy is one of the most risk-free strategies for BISK automotive agglomeration. However, since this strategy means trying to hold on to the least value-added area of the value chain, it can be considered as an approach that increases the risk premium as time progresses. Therefore, these companies, whose market share of their products will

gradually disappear, are faced with the threat of being wiped out by trying to take a place in the emerging mobility market.

Now, there is a well-established the supply industry in our country. I think we can consider automotive competitiveness as a whole. In other words, we need to consider the main industry and the supply industry together. That is, the main industry wants to supply a component from the domestic supplier, if it is feasible and if appropriate quality conditions are met, it is absolutely necessary to procure (I22).

The product lists that can be localized in the automotive sector are prepared by the civil society representatives of the main and supply industries. Therefore, it is well known by the industry which parts of a domestically produced vehicle can be produced locally and which are imported. Despite this, the desired localization move cannot be realized. It would not be wrong to say that the know-how and capital gap are among the possible reasons why the localization efforts have not been successful enough. It would be appropriate to add to this the fact that an economy of scale that has been created by global competitors for the products cannot be achieved only with the local market. Since the product localization strategy concentrates on areas where competition conditions are intense at the same added value level for the automotive sector, the chance of success is extremely low. In order to have a say in high value-added products in the mobility ecosystem, it is of great importance to get rid of the passive structure of traditional automotive suppliers that do business based on the orders of OEMs. This vicious circle, on the other hand, can only be possible by providing the mental transformation necessary for the transition to an ecosystem understanding from a sectoral perspective. It is apparent that a product-based strategy is unlikely to facilitate such a transformation.

iii. Collaborative product developers

Firms that better grasp the spirit of the transformation required for the transition to the mobility ecosystem, on the other hand, build their strategies on collaborating with companies or start-ups that specialize in areas outside their competence set. However, these types of companies are still searching for a product. The difference of these companies is structured on their willingness to find a new and more profitable market segment within the mobility ecosystem. Their goal is to develop an advanced and more sophisticated product which has a greater profit margin.

At the moment, there is a Japanese company, which we cooperate with technically. They are only working for TOYOTA, but our cooperation with them is about what I call “air blowers”, which provides heating and cooling inside the car, we are trying to make the electronics on that system ourselves. There are other companies, a Turkish company, actually founded in

England, maybe you know, for example, we are developing BMS "battery management system" together with them for a battery, they do the software, we do the hardware (I18). It is estimated that the main industry companies will try to simplify the supply chain as much as possible in order to respond to the customer demands that are expected to become more diversified in the coming period. Within the framework of this trend, which can be perceived as a complement to the outsourcing strategies that the automotive industry has historically implemented step by step, it is thought that they will concentrate on working with fewer suppliers. This situation is thought to improve the power of system suppliers in the value chain, and companies that directly supply parts to the main industry may become the subcontractors of the system suppliers.

As indicated several times, being open to collaboration is a key quality for the companies who are willing to take place in the emerging mobility ecosystem. Becoming a system developer requires result-oriented collaboration with the relevant companies who have the capability to design especially electronic and software components of a complex system. The transformation attempt based on collaborative product development is a coherent strategy to build a result-oriented collaboration through bridging with the actors and institutions outside the automotive industry. The strategy requires setting new objectives for the automotive supplier companies beyond the efficient manufacturing of an automotive part or component. Setting a new objective for the company requires an original mindset that can only be developed through a proper understanding the dynamics of quadruple transformation.

iv. Ecosystem builders

The final group of companies are labelled as "ecosystem builders" and they are trying to set new objectives for the company beyond the automotive parts, components, and systems. The independence of the company strategy from the product provides a broad range of opportunities and threats for the company. In that sense, the automotive supplier companies who are trying to leverage the building process of mobility ecosystem need to diversify their capabilities through overstepping the bounds of manufacturing and improving their muscles related to ecosystem building.

On the other hand, for the last four years, when you look at this issue not only as an automotive but also as a mobility ecosystem, we are on the way to become one of the companies leading this transformation in Turkey, we opened a second R&D Centre for this, and not only on automotive parts, but also on electronics. We are also trying to contribute to the automotive industry, which has transformed into a more software-based industry. For this, we are trying to establish a mobility innovation centre not only by ourselves but also by using open innovation systems, for start-ups or the spin-offs of our company. With the experience we have gained, we are on our way to become a catalyst and transformer by harmonizing the

standards of the automotive industry with these new technologies. We see ourselves as the head and leader of these transformations in the field of mobility (I15).

The institutions in this group show the desire to become a win-win platform where these collaborations will be formed and resolved, beyond creating collaborations specific to a particular product or service. An institution that reaches to the level of *ecosystem builder* should have an approach outside of the traditional protective behaviour patterns of the automotive industry. However, it is obvious that it is necessary to have a high level of credibility throughout the ecosystem in order to undertake the function of building a bridge of trust between different institutions. The credibility of the ecosystem builder has been established through a set of parameters which have risen on trust, collaboration and coordination attitudes of the institution. Of course, we should consider the existence of the critical mass and infrastructure necessary for the establishment of these relations and the construction of an ecosystem as a prerequisite. Therefore, an interaction aimed at creating value among the actors of the sector, which is concentrated in a certain geographical area, constitutes one of the basic conditions of ecosystem construction. The institutions who are willing to become a platform for innovative collaboration are expecting to benefit from the output generated by the other ecosystem actors. When you go beyond the manufacturing-oriented boundaries of the automotive industry and focus on the idea of ecosystem, all the institutions that we previously defined as supporting organizations become an integral part of the ecosystem. Therefore, the focus of study needs to be enlarged to cover the other actors of mobility ecosystem. While defining the ecosystem, it should not be neglected that not only the supporting factors of a sector become the essential element, but also that different sectors and fields of knowledge become a part of the process.

It is important to do these things well, to establish a systematic ecosystem and to implement them. People work together if we change understanding. For example, when you do prospective studies together. So, this is what I just said, when we combine biotechnology, artificial intelligence, and autonomous vehicle technology, this is a very forward-looking study, but people start like this and form this culture and infrastructure. When you suddenly roll up your sleeves and say let's build an autonomous vehicle, you waste more time, you know, and the quality of the work you did is not that good (I5).

In this context, we need to determine that what is defined as the mobility ecosystem is not a manufacturing area with definite boundaries like the automotive sector. Tangible and intangible assets that try to create value in an undefined area determine an ecosystem. In this field, no unity is defined as an outlier, on the contrary, added value is identified as a by-product that emerges from the collaboration of previously unrelated assets. However, when

we look at the dynamics of trust, collaboration, and coordination within the scope of BISK automotive concentration at this stage, it can be said that the mobility ecosystem is at the very beginning of the formation process.

I do not see that the cooperation environment has been formed yet, because if we count start-ups within the ecosystem, if we count a supply industry, if we count a main industry, and if we count the academy, they are all completely disconnected from each other, completely isolated, as of today, they are all doing things to each other, making suggestions, start-ups say “I need something from the main industry... I need cash” the supply industry needs customers from the main industry. Universities want to know and learn from both the main industry and the supply industry. But at this point, I don't see anything, I don't see the issue of unification, here's the reality of Turkey, everybody seems to take their side a little bit, it's not the way things are going to be done in Turkey right now, but the cooperation and relations between them, so everyone is looking at what they need. There are not many who take care of the needs of the whole (I14).

They are not many, but there are some actors and institutions who are aware of the nature of mobility ecosystem. Transformation begins with willpower. It is encouraging that institutions that set targets for themselves within the framework of different strategies in line with the requirements of the mobility ecosystem have emerged. In our analysis, we place the institutions that set goals other than producing more, better quality and cheaper, in the category of those involved in the transformation process rather than at the phase of understanding and perceiving the transformation process.

4.2.1.2.2 Investment – New Institutions

The emerging ecosystems require new types of institutions and new modes of collaboration which are the concrete signs of mental transformation. The transition process from strategy to action can be followed through emerging new types of institutions and organizations. In this framework, we can start by examining these structures created by different types of institutions that take the risks of the transformation process. The action stage of transformation is strongly linked with the applied collaboration of the institutions to form new types of institutions that will either be the object or the facilitator of the transition process. However, as emphasized in the previous section, since a mobility ecosystem consists of institutions and organizations that are in an effort to produce value, which are connected with each other by strong and weak ties. In that manner, the difference between the manufacturing and supporting organizations is not as sharp as the automotive sector. However, it would be more beneficial to start the analysis by separating the non-profit organizations that aim to support the formation and growth of the ecosystem from the profit

seeking product and service providers. I will begin this section by examining the new types of organizations created to trigger industrial transformation in the BISK region.

As far as I can determine, the first concrete initiative for the main industry to notice the transformation in the automotive industry is the research company MEKATRO, which TOFAŞ established in 2004 with an academician, specifically electrical and electronics engineer who has a well-deserved reputation in the field of electric vehicles. The company was established with the initiative and capital of the automotive main industry in a period that can be called an early period of transformation in the automotive industry. In those years, the company developed electric motors together with drive systems, and these motors were mounted on solar-powered prototypes and these vehicles won the first prize three years in a row in national competitions held by TUBITAK.

One year, Boğaziçi [University] applied to us for his car running on fuel cell, we designed the electric engine specially for them, and that car became the champion. As for the reason, [...] we had algorithms that could do the algorithms completely computer-aided and make the discharge graphs of the battery scientifically. In other words, we had come to know the driving scenarios and so on that would keep the energy flow algorithms at the optimum level, in 2006 - 2007, these dates (I6).

Unfortunately, the life of MEKATRO, as one of the first concrete output of collaboration between main industry and university in the field of advanced vehicle technologies, did not last long. However, the knowledge gained as a result of this initiative makes significant contributions to the formation of an Istanbul-based BISK mobility ecosystem. MEKATRO, which is now an indicator of the transition from strategy development to the action phase, has instilled hope in organizations and actors who want to be involved as technology developer in the quadruple transformation of the automotive industry. As a matter of fact, this experience is thought to have contributed significantly to the establishment of the Transportation Technologies and Intelligent Automotive Systems Research Centre, which was established in 2009 within the body of Okan University. In line with the goal of being an entrepreneurial university set by Okan University, a smart specialization strategy in the field of advanced vehicle technologies is being tried to be implemented. According to this strategy, the university has succeeded in bringing together the academic staff who have in-depth knowledge on the automotive industry closely and a serious research infrastructure in the field of advanced vehicle technologies. The university also plays an important role to constitute the mechanisms of university – industry collaborations especially through mobilising clusters and thematic centres of excellence.

Automotive Technologies Research and Development Centre (OTAM) was one the earliest attempts to initiate university – industry collaboration in Turkey established in 2004 to provide R&D, test, and certification efforts in collaboration with Istanbul Technical University, TUBITAK and Automotive Manufacturers Association (OSD). Although the Automotive Exporters' Association (OIB) and the Automotive Suppliers Association of Turkey (TAYSAD) participated in this cooperation in 2008 to strengthen the corporate structure of OTAM, unfortunately the university – industry collaboration could not be sustained at the institutional level. OTAM has been continuing its activities effectively within the ITU Foundation since 2018.

Another venture that aims to upgrade the position of the Turkish automotive industry within the global value chain is Automotive Technologies Platform (OTEP) which was established in collaboration with TAYSAD and OSD in 2008. The establishment of the platform has been fostered by the Ministry of Science, Industry and Technology through a directive given to the TUBITAK. All the main stakeholders have come together to form an intermediary institution that prepare the automotive industry to the upcoming transition. The purpose of the platform is expressed as follows:

[...] to unite R&D organizations that are directly or indirectly related to the automotive industry operating in Turkey around a platform and to increase the R&D capacity of the automotive industry significantly with the created synergy, and to maintain Turkey's long-term competitiveness in this field through identifying and initiating the studies collaboratively (OTEP, 2021).

Another result-oriented collaboration example is the "Innovation Centre" established by the Automotive Supply Industry Specialization Organized Industrial Zone with the support of the East Marmara Development Agency. TOSB Innovation Centre is a structure that aims to develop competence in the field of advanced technologies in the automotive supply industry. Within this framework, the main axis of the activities is focused on ensuring the transformation of companies through the development of cooperation at various levels between start-ups and the supply industry. Another pillar of leveraging transformation, establishment of common use centres. TOSB Innovation Centre is also trying to establish common use centres for the use of SMEs who have limited access to the advanced design tools.

[...] Innovation Centre actually draws a role model. We say that what we have been trying to do [...] at the TOSB Innovation Centre, this has a few pillars. [...] for example, we frequently bring the industry together with the start-ups that we try to go fast, that is, we have entrepreneur presentations every two weeks, we organize digital transformation exhibitions

every two months, that is, we show who is transforming what in the local area. At least, our companies see what is transforming, they either become customers, establish partnerships, or start to buy and sell its product, we are slowly starting to go through such a transformation through technologies through start-ups... On the other hand, we would like to achieve this transformation with central services. [...] we have established a training workshop, there is a design workshop, there are very expensive design programs necessary for our SME-level companies to do R&D and design, they cannot afford them, we buy them in a common place and open them for their use (17).

However, it is also a fact that there is a long way to go in order to transform these common-use areas into innovative collaboration basins for companies. First of all, the main problem of such infrastructures is the dilemma between the current needs of the industry and the requirements of the transformation. Considering that even the infrastructures established to ensure the short-term expectations of the industry are not utilized efficiently, it is extremely difficult to ensure the active use of common use infrastructures equipped with technologies that will carry companies to the future. Interfaces established with the cooperation of different institutions and organizations to support the formation process of the mobility ecosystem emerge as crucial building blocks in triggering and maintaining the transformation. However, there are a few supply industry companies that have made concrete investments to the transformation process by effectively using these structures created with the cooperation of different institutions and organizations. It would be appropriate to continue within the framework of the classification we made in the previous section of the companies that responded to the quadruple transformation observed in the automotive sector by building new formations. As it will be remembered, if we exclude those who are unresponsive to the transformation, I have evaluated the companies that aim to adapt their functions at the strategy level in three separate groups. It would be appropriate to examine the companies that have passed the stage of creating new ventures under these three groups which are named as product seekers, collaborative product developers and ecosystem builders.

The group of companies whose strategy is to find a new product for the autonomous, connected, and electrified vehicles. Among the companies that have adopted this strategy, I have not come across any company that has discovered a product in a higher segment than the current product in the value chain and invested in this field. The probability of finding a low value-added product that will provide a competitive advantage in vehicles with low production volumes that cannot be compared with traditional vehicles with internal combustion engines is extremely low. Moreover, even if such a segment is discovered, the company usually does not need to go to a separate organization to produce this product. The

layout and capabilities of the company are commonly adequate to produce the new product which does not have a huge technology gap with the existing product. The lightweighting is one of the main keywords for the companies who are looking for new products for the next-generation vehicles. Since the automotive supply industry generally builds its competitive advantage on the production of individual parts, the companies are trying to meet the vehicle weight reduction needs imposed by the tightening regulations regarding carbon emissions. The fact that the lightweighting target is a requirement for both conventional and electric vehicles provide a framework of possibilities that will enable companies to save both today and tomorrow.

[...] the development of materials, namely, higher strength steel, higher strength aluminium, that is, the production of the body will continue, we will continue here, so it is not possible for us to switch to an electronic or battery technology, [...] we focus more on production technologies. In the next business, how can we shape higher strength materials more easily, produce faster, produce cheaper, can we produce less material, focus on different processes, what we can do (I20).

However, when developing a strategy, it should be kept in mind that the first thing that comes to mind might not be the right solution which can also easily think about by the competitors. It is observed that large and small companies operating within the scope of the Turkish automotive supply industry, which specializes in materials and mainly metal processing, make significant investments in the production of composite materials. The fact that there are many companies that try to produce their products from composite materials and try to hold on to the market for many years by making them lighter. It means that many companies are preparing from their own perspectives in terms of adaptation to the quadruple transformation. However, it is doubtful to what extent the investments made in the field of composite materials will contribute to the transformation of the automotive supply industry and the adaptation of the company to the quadruple transition. Apart from the companies that try to maintain their competitive advantage by improving the material of the product they produce, companies that work on a new product or product group that will come to the agenda with electric vehicles are also included in this class. Since these companies do not have the competence, relevant infrastructure, capital, or collaborative willpower to produce more complex products, they aim to discover new parts similar to the products they produce in electric vehicles. However, within the framework of the aim of simplifying the supply system of the automotive main industry, the trend of transition from part to system is also observed in the segment of electric vehicles. This situation raises the possibility that companies that currently supply products directly to the main industry as Tier 1 will be positioned as Tier 2,

which provides parts to system manufacturers by falling one level down in the supply chain. Since the driving systems of electric vehicles are much simpler than traditional vehicles, it is difficult to enter this market with simple parts. One of the first to catch the eye of the new parts specific to electric vehicles is the lithium-ion battery cases. In the BISK automotive agglomeration, I have heard that there are companies that are rolling up their sleeves to produce the metal parts of these covers. An automotive supplier stressed that “of course, we also question the opportunities there, here may be the case of the battery, maybe there are other things, but there is not much that requires us to change there (I20).” However, these cases are produced as a system with electronic circuits and embedded software which requires an advanced know-how on battery management systems. Therefore, it is considered that investments in this area without taking orders will be quite risky for the supplier companies. Another choice for the automotive supplier companies to contribute the quadruple transformation is to develop a system for the electrified automobiles through establishing sound and on-the-job collaborations. Here, I have deliberately used the phrase "contributing" to the transformation rather than "adapting". Because in the previous approach, instead of solving a problem, there is an effort to get a share from the market by gaining the ability to produce a product. However, trying to design a complicated system in cooperation with another enterprise with different competencies aims contributing to this transformation. In this context, a cooperation initiative for immature technologies is a critical step towards becoming the subject of transformation from a position that is passively affected by change.

At the conference last week, there was a question that the presenter asked, the whole hall was full of suppliers and OEMs from Turkey, the question was, do you work with start-ups? Do you work with start-ups that produce innovative technology for new generation vehicles? He asked the audience to raise a hand, no one did. This is a very painful truth. Now today, you see Ford, Volkswagen in China, America, Europe, always partnering with software companies or going out and buying them, what does that mean? I won't say that OEM's are that cumbersome anymore, but the technology is progressing so fast that no one is equipped to handle this challenge alone and you definitely need to cooperate with some companies, large and small. The biggest obstacle in front of this is, I am speaking for Turkey, by the way, again short-term strategies (I13).

The companies who are willing to be part of the quadruple transformation are trying to design collaborative projects with the software and electronics companies. However, focusing only on engineering problems through collaborative projects is not adequate to be the subject of this transformation. In this context, it is a more complete option for the supply industry to gain the ability of abstraction in order to comprehend the social needs that necessitate the transformation and take an initiative in line with the spirit of these societal needs. It is extremely challenging for an established business that has achieved a competitive advantage

in a certain product line to go to this level of abstraction. In this context, collaborations to be developed with different institutions and especially start-ups will enable automotive sector companies to be a part of the quadruple transformation. On the other hand, it is a fact that there are serious problems in finding academicians and start-ups with sufficient competence, especially in regions that do not have a full-fledged ecosystem. In other words, it does not work in some cases to determine what should happen and to recommend cooperation in the solution of societal problems.

[...] one trust-shattering example can evoke N trust-shattering examples, that is, one negative experience brings up the issue that nothing comes out of the start-ups [...] I also consider that it has damaged the country's reputation in many environments, because [they define themselves] here we are in Turkey, we are such a start-up, maybe they share the names of the companies from the supply industry that they interviewed once or twice. They include them in European Union projects, then they can't, this time, the plague is damaging our reputation in the field [...] (I14)

The process of creating credible references for start-ups and academics is a very important issue in terms of building the intangible aura of the ecosystem. We will witness the step-by-step construction of a mobility ecosystem as networks of trust based on on-the-job collaborations between actors. Of course, at this point, positive examples need to be multiplied, people and institutions that damage trust relations need to be dissolved in the ecosystem. No matter how valuable the individual collaborations between institutions, the need for institutions that will bear the identity of "ecosystem builders" who are trying to be involved in system construction with a more comprehensive strategy. The existence of main and supply industry companies that are nurturing and developing serial ventures, albeit in limited numbers, gives hope for the construction of a healthy mobility ecosystem in the BISK region.

"Ecosystem builders" are the organizations that have calibrated their mindsets according to the requirements of mobility ecosystem. Such institutions have developed various mechanisms for the emergence of the elements that the ecosystem needs to be shaped and flourished. In this context, they not only cooperate with different institutions and organizations on concrete projects, but also provide a platform for the development of the cooperation environment. Thus, they have the opportunity to capture, map and make sense of information about scarce talent resources. The supply industry knows very well the requirements and intricacies of working with the main industry. In this context, I15 states that the supply industry can act as a "transformer" and "intermediate gear" between start-ups and

the main industry. Thus, suppliers that have been working with OEMs for a long time need to be able to demonstrate their ability to be a "bridge of trust" with brand new companies that shine and fade within the ecosystem.

We organize technology days on behalf of the main industry in Turkey, we invite companies that we invest to the technology days, we bring them together and we see that they are very satisfied with them, we see the interest of the main industry in Turkey in projects such as our own venture, we trust them... We see that they prefer those solutions because they trust, so the sign of this is very clear in Turkey, we have more relations with the innovation groups established with the main industry, R&D groups, in this direction, we actually create environments when we can explain them, technology days is one of them, again R&D one of these is the monthly speaking activities we hold at our centre, many competing main industries can also come there... (I15)

The ecosystem builders provide also financial solutions for the start-up through rather their venture capital firms or bridging the supply with the customers. It is observed that companies engaged in ecosystem building have expanded their operation area functionally and directly participate in networking activities which are generally carried out by civil society, public or universities. All these ecosystem building efforts increase the company's visibility significantly and increase its competitiveness in the current product range. In fact, the platform services provided by the company for the development of the ecosystem bring with it an outcome that strengthens its current position. It is apparent that on a global scale, main industry companies are more actively involved in ecosystem creation processes. However, the issue of dependency of the local automotive manufacturing facilities in Turkey prevent the local OEMs to organize the playground from the mobility ecosystem.

And here I am saying this to point out that an industry that is very dependent on things, and is very dependent on outside, with its main partners, it is not possible to ignore this, even if Ford was able to create some uniqueness on its own, even if TOFAŞ was able to undertake it here as the centre of commercial vehicles (I23).

In that sense, Turkey's Automobile Enterprise Group (TOGG) might be a game changer to build a technologically advanced mobility ecosystem in the BISK region. TOGG aims to build a combined set of mobility solutions through mainly an electrified, connected, and autonomous driving experience but not limited. The following statement is included under the heading of mobility solutions on the TOGG web page.

The ecosystem we are building around the electric, connected and new generation vehicles will incorporate a panoply of services to improve our lives; from charging infrastructure to location-based applications, smart device connection to smart parking applications, membership-based transportation services to over the air updates (TOGG, 2021).

As a result, the ecosystem builders have a great contribution to the establishment of a mobility ecosystem. They are operating as a system integrator and trying to fill the gaps within the ecosystem through facilitating collaborations among the actors of mobility ecosystem. The system thinking approach is a key capability in order to operate as an ecosystem builder. It is thought that a multidimensional and layered mobility ecosystem may be formed in the region with the increase of companies adopting the ecosystem building approach, which requires the most complex set of competencies among different types of venturing strategies. Therefore, the development of strategies to support such companies technically and financially with public resources will accelerate the construction process of a robust mobility ecosystem.

4.3: Coordinating Automotive Supply Chain and Ecosystem

According to the functional sprawl dynamics of the automotive value chain, the coordination issue has also become a widespread phenomenon in relation to the regional innovation systems. Basically, the mechanism of coordination has been designed around and by the OEMs and Tier 1 system supplier companies in the automotive industry. However, with the embodiment of the effects of the quadruple transformation, various development areas and opportunities began to emerge outside of the coordination mechanism organized hierarchically as the centre and the periphery within the boundaries of the supply chain. The transition in the coordination mechanism has been evaluated in line with the trust, collaboration, and coordination relations. The process of coordination is strongly related with strategy building and directing the investments into the desired regional development areas. However, both the process of strategy building, and programming are expected to be influenced by the changes in the nature of value creation processes.

Every nation has a written or unwritten strategy to support and foster the competitiveness of its industrial base. It is generally expected that nurturing and supporting the current industrial production will let to increase the competitiveness of the target industries under the assumption that the private sector can spend the generated surplus value wisely to remain competitive in the future. However, in some cases, individual companies do not have an ability or capacity to transform themselves in order to enter into more profitable market segments. They generally seek to remain profitable under the conditions of the decreasing

rate of returns. Naturally, the external support at the firm level only helps to sustain the current activities of the industries, not their innovation and R&D investments for new or emerging segments. These kinds of companies are generally potential victims of the changing conditions, and they are pushed out of the market by start-ups or FDIs. Since the transition of the market has become common phenomena under rapid technological development, the game of booms and boosts has been playing all over the world. Well then, why governments and other actors into the ecosystems are continuously trying to develop policies to support and nurture their industrial base?

The structural and functional adjustments at the global scale under the post-industrial era have inevitably some crucial consequences on the organization of production. Talking about transitions at the different levels that have diverse objectives, scopes, and scales has become an ordinary daily routine. Under the fierce global competition, adoption of the new paradigms and facilitating the adaptation process of the stakeholders in coherence with the *zeitgeist* are also one of the main priorities of regional policy. Usually, the lead actors in an ecosystem formally or informally propagate the need for a transition to the more profitable and emerging market segments. Under the circumstances of rapid transitions, it is generally accepted that one of the primary duties of a progressive regional policy is to foster, facilitate, and manage the change at the regional level. The main framework of this section is built on the financial and technical support or, more comprehensively, the work it has done within the scope of strengthening the automotive value chain since the establishment of the East Marmara Development Agency. Based on this framework, a discussion will be held on the formation of the "Turkey's Automobile Enterprise Group (TOGG)", which claims to enter the market as a new main industry actor in the transformation process of the automotive industry towards the mobility ecosystem, and regional support mechanisms that can develop the value chains that will form around it.

Automotive and automotive sub-industry is an industry with a wide range of value chain concentrated in Bursa, Istanbul, Sakarya and Kocaeli provinces. While discussing the coordination relations, we will narrow down the BISK region, which is the geographical focus of the thesis, and concentrate on the East Marmara region, which has an administrative integrity within the framework of regional development policies. Narrowing the research focus will give the opportunity to examine the studies carried out on a regional scale within the framework of the coordination of the automotive value chain in more depth.

Considering that the value chain far exceeds the defined boundaries of the industry, limiting the analysis to NACE Rev.2 29 – Motor vehicle, trailer (trailer) and semi-trailer (semi-trailer) will prevent us from seeing the whole picture. By using the inductive method consistently for the purpose of the study, financial supports given to for-profit organizations by the East Marmara Development Agency since 2010 were examined, and organizations providing goods and services to the automotive industry were identified among the organizations receiving support. While the said classification was made, it was determined whether the supported enterprises served the automotive industry within the framework of the information they provided on their websites, and the classification of these enterprises was carried out according to NACE Rev.2 as accurately as possible. As a result of the study carried out in this context, the NACE Rev.2 network related to the value chain of the industry was determined as in Table 12.

Table 12 - Classification of Automotive Value Chain in NACE Rev.2 Standards

NACE Rev.2	
Code	Description
22.19.09	Manufacture of rubber conveyor belts and the conveyor belts
22.29.90	Manufacturing of products that uncategorized somewhere else
24.32.01	Manufacturing of cold rolled narrow strip steel by the method of (width <600 mm)
24.42.21	Manufacturing of aluminium bars, rods, wire and profiles, tubes, pipes and fittings (including those from alloy)
24.51.13	Cast iron (casting of semi-processed iron, grey iron, graphite iron, malleable cast iron, tubes, pipes and profiles with an empty inner part, manufacture of tubes and pipes of cast iron and their connection parts)
24.53.01	Casting of light metals (aluminium, magnesium, titanium, zinc etc. casting of semi-finished products of cast light metal casting)
25.50.01	Hammering, pressing, printing and stigmatizing of metals
25.50.02	Powder metallurgy
25.61.01	Heat treatment of metals and anodising, curing, varnish, etc. surface treatment, electrolysis, or by chemical treatment with zinc-coated metallic coating (excluding tin and nickel plated) and plastic, Teflon, etc. non-metallic coating materials activities
25.62.02	Machine processing of metals (milling, grating, varnishing, grooving, combining, welding, etc.) except laser-cutting metals)
25.73.02	Manufacturing of hand tools, machine tool parts, vases, pinchers etc.
25.73.03	Manufacturing of mould and pouring model from metal (cake and shoe moulds)
25.93.01	Manufacturing of Metal chains (articulated link chain), plus parts and springs and leaves for springs, coated or cored wires, rods, tubes, plates, electrodes (electrical works with those used in electrical insulation excluding)
27.40.06	Manufacture of illuminated signs, illuminated advertising, and the like

<i>Table 12 - Continues</i>	
Code	Description
27.90.08	Manufacture of electrical machinery and apparatus with individual functions (antenna amplifiers, devices transmitting power to fences, electrical machinery with translation or dictionary functions, noise reduction units used in audio recording devices, etc.).
28.11.10	Manufacture of all internal combustion engines, pistons used in diesel engine, etc., cylinders and cylinder blocks, cylinder heads, cylinder liners, intake and exhaust valves, piston rings, moving arms, carburettors, fuel nozzles, etc
28.21.90	Manufacture of ovens and furnaces (industrial furnaces) not elsewhere classified
28.22.10	Manufacture of manual or motor -powered lifting, handling, loading, or unloading machinery (crane pulley, hoist, crane, anchor crane, jack, forklift, lifting and carrying rigs, cranes, mobile lifting frames and so on.)
28.99.10	Manufacturing of industry robots for specific purposes in multi tasks
28.99.90	Manufacturing of the specific purposed machines not classified in any other place
28.91.02	Manufacture of cylinders and other parts for the hot and cold metal rolling machines and for rolling and metallurgical machines
29.20.02	Manufacture of trucks, cabins, cups, dump trucks for motor vehicles, (the bodywork of cars, trucks, vans, buses, vans, tractors, dump trucks and special purpose motor vehicles)
29.31.04	Manufacture of ignition wiring sets and other wiring sets for motor vehicles as well as the production of spark plugs and magnetos, dynamos, magnetic flywheels, distributors, ignition coils, starter motors, alternators and so on.
29.32.20	Manufacture of other parts and accessories for motor vehicles (brakes, gear boxes, wheels, suspension systems, shock absorbers, radiators, exhausts, clutches, steering boxes, ties, tie rods, ball joints, etc.). (Including those for tractors, fire trucks, and so on.)
29.32.21	Manufacture of parts and accessories of the body, cabin and cups for motor vehicles (bumpers, seat safety belts, airbags, doors and so on included)
32.99.10	Manufacturing of fire-proof and protective security outfit and helmets with other security products
45.20.07	General maintenance and repairment services of motorized land vehicles
45.32.03	Retail sale of tires and rims for motor vehicles in specialized stores (motorcycle parts and accessories not included)
85.32.90	Activities of other courses related to vocational education

In the classification made on the distribution of financial supports, it has been observed that the automotive value chain spans nine different areas according to NACE Rev.2 binary coding. In order to gain a perspective in terms of the regional ecosystem, services that we can consider as supportive activities, and which are mostly provided by non-profit organizations are also included in our analysis by taking a step back. In this context, financial support and activities that can contribute to the strengthening of the automotive industry value chain in areas such as test and innovation centres, vocational training and knowledge production are also included in the scope of the study. Thus, a draft study has been tried to be put forward

for a mapping to be prepared for the automotive value chain, based on the supports provided at the regional level.

The classification of the supports provided by the East Marmara Development Agency in terms of the automotive value chain is very important in two respects. First of all, the classification of retrospectively supported projects is very valuable in terms of clearly monitoring and making sense of the different elements included in the automotive value chain. The classification provides an opportunity to evaluate many issues such as business types, technology levels, geographical distribution of the financial supports provided, and also provides a methodical tool for us to have an opinion on issues such as the effect, effectiveness, appropriateness, and sustainability of the financial supports provided. In this framework, in addition to making a general evaluation of the existing support mechanisms in terms of the automotive industry, it is aimed to provide input to the support programs to be designed in the field discussed in the study.

4.3.1: Global Automotive Value Chain and the Position of East Marmara

The automobile has a distinctive place in industrial production with its unique features. The first feature of the automobile, which strengthens its unique position among other end-consumption products, is due to the quantity of its components. Although it differs according to the model and equipment features, an average automobile today consists of approximately 30,000 parts of different sizes and qualities. This number may seem small compared to a Boeing 747, which consists of around 6 million parts, but as an industrial product, the number of parts is not the only thing that makes the car special. While the total number of orders received by Airbus and Boeing in 2019 was only 1,377 (Wagner, 2020). On the other hand, 92 million vehicles were produced on a global scale in the same year, which leads us to the conclusion that the number of parts produced for the automobile industry in a year is approximately 3 trillion. Therefore, automotive production requires intensive raw material consumption and a capital-intensive production structure. With this feature, the automotive industry has traditionally been organized around a small number of brands and companies. The total share of the top 10 automotive main industry manufacturers in global sales was 75% in 2019. The share of the top 10 main industrial enterprises in global sales did not change

much compared to 2010, but General Motors and Ford, which were in the first two places in 2010, dropped to the fourth and sixth places, respectively.

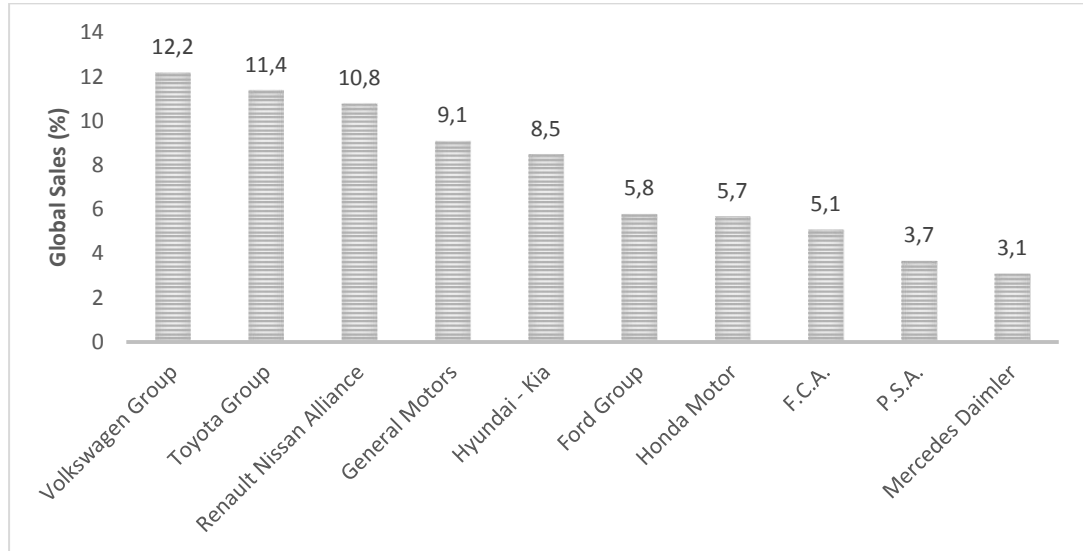


Figure 11 - Global Sales Shares of the Top 10 Automotive Companies in 2019 (Adapted from <http://focus2move.com>)

Similar to the distribution of automotive production among the main industrial brands, it can be said that the geographical distribution of production tends to be concentrated in certain centres. Approximately 75% of the automotive production, which is approaching 100 million units annually on a global scale, is carried out by the top 10 countries as of 2019. However, although China's production increased 14 times between 1999 and 2019, making 28% of the world's production, the share of the top 10 countries in the global market in 1999 was 82%. This situation reveals that automotive production is spatially dispersed to different countries, albeit slowly, and that the surrounding countries are taking more and more shares in automotive production. In the last 20 years, Turkey's share of global automotive production has increased almost five times and reached 2.6% for 2019. When the share of the selected countries in the world automotive production since 1999 is analysed, an interesting phenomenon emerges that should be interpreted as well. As of 2019, Turkey ranks 14th in global automotive production. For comparison, Canada and the Russian Federation, ranked 12th and 13th, respectively, and the Czech Republic and Great Britain, ranked 15th and 16th, were selected in the same list. The shares of the five selected countries, including Turkey, in the world production in 2019 are very close to one, and when we trace back, it is observed

that the shares of Turkey and the Czech Republic have increased to a large extent, while the shares of Canada and Great Britain have decreased significantly. In Figure 12, it is seen that the said break occurred after the 2008 crisis and that these countries could not reach their pre-crisis share. It is observed that the Russian Federation quickly closed its share after the 2008 crisis and increased its share by 1.5 times in 2019 compared to 1999.

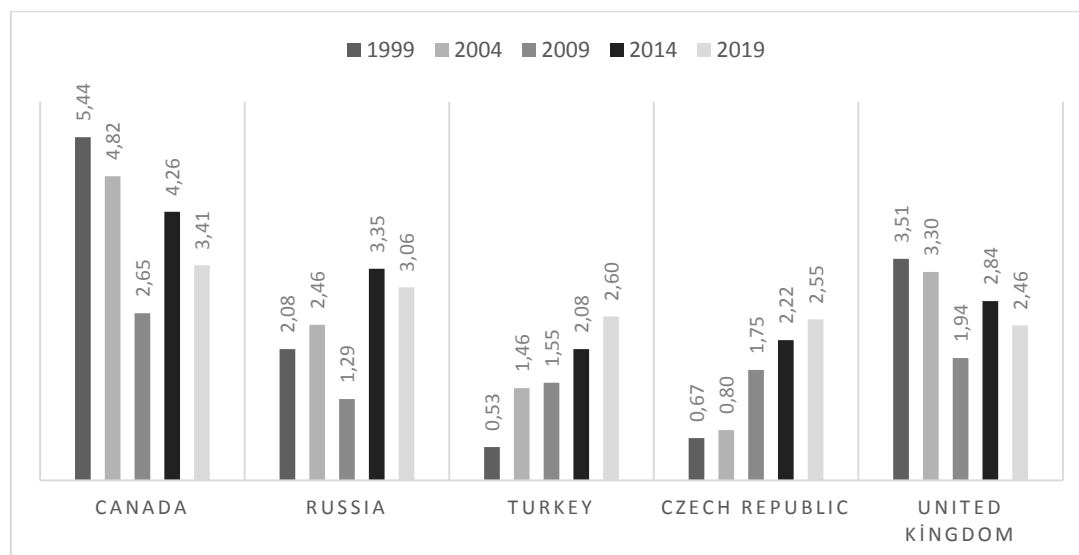


Figure 12 - Share of Turkey and Selected Countries in Global Automotive Production (Adapted from <http://www.oica.net>)

The process of spreading of automotive production from the core countries to the periphery has accelerated especially after the 2008 global financial crisis. It is accepted that the automotive industry, which is built on fossil fuel-consuming internal combustion engines, is in a transformation with technological advances that enable electric, connected, and autonomous vehicles on the one hand, and new business models developed with the emergence of new generation vehicles on the other. Another reason behind the spread of conventional vehicle investments to neighbouring countries is the multiple transformation itself in the automotive industry. Almost all of the electric vehicle production, which includes innovative technologies, is carried out in countries where the necessary demand conditions for these vehicles are created. In this context, there are 41 electric vehicle manufacturers in the United States, 67 in the European Union and 90 in China (EVtrader, 2020).

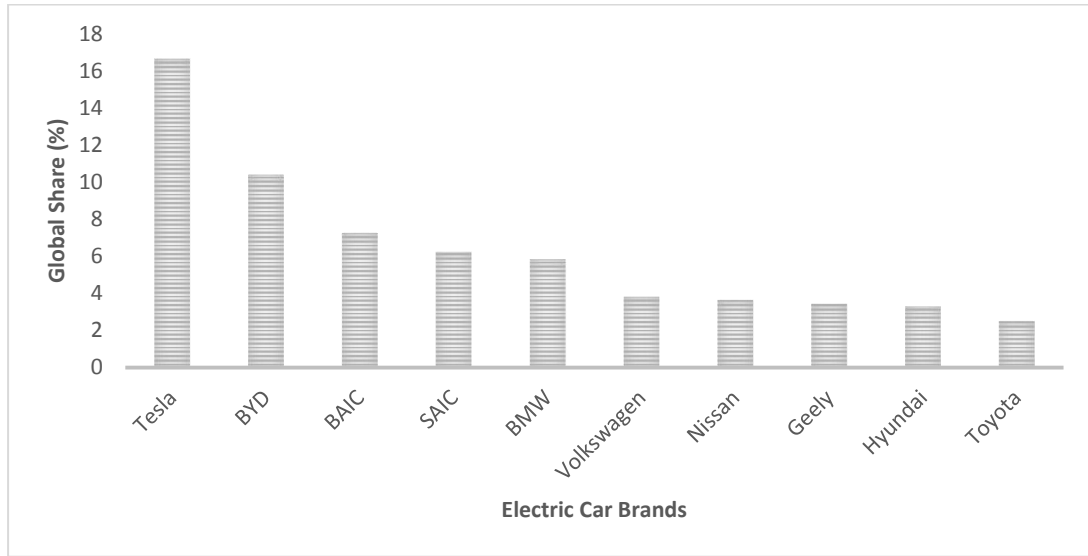


Figure 13 - Global Sales Shares of the Top 10 Electric Vehicle Manufacturers in 2019 (Adapted from <http://statista.com>)

The fact that the global electric vehicle fleet increased by 2 million in 2018 and reached 5.1 million revealed how fast the market is growing. According to electric car brands, Tesla ranks first in 2019 global electric vehicle sales, followed by three Chinese companies BYD, BAIC and SAIC. The fact that the conventional vehicle manufacturers in the list have a very low market share is an indication that the established actors cannot use their first-comer advantage in the electric vehicle market. According to the estimation made by the International Energy Agency (Till Bunsen et al., 2019), global electric vehicle sales are expected to reach 23 million annually in 2030. It is stated that the radical transformation in the sector will deeply affect not only the automotive main industry but also the supply industry, and many businesses operating in this field are at risk of either being pushed out of the market or willing to settle for lower profit rates. The fact that the main industrial companies producing in Turkey cannot act independently from their centres in investment decisions makes it difficult for the supply industry to maintain its competitiveness in the coming period.

Today, the automotive industry is the most important industrial production area in Turkey, with its 12 consecutive years of being the export champion, the employment opportunities it creates, and the wide value chain spread across different sub-sectors. As of 2018, the Turkish automotive industry has reached an annual installed production capacity of over 2 million.

Table 13 - General Information About Automotive Main Industry Companies [Adapted from (Otomotiv Sanayii Genel ve İstatistik Bülteni, 2020)]

OEMs	Location	Date of Establishment	Licence	Capital (1000 TL)	Foreign Capital (%)	Capacity	
						Car	Commercial
A.I.O.S.	Kocaeli	1966	ISUZU	84.000	29,73	0	19.012
Ford Otosan	Eskişehir	1983	FORD	350.910	41,04	30.000	425.000
	Kocaeli (Gölcük)	2001					
	Kocaeli (Yeniköy)	2014					
Hattat Traktör	Tekirdağ	2002	VALTRA	40.000	0	0	25.000
			HATTAT				
Honda Türkiye	Kocaeli	1997	HONDA MOTOR EUROPE LTD	180.000	100	50.000	0
Hyundai Assan	Kocaeli	1997	HYUNDAI MOTOR COMPANY	627.235	70	245.000	0
Karsan	Bursa	1966	HYUNDAI MOTOR COMPANY	600.000	0	0	52.225
			MENARINI BUS				
M.A.N. Türkiye	Ankara	1966	MAN TRUCK & BUS AG	65.000	99,9	0	2.400
Mercedes Benz Türk	İstanbul	1968	MERCEDES BENZ	275.000	84,99	0	19.450
	Aksaray	1985					
Otokar	Sakarya	1963	FRUEHAUF	24.000	0	0	10.300
Oyak Renault	Bursa	1971	RENAULT	323.381	51	375.000	0
Temsa	Adana	1987	TEMSA	210.000	0	0	10.500
Tofaş	Bursa	1971	FIAT	500.000	37,8	290.000	210.000
Toyota	Sakarya	1994	TOYOTA	150.165	100	280.000	0
Türk Traktör	Ankara	1954	NEW HOLLAND / CASE IH	53.369	37,5	0	50.000
	Sakarya	2014					
Σ				3.483.060		1.270.000	823.887

The first data on Turkey's vehicle production quantities belong to 1963. The total number of vehicles produced within the borders of the country in the aforementioned year was 11,112. Approximately 8,000 of these vehicles are tractors, and it was recorded that only 30 cars were produced in 1963 (*Otomotiv Sanayii Üretim Bülteni*, 2019). By 2019, Turkey's total vehicle production was around 1.5 million, and with this number of productions, it increased its share in global automotive production to 2.6 percent.

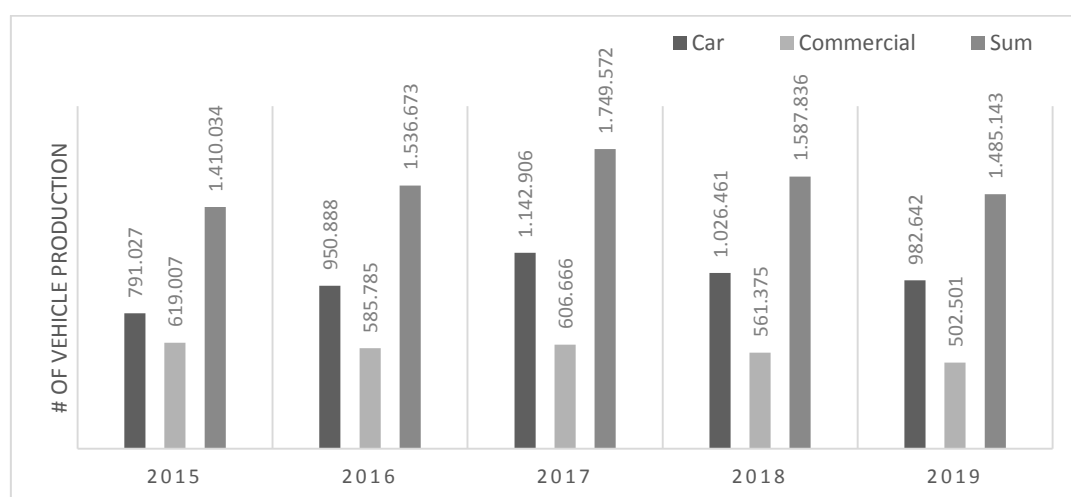


Figure 14 - Number of Vehicles Produced in Turkey in the Last 5 years (Adapted from OSD)

The automotive sector, which has been the export champion of the last 12 years, realized an export of 31.3 billion dollars in 2018 with an increase of 11% compared to the previous year. The export of the ready-made clothing and apparel industry is the following industry with an export of 17.6 billion dollars. When we look at the present from 2010, the automotive sector has been giving foreign trade surplus at an increasing rate in the last three years, except for the years 2011 and 2015.

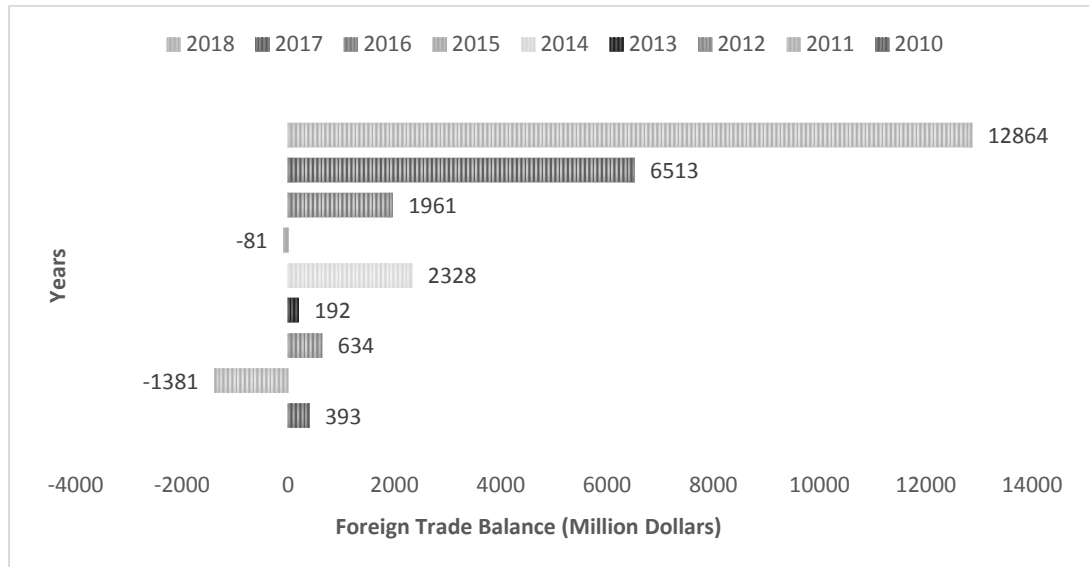


Figure 15 - Foreign Trade Balance of Automotive Industry in Turkey 2010 – 2018 (Adapted from OSD)

In terms of employment created, a total of 52.000 people is employed by the main industrial enterprises as of 2018. Blue-collar workers consist of 40,000 of employment created by the automotive main industry. In Figure 16, the employees employed by the five production facilities that provide the most employment are presented by classifying them as blue collar (BC) and white collar (WC). While office personnel, managers, engineers, and administrative engineers are included in the white-collar category, there are manual workers under the blue-collar definition. The company with the highest ratio of white-collar employees to blue-collar workers is Mercedes Benz Turkey with 44%, while the production facility with the lowest rate is Toyota with only 7%. In Ford Otosan, which ranks first with more than 10,000 employees, this rate was calculated as 31%. (*Otomotiv Sanayii Genel ve İstatistik Bülteni*, 2020). When we consider the supply industry other than the main industry, the number of people employed in the sector increases significantly. The number of people employed only

within the scope of the 29 NACE code “manufacturing of motor vehicles, trailers (trailers) and semi-trailers (semi-trailers)” was 199,087 in 2018. However, the existence of many enterprises operating under different NACE codes, but supplying services or products to the automotive sector, among other sectors, shows that the employment opportunities created by the sector are far beyond these numbers. In order to better guess the employment created by the automotive industry, it would be useful to take a closer look at its shares in different sectoral sub-headings.

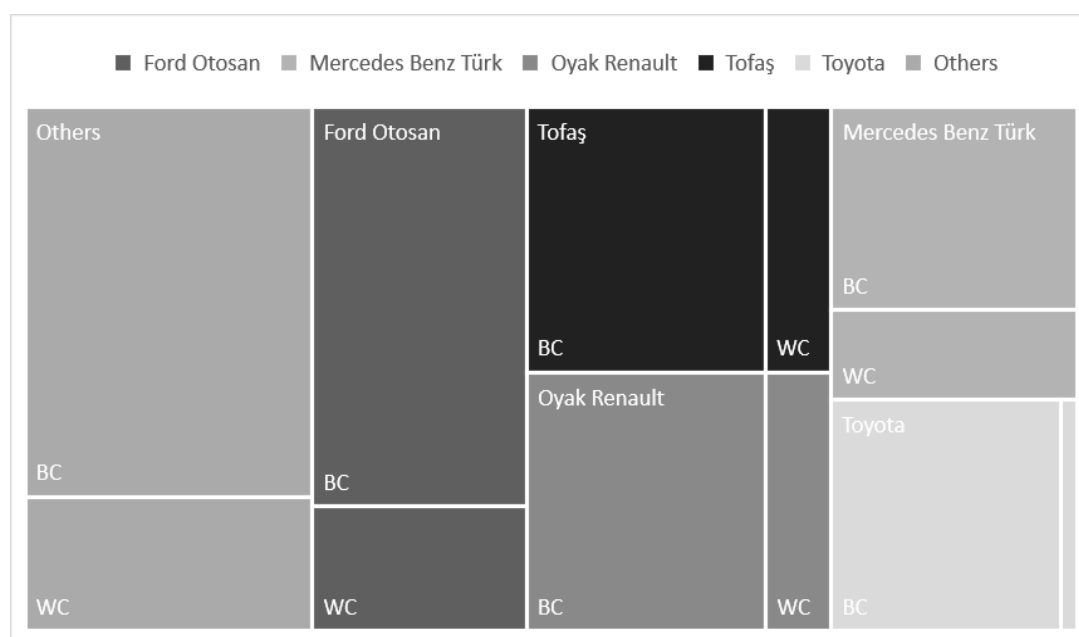


Figure 16 - The Ratio of White-collar to Blue-collar Employees (Adapted from OSD)

It continues to be an important centre of attraction for investments in the automotive main industry and supply industry along the East Marmara, Kocaeli, Sakarya and Düzce lines. Considering the history of automotive production in Turkey, the formation of the automotive industry in the region started at a relatively late period, in the early 1990s. The only automotive industry investment established in the region until these years was the ISUZU factory, which was established in Gebze in 1966 for the production of commercial vehicles. The establishment of the Toyota automotive factory in the Arifiye district of Sakarya in 1992 is the first main industrial investment of the region in terms of automobile production. The first fruits of this investment were taken in 1994 with the production of the 7th Generation Toyota Corolla Sedan. After this investment, both factories started production in 1997 as a

result of the investments made by two Far Eastern companies Honda and Hyundai in Kocaeli's Gebze and Izmit districts. Continuing its production in Istanbul since 1960, Ford Otosan's move to Kocaeli's Gölcük district in 2001, with the largest automotive industry investment ever made, was the last automobile production facility investment made in the region. After this investment, the last automotive main industry investment in the region was completed in 2004 with the establishment of the Türk Traktör factory in Sakarya.

With the new model line investments made in addition to these investments, the region has become an important agglomeration geography for the automotive main and supply industry. Apart from the 15,000-vehicle production capacity of the Ford İnönü (Eskisehir) Factory, where trucks and tow trucks are produced, Ford Otosan has an annual production capacity of 440,000 automobiles and commercial vehicles in its two factories in Kocaeli. Other important manufacturers of the region are Honda and Hyundai companies, which produce automobiles in Kocaeli, and Toyota, whose production facility is located in Sakarya. The East Marmara Region has a 47% share in Turkey's total production capacity, with a total production capacity of 605,000 in automobile production. In commercial vehicle production, 55% of Turkey's total installed capacity is located in Kocaeli and Sakarya. Under the 29 NACE code "manufacturing of motor vehicles, trailers and semi-trailers", the number of people employed in these two provinces is 53,472, which corresponds to approximately 27% of all employment in Turkey under the aforementioned title.

4.3.2: Regional Supports in the System of Orbital Motion

Since its establishment in 2010, the East Marmara Development Agency (EMDA) has been involved in financial support programs under various thematic headings for the private sector, public institutions, and non-governmental organizations. In order to analyse the regional supports provided by the EMDA, the public, private and civil institutions that belong to the automotive value chains have been explored from a list of supported projects which includes 533 projects. The regional supports for the automotive value chain were evaluated by the for-profit and non-profit organizations that make up the automotive value chain.

4.3.2.1: Financial Supports for the Automotive Industry in East Marmara

First, under different thematic support programmes, all private sector organizations that belong to the automotive supply chain are classified according to the products they produce and are positioned according to NACE Rev.2. In order to position the financially supported enterprises within the scope of the supply chain, the web pages of the enterprises and the records of the chambers of commerce and industry of the relevant province were examined, and the basic production areas of the enterprises were tried to be determined. However, since there are companies that operate in different sectoral value chains among companies that produce very similar products, the list obtained for the product has been subjected to a second simplification, paying particular attention to whether there are automotive companies among the customers of the relevant businesses.

Table 14 - Support for Businesses in the Automotive Supply Chain

Year	Name of the Financial Support Programme	Number of Funded Projects	Number of Companies in the Automotive Supply Chain	Proportion of Companies in the Automotive Supply Chain
2010	Improving Competitiveness of SMEs (1)	63	12	19%
2011	Improving Competitiveness of SMEs (2)	52	15	29%
2013	Cleaner Production (1)	18	3	17%
2014	Improving Machinery Manufacturing Industry (1)	34	10	29%
2014	Cleaner Production (2)	25	7	28%
2015	Improving Machinery Manufacturing Industry (1)	12	3	25%
2015	Cleaner Production (3)	10	2	20%
2016	Improving Machinery Manufacturing Industry (1)	13	6	46%
2018	Developing Value Chains of Transportation Vehicles and Systems	2	1	50%
Σ		229	59	26%

It is seen that businesses operating at different levels of the automotive supply chain benefit heavily from almost all of the calls to support the manufacturing industry. The machinery manufacturing industry is among the important components of the automotive supply chain in terms of the production of production tools. However, there are intersections not only in terms of the means of production, but also in the sub-components of the supply industry between both sectors. The existence of a large number of enterprises that provide input to both the machinery and automotive sectors among the enterprises entitled to receive support within the scope of the "Machinery Manufacturing Sector Development Financial Support Program", which was announced for three years in a row, gives the impression that the enterprises in the lower stages of the supply chain are supported with these financial support programs. As the supports move towards the lower levels in the supply chain, competition

intensifies and profit shares decrease. The fact that the target audience of the financial support programs provided by the agencies for the private sector is limited to SMEs makes it impossible for the automotive main industry, Tier-1 and even many Tier-2 enterprises to benefit from the supports. It is seen that many manufacturing industry enterprises, which are at the bottom of the supply chain processing materials to different sectors at a basic level, have benefited from financial supports.

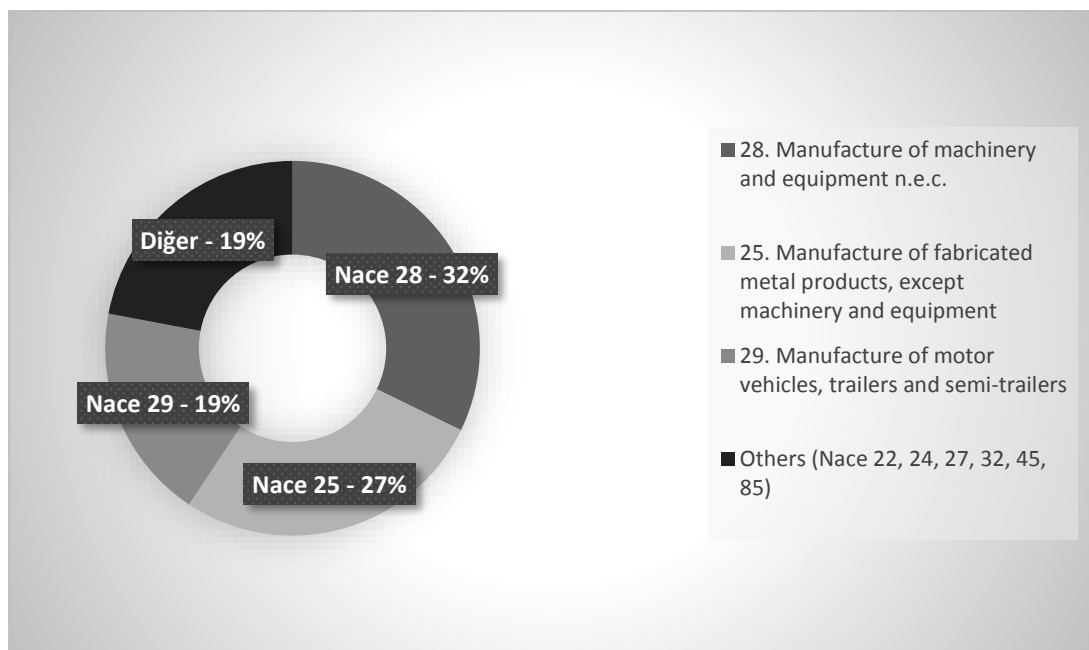


Figure 17 - Distribution of Financially Supported Companies

As a result of the classification of the enterprises that are supported within the scope of the automotive supply industry, it can be said that the enterprises benefiting from the supports are basically gathered under three different NACE Rev.2 codes. As mentioned before, "manufacturing of motor vehicles, trailers (trailers) and semi-trailers" with the code 29 stands out as the main title of automotive industry establishments, but only 19 percent of the supply industry enterprises operating under this code are financially supported. It corresponds to nearly 60 percent of the supported projects were carried out by businesses operating under the titles of 28 NACE code "manufacture of machinery and equipment not elsewhere classified" and 25 NACE code "manufacture of fabricated metal products (excluding machinery and equipment)".

Enterprises operating in the field of industrial automation are classified under the title of “production of industrial robots that can be used for multi-tasking for special purposes” with the code 28.99.10, and there are seven enterprises operating under the said manufacturing field.²⁰ Another prominent sub-title with seven supports under 28 NACE code is 33.20.53 “Manufacture of lifting, transporting, loading or unloading machines (crane hoist, freight elevator, winch, iron capstan), jacks, forklifts, lifting and transport towers, cranes, mobile lifting cages, etc.)” is the subtitle. Businesses operating under this subheading generally produce lifting equipment for many sectors. The most prominent sub-title under the 25 code "manufacture of fabricated metal products" is 25.73.03 "manufacturing of metal molds and casting models", and support was given to seven projects of enterprises operating in this context.

Classification according to NACE codes is also a tool used to determine the technology level of the relevant sector. The classification of sectors according to their technology levels has also been frequently used in the design of support mechanisms in recent years. For example, businesses that can benefit from KOBIGEL grants and interest-free loans provided by KOSGEB are determined according to their NACE codes. According to this classification, 54 percent of the supports provided to the automotive supply industry are classified as medium-high technology, while 40 percent are classified as medium-low technology level.

Table 15 - Classification of Financial Supports in Automotive Supply Chain

Nace Rev.2	Firm	Industry	Technology Level
22. Manufacture of rubber and plastic products	3	İmalat	Medium-Low Tech
24. Manufacture of basic metals	4	İmalat	Medium-Low Tech
25. Manufacture of fabricated metal products, except machinery and equipment	16	İmalat	Medium-Low Tech
27. Manufacture of electrical equipment	2	İmalat	Medium-Low Tech
28. Manufacture of machinery and equipment n.e.c.	19	İmalat	Medium-Low Tech
29. Manufacture of motor vehicles, trailers and semi-trailers	11	İmalat	Medium-Low Tech
32. Other manufacturing	1	İmalat	Low Tech
45. Wholesale and retail trade and repair of motor vehicles and motorcycles	2	Hizmet	Less Information Intensive Services
85. Education	1	Hizmet	Information Intensive Services
	Σ 59		

When we look at the distribution of the supports provided for the automotive supply chain by years, it is seen that the years 2011 and 2014 came to the fore with a total of 15 and 17

²⁰ Businesses operating in the field of industrial automation can also be evaluated under the 33.20.53 code "installation services of industrial process control equipment (design and installation of industrial process control equipment and automatic production facilities, installation of industrial time measuring instruments and devices) (including those with automation support)". It may be more accurate to classify these enterprises under the code 28.99.10 since they also carry out different industrial automation system designs and manufactures apart from installation.

projects, respectively. While there is a balanced distribution over the years between the basic NACE codes 25, 28 and 29 in general, the 28 code "machinery and equipment manufacturing not elsewhere classified" increased slightly in 2014 and 2016, possibly due to the "Machine Manufacturing Sector Development Financial Support Programs" seems to come to the fore.

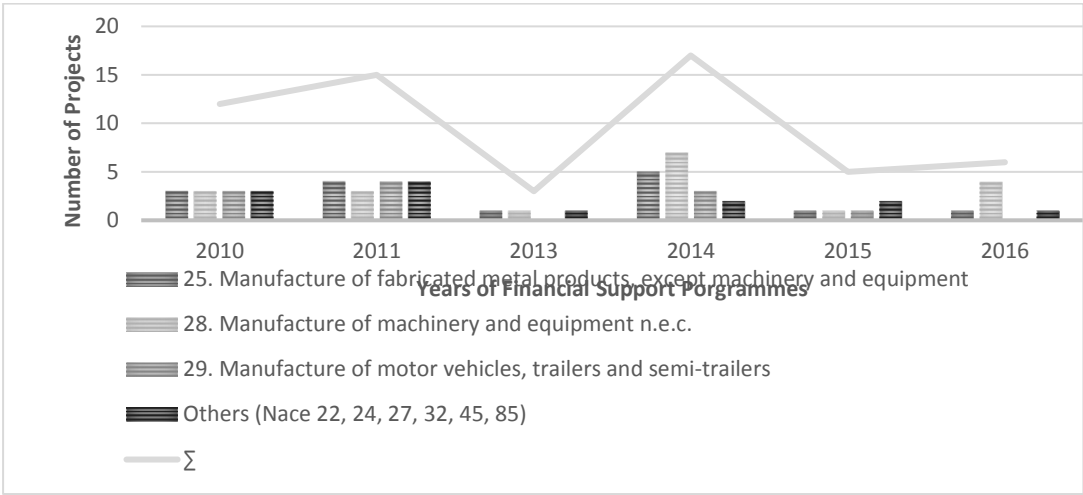


Figure 18 – Regional Supports to Automotive Companies

When we look at the distribution of the supports provided for the enterprises operating in the automotive supply industry to the provinces in the region, we see that the sector is distributed in line with the spatial preferences. While 60 percent of the supported enterprises operate within the borders of Kocaeli province, this rate rises to 88 percent when we include Sakarya.

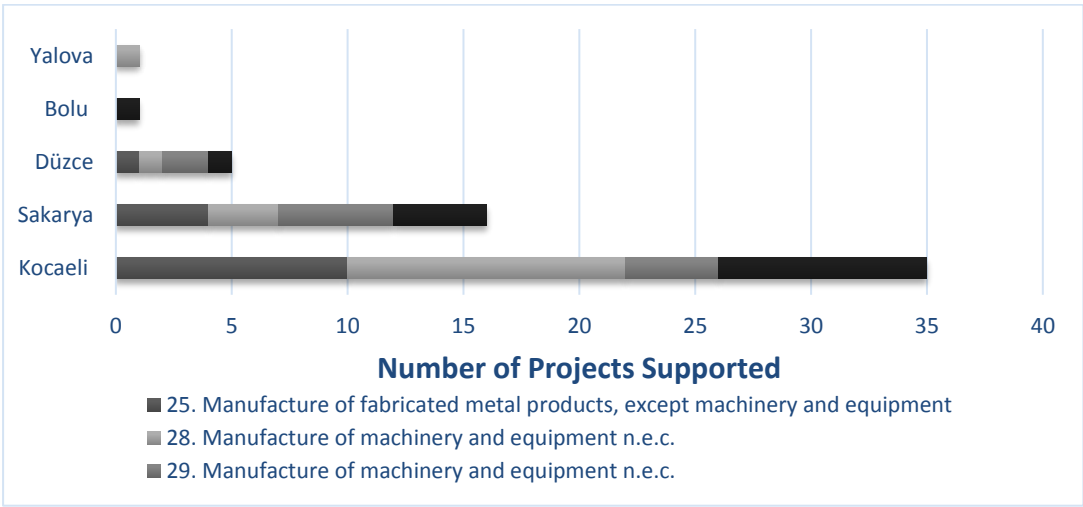


Figure 19 – Regional Supports to Automotive Companies

4.3.2.2: Financial Supports to Improve Subsidiaries in East Marmara

In recent years, supports for developing industrial public infrastructures have started to be preferred more by agencies and donor organizations. In this context, agencies have supported institutions and organizations that aim to strengthen regional ecosystems from past to present, within the framework of different mechanisms. East Marmara Development Agency has also contributed to the development of the regional automotive ecosystem at different levels since its establishment, in addition to the support it has given to private sector organizations. In this context, it supported 38 projects prepared for the development of the regional automotive ecosystem upon the requests of various non-profit organizations operating in the region. The total value of the supported projects is 34.5 million TL and 28 million of these amounts was supported by the Eastern Marmara Development Agency.

Table 16 - The Programmes and Projects for Supporting Activities

Year	Type of Financial Support	Number of Projects
2011	Direct Activity Support	1
2012	Direct Activity Support	1
2014	Guided Project Support	2
2015	Direct Activity Support	1
2016	Direct Activity Support	1
2018	Guided Project Support	1
2016	Financial Support Program for the Development of Production Infrastructures	2
2018	Financial Support Program for the Development of Production Infrastructures	2
2018	Financial Support Program for the Development of Vocational Training for the Manufacturing Industry	22
2019	Financial Support Program for the Development of Vocational Training for the Manufacturing Industry	5
Σ		38

Support for developing the automotive ecosystem can be roughly divided into three groups:

- i. Knowledge generation,
- ii. Test and innovation centres
- iii. Vocational training workshops.

In this context, all four projects for knowledge production were prepared within the scope of “Direct Activity Support”. Projects consisting of activities for the production of outputs in the types of needs analysis and research reports were carried out within the framework of the topics of employment, clustering, and pre-competitive cooperation in the automotive sector. The “Domestic Hybrid Commercial Taxi Technical and Social Research Report”, which was prepared within the scope of another project, includes the data of the field research conducted in order to use the vehicle developed in cooperation with Karsan and Hexagon Studio, which was a finalist in the New York Taxi “Taxi of Tomorrow” tender in 2010, in Turkey.

Two of the six projects in the second category are “Guided Project Support”, and the remaining four are projects entitled to receive support within the scope of the “Financial Support for Development of Production Infrastructures Program.” Within the scope of the infrastructures created with the projects, material and system strength, life, performance, electrical and electromechanical tests can be performed for the automotive and basic metal sectors. "Integrated Circuit Design and Test Centre" was a project carried out by TÜBİTAK. It was a research infrastructure that aims to contribute the improvement of the competencies of the region in integrated circuit design. The "Automotive Test Centre" and the "TOSB Innovation Centre" were established with two projects carried out by TOSB, contributing to the strengthening of Gebze's central position in the regional automotive ecosystem.

As it is known, the subject of vocational education continues to occupy the top of the agenda of the industry. East Marmara Development Agency declared a call named as "Financial Support Program for the Development of Vocational Education for the Manufacturing Industry" two years in a row in 2018 and 2019, and 42 projects were entitled to receive support in this context. Among the supports provided to non-profit organizations in order to strengthen the regional automotive ecosystem, the majority of the infrastructures were the "Training Workshops." Of the supports provided in this context, 27 of them are within the scope of the "Financial Support Program for the Development of Vocational Education for the Manufacturing Industry" and one of them consists of the projects supported within the scope of the "Guided Project". A large proportion of the training workshops, such as 44 percent, includes activities related to the establishment of infrastructures that host "Industry 4.0" technologies. Training workshops for metal, machinery and welding technologies are also among the infrastructures established through the financial support of EMDA. Three of the projects supported in this context have been designed in order to serve directly to the automotive industry, and all of these projects are carried out by Vocational Schools and Vocational and Technical Anatolian High Schools operating within the provincial borders of Sakarya. The 28 projects of the high schools have a total of 35 partner companies operating in the automotive industry. In addition to the main industrial enterprises such as Toyota, Ford, Otokar, Başak Tractor, there are many supply industry enterprises among the partners of the projects. Within the scope of the project structure created specifically for this program, on the one hand, infrastructure needs were met in the field of vocational education, on the other hand, special attention was paid to the development of cooperation models with industry in the area of vocational training.

4.3.3: Designing Support Mechanisms for Mobility Ecosystem

It would be appropriate to start the subject with a brief analysis and criticism of the regional support mechanisms given through the development agencies. First of all, it would be appropriate to start with the determination that there are significant differences between industry and ecosystem approaches in the design of regional support mechanisms since the whole argument of the study is based on this dual structure. As a result of the analyses made within the scope of the study, it has been determined that the elements that make up the basic structure of the automotive industry in the relational context are defined as protecting and accumulating. It can be said that the activities and investments made within the scope of company projects are compatible with these two behavioural patterns within the automotive industry. In particular, the biggest part of the support requests of the enterprises operating in the automotive supply industry is realized within the framework of the purchase of new machinery and equipment. Production facility and machinery expenditures are among the most basic investment items of the capital accumulation process. Considering that development agencies do not consider construction expenditures to be eligible within the scope of private sector supports, it should not be surprising that machinery investments take a large place in the supports given. Even though the subject and scope of each support program opened to support the private sector varies, I have witnessed jokes among the experts stated the only target group that support programs satisfy under all circumstances is German machine manufacturers. Using the received support to invest in capital goods has become the basic reflex of companies. In this context, there is no difference between programs aiming to increase the competitiveness of the private sector or to adapt cleaner production processes. In the final analysis, the justification for new machines to be purchased may be identified through the rationale that they consume less electricity and contribute to cleaner production processes in one program, while in another program they increase efficiency in production processes. The only thing that does not change is the desire of firms to invest in capital goods. This is the primary reason for the idle capacity problem in the automotive industry which was discussed earlier. However, it should be noted that this behaviour pattern has been shaped through the dynamic of *orbital motion*, which describes the involuntary movement of companies producing low value-added products in the automotive sector around the main company. While the necessity of increasing production capacity constantly is one of the major determinants of the capitalist economy, it is inevitable for companies operating in line with

the production targets of the main industry with long-term contracts to use every opportunity to invest in capital goods. It is not possible for companies to behave in any other way within the framework of this defined system. The failure to obtain the desired outputs from private sector supports resulted in development agencies simply leaving the area of private sector supports. Of course, this is not a well-thought-out strategy, but a decision taken at the central government levels by looking only at the results of the program without searching the root problems of the consequences. The distinctive features of the design of private sector supports in an ecosystem-based structure will also be emphasized soon after the analysis of regional private sector supports in automotive industry under the conditions of *orbital motion*.

As we discussed at length in the previous sections, another element that determines the relations among the actors in an automotive agglomeration is conceptualized as *protecting*. The form of protection developed by the supplier industry companies operating in the automotive sector, depending on their lower level of position in the value chain, stands out as a factor that defines the basic dynamics of the automotive industry. This behavioural pattern has a direct impact on the purpose, scope and content of the projects prepared in order to get financial support from the regional competitive programmes. The most significant reflection of this protectionist approach is that its negative effects on the trust and collaboration behaviours of companies. In all the programs for profit making organizations, although companies get extra points in the evaluation process if they cooperate with different companies or universities, I witnessed that no company took advantage of this opportunity during my 10 years of professional carrier at the East Marmara Development Agency. This situation stems from the fact that SMEs want to use all the support for capital goods investments on the one hand, and the company's cautious stance against the others about production processes and business connections on the other hand. Therefore, the fundamental behaviour patterns of companies that produce with low added value, shaped within the framework of accumulation and protection, caused the agencies not to get the results they wanted from private sector financial support programs.

We got an idea about the undesirable results of the private sector financial support programmes on their target groups. These subsidies were used inefficiently to finance machinery and equipment investments of companies in private equity goods. What were the expected results and objectives of the financial support programs designed for the private sector? For example, within the scope of the Financial Support Program of EMDA for

Increasing the Competitiveness of SMEs in 2010, besides the general purpose of increasing the production, service and human resources quality of enterprises, priority, establishing quality management systems, supporting R&D centres and even transition to environmentally friendly production processes were listed as the priorities of the programme. Looking from today, the results of the programme was not surprising at all, and almost all of the projects were designed and implemented according to company priorities, not program priorities. The conflict between the programme priorities and project outcomes has been realised by the agency and this situation was not unique to the East Marmara Development Agency. As a reaction to this situation, the priorities of the financial support programs for SMEs were narrowed down and focused on areas such as R&D and cleaner production. While almost no applications were received for the R&D program launched in 2011, the cleaner production program also served to support the capital investments of the enterprises. Such examples can be replicated for other agencies as well, and for this reason, with the guidance of the Ministry of Industry and Technology, the agencies began not to announce direct calls to the private sector.

It is a fact that supporting private sector activities carrying out production activities within the framework of a sectoral perception increases the production capacities of companies through investing on machinery and equipment. The main output of these investments is to increase productivity in enterprises. However, machinery and equipment investments are not the only way to increase productivity in a business, but it is the shortest and risk-free way. On the other hand, it is possible to increase productivity with investments to be made in human resources and improvements to be made in production processes. However, in a system built on cheap labour, training and consultancy services are equivalent to money thrown into the streets for SME-level companies. Such companies provide training and consultancy services only when necessary and generally in line with the demands of the main industry.

Although concepts such as ecosystem development are included in the priorities of some programmes, it is not possible to assist emerging ecosystems with the traditional regional financial support scheme. Since, in this approach, the agencies position themselves externally to the regional actors and determine their target audiences in such a way that they keep an equal distance from everyone in thematic areas, not according to the trust, collaboration, and coordination capacities of the regional actors. Although being equidistant from all regional

actors is seen as a positive attitude within the framework of the bureaucratic neutrality principle, this neutrality gains a limiting quality in the context of regional policy which aims to build and support trust-based ecosystems. However, the selection of private sector actors or non-governmental organizations by the public institutions, which are believed to produce good results when they work together, is not a desirable strategy, especially in societies that do not have robust regional governance systems, as it will lead to favouritism and eventually corruption. For this reason, the establishment and support of interface organizations which has relative independence from both public institutions and the private sector is one of the defining features of the ecosystem approach. At this point, it is very important that these interface structures are organized in a way that considers the long-term social benefit rather than the short-term interests of the industry, even if they are financed by the private sector. Interface structures, which are established under the names of clusters organizations or innovation, research, technology and excellence centres and whose main purpose is to provide innovative transformation of the industry, can identify leading institutions, organizations and individuals who play an active role in ecosystem formations, since they carry out their activities at a much closer distance to the field. An ecosystem-based support system also runs through a trust-based collaboration network built by such interfaces to accelerate transformation.

We have defined sprawl as the major behaviour containers of the institutions within the emerging mobility ecosystem. It has been determined that the strategy of expanding into areas that institutions have previously defined as outside their sphere of influence is realized within the framework of two basic approaches, namely bridging and venturing. In this context, it is thought that there is a need for a regional development policy beyond financial support mechanisms. The result-oriented programming approach, which marks the last period of development agencies and aims to provide integration between regional planning processes and support processes in certain focus areas, can create a valuable basis for supporting transformative ecosystems.

Development Agencies Result-Oriented Program Preparation and Implementation Guide prepared by the Ministry of Development in 2018 defines Result Oriented Programmes (ROPs) as follows:

[...] in order to achieve strategically determined development goals, ROPs include sub-programmes, projects and activities that aim to achieve development results in a specific sector, theme, or place; are based on qualified analysis; are prepared in cooperation with

relevant institutions; compatible with regional plans; have measurable results and output indicators; medium term (preferably 3 years) program.

Although ROPs provide a healthy and applicable framework for regional development processes, it is difficult to say that agencies have correctly perceived and implemented the tool offered by the ministry. Regional development agencies should have established governance mechanisms that strengthen inter-institutional relations in order to establish and develop interfaces that will be the carrier of regional policies within the framework of a result-oriented setup. Since it is not possible to establish such mechanisms from the top down with a political will, many years are needed to establish the credibility built on the basis of trust. A regional trust-base need to be established in order to companies can collaborate with other ecosystem actors to produce more complex products. The following words of I1 show that the capabilities of agencies in terms of governing inter-institutional inter-actions in establishing an ecosystem-based trust-building process were quite exaggerated.

That's why we told the agencies, "Friend, you're [*working in your region*] for 10 years, if you're not a donkey, two or three of your stakeholders must be counting on you. Don't they trust? It's ok too. Let's give you a year [*to build your credibility*]. First, try ROP on yourself and apply it so [*you can say the other stakeholders*] that I can act according to my ROP. I hope those who want to come with me should come according to my ROP. If you open the negotiation floor like this, they will come.

I am not sure. First of all, trying to build research-oriented ecosystems that will shape the future is already out of the agenda of agencies that are accustomed to determining strategies in line with the demands of the industry. Second, expertise of agency staff has been nurtured within their small regional policy area and lacks the knowledge and skill level required to become an ecosystem builder. Within the framework of these two basic oppositions, agencies should be allowed to develop an ecosystem understanding beyond the sectoral perspective, to determine regional specialization strategies within this framework, and to improve their capabilities in these areas. The development agencies need to support the regional dynamics of trust, collaboration, and coordination relations through the activities of specialized interfaces closer to the field that will feed the ecosystem will strengthen cross-sectoral relations and pave the way for an enabling environment for collaborative manufacturing of more complex products.

4.4: Conclusion

In this section, where the main findings of the study are examined in detail, it is focused on how the transformation of trust, collaboration and coordination relations have been reshaped according to the changing dynamics of value creation process. The transformation from automotive industry to the mobility ecosystem provide a wide range of opportunities to analyse the changing conditions of inter-institutional interaction. The strength of the TCC cycle lies at its ability to illuminate the antecedent and successive links of collaboration. The analysis of collaboration beyond the different types of inter-institutional interaction under two systems through an extended analytical framework expands not only the scope but also provides a depth to the analysis. In that manner, trust as one of the primary conditions of collaboration provides an ontological base to explore the transforming nature of the inter-institutional relations. The analysis of trust in terms of two systems gives the opportunity to work several layers below the surface and provides valuable tools to understand the different aspects of collaborative relations. On the other hand, a study on the changing nature of coordination mechanisms allows us to construct connections with the spatial characteristics of inter-institutional collaboration within and outside the global value chains. The research framework that has been developed also presents a template for examining inter-institutional relations in different value chains for different geographies.

CHAPTER 5

AN ADJOURNED LITERATURE REVIEW

5.0: Introduction

As mentioned before, in this section, I will try to evaluate the theoretical approach that have been formulized within the framework of the inductive method in comparison with the relevant literature. In that sense, the section of literature review has been divided into three parts. The first part of the chapter intends to investigate the industrial policy approaches with a particular attention to the regional development policy tools. The second part constitutes the core of the dissertation and aims to explore trust, collaboration and coordination relationships of the companies that belong to a certain supply chain. The studies on the trust, collaboration and coordination relationships in the automotive supply chain have illuminated the relevance of the dissertation hypothesis that have been constructed inductively through grounded theory methodology. The third part seeks to evaluate the literature that focuses on the transition process from supply chain coordination to the ecosystem management.

5.1: The Revival of Industrial Policy

Industrial policy (IP) has regained its' popularity among both scholars and policymakers through reinventing itself and rising from the ashes. The bad reputation of IP comes from the prevalent discourse of neoliberal era about market distortive government intervention. It is generally asserted that 'picking winners' policies of post-WWII has created some abrasive effects on competition and built a safety zone of vested interest for a group of privileged industries (Aghion et al., 2011). Nearly thirty years of disgrace, industrial policy has become prominent after the 2008 financial crisis and armed with new instruments of guidance and coordination. 'Old' industrial policy has an explicit emphasis on government intervention

into the markets. Although the ‘old’ industrial policy has been the central instrument of the welfare state, it is accused to suppress technological development and the need for structural changes. It was asserted that the ‘old’ IP also built a barrier in front of the development of green technologies and energy efficiency through supporting and sheltering old industrial pollutant facilities (Aiginger, 2015, p. 372). However, the new industrial policy is not built on the classical Keynesian approaches. It has a set of growth-enhancing and competition-friendly tools to foster so called ‘smarter’ development. Designing a coherent and sound industrial policy is a complex issue that covers a large bundle of policy instruments. While some industrial policy instruments are designed and implemented at the national level, some instruments are planned and executed at the local and regional stages. These include policies of regulation/deregulation, science, and technology, state procurement, trade, intellectual property right, competition, investment support, foreign direct investment (FDI) promotion, sectoral support, clusters, and networks.

The rebirth has transformed the characteristics and instruments of the industrial policy as well. It has to be stressed that there is no single definition for the industrial policy. The quotation below is just one of the examples for the definition of industrial policy:

[...] industrial policy refers to a set of measures taken by a government that aim to influence the performance of firms, sectors, industries, and clusters towards a desired objective, as well as the financial, human and organizational resources, and organizational and contingency arrangements made in order to implement this objective (Pitelis, 2015, p. 18).

Although the industrial policy is traditionally referred to manufacturing, the modern meaning has been broadened to all the related sectors of an economy because of the blurred borders among manufacturing, services, and agriculture (Rodrik, 2004). In that manner, it is necessary to make a distinction between narrower and broader perspectives of industrial policy. The following definition reflects a narrower understanding of the industry, which is determined within the borders of manufacturing activity. Coates states that “conceived very narrowly, industrial policy is simply a set of initiatives designed to strengthen the economic viability of locally-based manufacturing firms—that is, it is policy focused on the health of economic units which produce tangible commodities and employ local labour to do so (2015, p. 41).” Focusing just on manufacturing activity, narrow definition of the industry does not have a concern with integrated activities such as service provision, transport, energy production, and agriculture. However, one of the primary duties of the new IP is to re-balance the instability between manufacturing and services in favour of manufacturing (Green & Geoff, 2015, p.

183). Another description of the industrial policy emphasizes a comprehensive perspective but determines a temporal limit to the industrial policy.

Industrial policy in the broadest sense describes policies that aim to support the development and solve sociadoption of technologies and capabilities that raise social productivity. Industrial policies (or technology policies as they are sometimes referred to) are required when private contracting fails to organize potentially gainful investments that achieve these outcomes (Khan, 2015, p. 81).

The industrial policy is called for duty in the case of where the private actors are unable to detect a market segment and to organize possibly a profitable investment. The definition limits the movement area of industrial policy with directing and supporting the private sector to the future market opportunities. However, the broad definition of industrial policy takes a holistic position to define the term. The broad definition extends the traditional understanding of the industry to the whole economy. In that sense, the industrial policy in a broader sense intends to support and coordinate institutions of the economy through growth-enhancing instruments. The study prefers to understand the term of the industry in a broader sense that covers economic and social activities that enable value creation but calibrates the focus from the institutions to the relations. The dissertation proposes ecosystem enabling regional support mechanisms that aim to foster inter-institutional trust and collaboration interactions rather than focusing on economic units at the regional industrial policy level. From the perspective of ecosystem thinking, we can conclude that regional industrial policy focuses on the creation of a cross-sectoral and inclusive trust-based environments and aims to support mission-oriented collaborative activities of value creation in order to solve local and global challenges.

It is worth to ask why industrial policy comes back to the agenda of economic growth? Moreover, why now? The rebirth of the industrial policy has some underlying reasons that have built its new character. First, the global financial crisis in 2008 has created some doubts among the governments about the legacy of laissez-faire policies as the best option without a rival. The fail of neo-liberal policies after the crisis has led to a search for new ways to flourish and re-examination of neo-liberal premises (Coates, 2015, p. 56). Second, climate change elicits the perception that it seems not possible to sustain a transition to clean-technologies without government intervention and support. The laissez-faire logic has led to misinvestment to non-tradable goods through traditional unclear technologies rather than investing in clean-techs to produce growth-rich tradables. Clean-tech requires a much longer time to make a profit and because if the governments do not subsidize, the private sector tends

continue to invest in dirty technologies (Aghion et al., 2011, p. 1). Third, another pull factor that facilitates the re-emergence of industrial policy is the upcoming transitions of the industries on the high-tech revolution. The race against time on upgrading industrial base welcomes the governments to the pitch as the financier of transition burden. The governments generously support high-tech sectors of the future with the instruments provided by new industrial policies. Fourth and the last, the pressure comes from the some of the emerging economies, especially from China which has a well-designed growth-enhancing sectoral policy makes the industrial policy a current issue again. These four important developments, which brought industrial policies to the agenda again, are also an expression of the fact that an ecosystem understanding beyond the sectoral containerisation perspective has started to become widespread. In this context, it is inevitable that industrial policies should be reconsidered within the framework of this new reality. At this point, countries also have a responsibility to create suitable environments for producing solutions that will save the world from destruction while developing their policy instruments. Therefore, it is of great importance to present an international perspective beyond the borders of the country while developing policy instruments.

5.1.1: Industrial Policy within the New Context

Classical economics which was the dominant school of economic thought in the 18th and 19th centuries searches for an optimization of the existing resources to establish an equilibrium. The equilibrium that maximizes the total output also constitutes the primary ground for the mainstream economic theories including both demand side policy advocators such as Keynesians and supporters of supply-side trickle-down policy. The principal emphasis of these economic theories is to acquire the most out of available resources at an equilibrium point. In that sense, the incremental improvement of the system on the line of “doing better what is already being done (P. F. Drucker, 1984, p. 26)” under the realm of economic relations is the primary concern of the mainstream economic theory.

However, the world is changing. Today, the challenges we have faced are incredibly complex. We also have a new set of skills and technologies that we can deal with these challenges. Maybe, more importantly, many people have the desire and grit to declare war against these societal challenges. The new industrial policy has emerged with this context, and it is a

product of a new type of thinking. The section deals with the characteristics of the new industrial policy concerning the context where it was born. The main characteristics of the new industrial policy which have been derived from the field study can be summarised under the headlines of (i) anchoring long-term societal interest; (ii) discovering through collaboration; (iii) thinking from the end; (iv) bearing the risk and (v) breaking the walls. Now, I will try to reveal the correspondence of each of the five detected feature of the new industrial policy within the literature.

Anchoring long-term societal interests: One of the most critical features of the new industrial policy is the ability to integrate the local or national policy objectives with long-term societal interests and global challenges. New industrial policy focuses on long-term societal interests rather than supporting individual companies to save jobs (Aiginger, 2015, p. 374). In that sense, the sustainable development goals (SDGs) play an important role and provide a clear and measurable guideline to fight against long-term societal challenges. The SDGs are a vibrant scheme to reach a better and more sustainable future for everybody. In 2015, world leaders were decided to realize 17 goals and 169 targets under these goals by 2030 to make the world a better place to live. The SDGs address the global challenges that the world faces, including those related to poverty, inequality, climate change, environmental degradation, prosperity, and peace and justice (Le Blanc, 2015, pp. 77–78). The SDGs are a request for action by all countries to assure affluence while saving the planet. The goals identify ending poverty should go together with strategies that intend to build economic prosperity and focus a couple of social needs including education, health, social protection, and job opportunities at the same time struggling against climate change and protecting the environment. The global development challenges cannot be solved without cooperation and coordination among the different types of actors and institutions. In that sense, governments, CSOs, the private sector, and international institutions need to design plans, strategies, and implementation processes together with the local actors (United Nations Development Programme, 2017). The SDGs are expected to trigger six transformations at the societal level, which are listed below:

- Transformation 1 (T1) – Education, gender, and inequality
- Transformation 2 (T2) – Health, wellbeing, and demography
- Transformation 3 (T3) – Energy decarbonization and sustainable industry
- Transformation 4 (T4) – Sustainable, food, land, water, and oceans
- Transformation 5 (T5) – Sustainable cities and communities
- Transformation 6 (T6) – Digital revolution for sustainable development

At first sight, it seems that the only related transformation for the industry is T3 and maybe T6. The other transformations look as if irrelevant with the industrial policy. However, industrial policy, in a broader sense is critical for each of the six transformations. New industrial policy needs to be designed and implemented in order to pave the paths to the six of the transformations because the necessary innovations to reach the transformations are going to be realized at the industrial level. Countries have to transform consumption and production patterns without sacrificing living standards of the people in order to reach the principles of circularity and decoupling.²¹ Precisely, for instance, the approach of life-cycle to electric vehicles is critical for reducing the resource intensity of the automotive industry that will leverage the goal of decarbonization of both the production process and mobility (Sachs et al., 2019).

Discovering through collaboration: The new industrial planning approach seeks to create a suitable climate for cooperation among the government, university, and private sector both at the design and implementation phases of the industrial planning process. It is a collaborative discovery process, which targets to explore the underlying costs and opportunities in order to design coherent strategic coordination. Choosing the right set of policy instruments to overcome the obstacles and to discover the opportunities stays at the core of the discussion. It is argued that government has imperfect information to choose the right policy at the right time within the ranges of maximum permissible dose. However, as Rodrik discussed private sector also do not has complete information (Rodrik, 2004, p. 3). Thus, they need to cooperate in order to find the right solutions to the issues of industrial development. Effective collaborations among the relevant institutions and actors that aim to overcome local and global challenges are conceptualised as quadruple helix structure. The quadruple helix approach focuses on democratisation of the R&D&I activities through linking the relevant actors to collaborate on a specific challenge. Including society to the knowledge generation and implementation processes is supposed to increase the impact of the policy response to the problems.

Thinking from the end: Starting to design a plan from the end of the desired outcome is another characteristic of new industrial policy. It is usually called as mission-oriented policies

²¹ Circularity and decoupling are two main instruments in order to reach SDGs. Countries have to decouple the welfare indicators from environmental degradation through facilitating reuse and recycling of particularly the consumer goods, which is described as circular economy.

(Dominique Foray, 2018b; Mazzucato, 2015; Sachs et al., 2019) which targets to create and exploit radical innovation (Chiang, 1991, p. 339). The stepping back strategy from the desired outcome enables to capture the opportunities of the future and allows designing an industrial policy framework in order to diversify the possibilities. Most of the governments have a plan to support the most promising embryonic industries of the future, which are expected to have transformative potential. The desire to invent something new and marketable forms the core of the new industrial policy, and this desire is pushing the governments to the undiscovered areas of possible opportunities. Thinking from the end strategy does not cover merely supporting promising industries of the future. The role of government is to provide the legal, physical, and psychological conditions for the emerging industries by trying to harmonize the efforts of the related actors.

Bearing the risk: The government is entering the entrepreneurial zone by employing a discovery process to support the most promising specialization area. Investing in new technologies of the future entails more risk than supporting the established institutions in order to sustain economic development. The new industrial policy demands to reposition of government as the lead risk-taker where the private sector fails to catch the long-term opportunities (Bowman et al., 2015, p. 64). The failure of the private sector on financing radical innovations invites the government to the pitch, especially during the periods of transformation. The high-risk funding gap is filled with the government subsidies that socialise the risk of innovation, but the rewards of successful radical innovation are collected by the private sector (Mazzucato, 2015, p. 174). The imbalance between the risks and rewards of radical innovation contains a potentiality for a profound transformation on the distribution of intellectual property rights.

Breaking the walls: The industrial policy is no longer an eccentric branch of economic policy that has been isolated from other types of policymaking processes. In some cases, the terms of ‘innovation policy’ and ‘industrial policy’ are already using interchangeably. The interaction between the branches of development policy has also influenced the industrial policy that does not have a good reputation during the neoliberal era. As indicated before, after the financial crisis in 2008, the industrial policy has regained its popularity, and this process has led to increasing interaction among the fields of economic policy. The future-oriented industrial policy has to maintain uninterrupted communication among the different policymaking and strategy building processes. The goals and borders of the term *industrial*

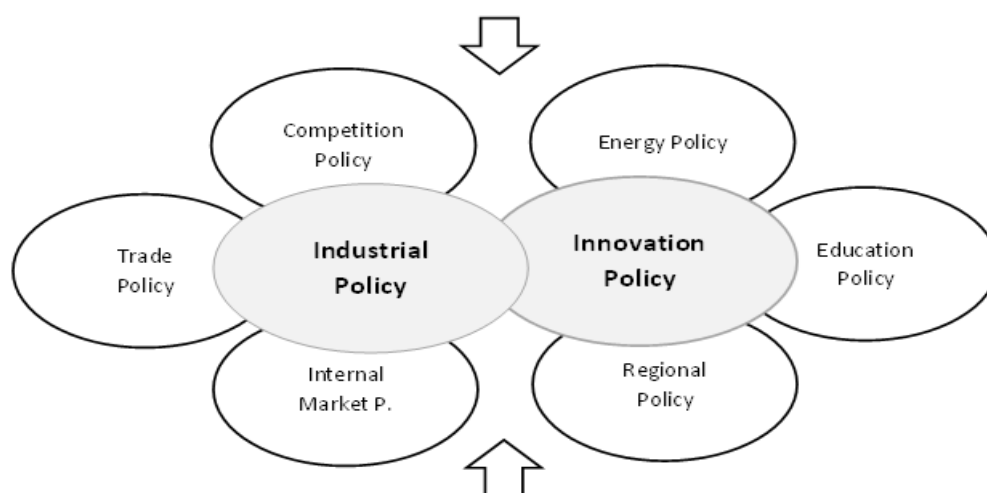
are determined by the push and pull factors under the conditions of competition and beyond GDP goals respectively (Aiginger, 2015, p. 374). The interaction of innovation and industrial policies with the policies of competition, energy, education, place-based, trade, and internal market have strengthened the influence and effectiveness of the industrial policy. The complex interaction with the other policies creates a coordination problem among the different branches of the policymaking process that are trying to be solved through developing new types of collaboration mechanisms.

The five distinctive feature of the new industrial policy bears clear traces of the transition from the sectoral to the ecosystem approach that I have revealed within the scope of the study. At this point, the new industrial policy approach focusing on global problems with an understanding beyond national interests, and the fact that a significant part of the tools it proposes has to be applied in the local and regional level, provide important clues about the regional management of the transformation, which is the main route of the dissertation. The must-have five characteristics of the new industrial policy which has been drawn from the requirements of the ecosystem thinking are compatible with the emerging policy pattern at the regions of the first world. From the point of the inter-institutional interaction the role of the new industrial policy has to be provide suitable places, tools and capabilities that might generate applicable solutions to the global challenges. It is necessary to create appropriate conditions for such a policy framework both to be formed and to be successful and to mobilize a mental transformation at the societal level. At his point it is useful to look at pulling and pushing forces for the new industrial and innovation policy frameworks that has been defined by by Aiginger (2015). The first pulling force is defined by him as “the vision of new growth path.” The tendency to redefine the indicators of the economic growth beyond the Gross Domestic Product is seen as the first pulling force that enables a new industrial and innovation policy. In fact, if we go one step further from this point of view, it is observed that there has been a continuous mental transformation from the unlimited growth to the sustainable growth and then finally the conscious downsizing approach. Of course, it seems very difficult to create a shrinking scenario for the system by ignoring the regime of continuous accumulation, which is one of the basic prerequisites of capitalism. Of course, as Aiginger (2015) accurately identified, it is a fact that the negative effects of human beings on the earth, such as the global warming and the depletion of natural resources, constitute an important driving force in limiting growth, even if we do not want to think about it. The goals to overcome the local and global challenges also constitute a pulling factor for the formation of new industrial policy

framework. It is directly related with the enabling technologies which provide smart solutions to the societal challenges. All of the driving forces outside our economic system are shaped within the framework of the nationally constructed welfare desire to take the lead in the global race and other hand the fear of lagging behind.

Pulling forces

- Vision of a new growth path (welfare beyond GDP)
- Societal goals (health, climate, and social cohesion)
- Excellence in specific technologies (e.g., energy efficiency)



Pushing forces

- Competition, openness, and globalization
- Activated, trained, and retrained labour force (flexicurity)
- Competitive advantages (supported by policy)
- Climate change, ageing

Figure 20 - The Systemic Industrial and Innovation Policy in a Nutshell (Aiginger, 2015, p. 374)

In short, the raising interaction among the policies has been facilitated through pulling forces such as the goal to discover new growth paths, long-run societal goals, excellence in science and technology. Pulling forces are fed by the societal desires and curiosity to discover powered through the advancements in the enabling technologies. On the other hand, pushing forces represents the internal and external circumstances that shape the environmental conditions of growth and development.

5.1.3: Place-based Industrial Policy

The strategies designed on new policy models in the field of regional policy are based on the literature that has been accumulated since the last quarter of the 1980s. The academic

flourishing on the issues of development enables to sprout new approaches such as new growth theory, business clusters, knowledge economy and learning regions. In this section, I am going to explore the primary place-based new industrial policy tools and strategies that aim to construct an enabling environment for the collaborative regional development actions. Clusters, smart specialisation strategies, mission-oriented strategies and regional innovation systems are the four sub-titles that will be covered in this section.

5.1.3.1: Clusters

Geographical proximity or agglomeration of particular types of economic activities has been first detected by Alfred Marshall in his book *Principles of Economics* in 1890. He defined the concentration of industries together with inventions in mechanics, mass production and long-distance distribution channels as the primary source of new type of industry based on free competition. The localization of the industry which means simply “the concentration of particular branches of production in certain localities (Marshall, 2013, p. 618)” was defined by him as an enabling factor that ensures external economies. Marshall (2013, p. 223) also emphasized that one of the extremely vital consequence of the localization is the gradual formation of division of labour in the fields of mechanical crafts and business management. He also stressed that industrial localization plays a significant role in attracting skilled workforce to the region, and it is still one of the most critical arguments of the scholars (Andersson, T.; Schwaag-Serger, S.; Sörvik, J.; Wise, 2004; Bergman & Feser, 1999; Enright, 2003; S. Feser & Sweeney, 2000) who have been seeking regional policy alternatives to support the emergence of Marshallian collaborative atmosphere (Coe et al., 2004; Scott, 1995) and to accelerate the agglomeration processes. Marshall simply tries to understand the mechanism of profit generation within a particular geographical area where an industrial agglomeration is already an existing situation. In that manner, the localized industries are defined as the concentration of characteristically resembling many small and medium sized firms in a specific location is the major cause of the emergence of external economies (Inamizu & Wakabayashi, 2013, p. 14).²²

²² The expansion in the scale of production was divided into two classes where internal economies refer to the individual growth of the firms and external economies are described as the production growth caused by the general expansion of the whole industry (Inamizu & Wakabayashi, 2013, p. 15).

There are two major approaches in studying economic geography of industrial agglomeration. The consequences of the localized industries on the dynamics of regional industries constitute the main problematique of the scholars who are following the Marshallian path. While Marshall and his followers evaluate the economic consequences of agglomerations, which they accept as given, A. Weber's followers formulize and examine the causes that reveal these agglomerations (Inamizu & Wakabayashi, 2013, p. 14). The study of Marshall on the geographical proximity of the industry has opened a different way of understanding how the locational choice of economic rationality enables the survival of small factories without being a part of a vertically integrated industrial giants. Following Marshallian tradition the scholars Brusco (1996) and Becattini & Rullani (1996) in their case study on Italian industrial districts emphasized that the localisation of the industries within a particular geographical location has created external economies that support cooperation climate. The contribution to the advantages of localisation economies have been studied in-depth through the scholars such as (Philip Cooke, 1992; Scott, 2006).

Porter (1985) and Enright (2003) has explored the consequences of industrial agglomeration on the competitiveness of the companies. The cluster approach constitutes one of the central veins to understand the dynamics of regional development. Since Porter's "The Competitive Advantage of Nations," clusters have gathered serious attention from diverse types of actors who are dealing with regional development. Policymakers have also shown particular interest to cluster approach as a magical tool to foster regional economic development. The main reason for the interest comes from the fact that 'they are everywhere' (Enright, 2003) and the presence of clusters can be easily proven by the simple statistical data. One can easily determine the industrial or service agglomerations in their city or region without making any in-depth analysis. Being omnipresent and easy to detect are the two main characteristics of the clusters that make them a famous tool for regional development policy.

Clusters are conceptualised as the main facilitators of knowledge diffusion, application, and exploitation in spatially agglomerated value chains. On the other hand, the approach of RIS usually covers more than one industry and cluster. The group of institutions is defined as one of the two subsystems into the RIS, which allows generating and diffusing the knowledge. Comparing to clusters, the power of institutions into the conceptualization of RIS is much stronger (Tödting & Tripl, 2005, p. 1206). The concepts of geographical agglomeration of particular industries and business clusters constitute a central role for the dissertation. The

agglomeration or cluster of the automotive industry in the BISK region defined as the first system which has been described through the term orbital motion. In that manner, the regional dynamics of inter-institutional relations have been analysed through the tool of trust, collaboration and coordination cycle and characteristics of the transition from an agglomeration to an ecosystem has been uncovered in terms of relational perspective. Of course, it is worth emphasizing that automotive concentration is a prerequisite for ecosystem transformation, but it does not constitute sufficient condition. As we mentioned before, different value chain aggregations within a particular region are needed to ensure ecosystem transformation. The main reflection of this situation is that the emerging mobility ecosystem emerged not in Kocaeli, Sakarya and Bursa, where automotive production is concentrated, but mostly in Istanbul. A diversified regional economic base provides suitable conditions for the emerging of advanced ecosystems.

5.1.3.2: Smart Specialisation Strategies

Dominique Foray defines smart specialization at the very beginning of his book, which has the same name as the term itself.

The notion of smart specialisation describes the capacity of an economic system (a region for example) to generate new specialities through the discovery of new domains of opportunity and the local concentration and agglomeration of resources and competences in these domains. Such a capacity is needed to initiate structural changes in the form of diversification, transition, modernisation or the radical foundation of industries and/or services (2015, p. 1).

Following the description above, the smart specialization might be divided into three phases. First, our economic ecosystem needs to find new domains of competitiveness; secondly to direct all related resources and competencies to these new domains, and finally, to trigger structural changes in the ecosystem through the capacity created. Immediately after the definition, Foray explains a possible pitfall that might cause a misunderstanding of the concept. The smart specialisation is not related with just the dominance of a regionally agglomerated industry. It is about to foresee the future of the market condition and evaluate the conditions of the region according to the predicted future value of the dominant industries. In that sense, defining the BISK automotive agglomeration as part of the smart specialisation strategy because of the dominance of the sector might be considered a fallacy.

On the other hand, any competitive domain that has a potential to build on the capacity and capability of the automotive industry in the region such as autonomous courier vehicles or services might be a smart specialization area for BISK. At the second stage, the region can accommodate the capabilities of electronic and software sectors to develop autonomous systems. The capability on autonomous systems enables diversification at the several possible branches of autonomous systems such as autonomous mining machines, retrofit kits for autonomous driving and even new business models on specific types of mobility requirements. The emerging markets on autonomous parts and components have the potential to transform conventional automotive parts and components industry in BISK. Therefore, the combination of three generic technologies (automotive, electronics and software) with the existing capabilities of the region might enable to create niche competitive areas for the region. The critical point to stress about the entrepreneurial discovery process (EDP) is its endogenous character that relies fundamentally on the local resources. In that sense, EDP is simply a process of diversifying the growth paths of a region through concentrating the resources wisely to the potentially competitive areas in order to transform the productive forces of the region (D. Foray, 2015, p. 2).

Smart specialization strategies have become the backbone of the European regional innovation policy for the period 2014-2020 (DG Regio, 2012; Dominique Foray, 2018a; Trippel et al., 2019). Throughout the period, European regions have developed 120 S3 to determine investment priorities of their regions. The goals of the Europe 2020 growth strategy are ambitious. The planned investment amount on innovation at the regional level is expected to reach EUR 67 billion. According to the performance indicators of the European Regional Development Fund (ERDF), by the end of 2020, it is planned to bring 15.000 new products to the market, create 140.000 start-ups and 350.000 new jobs (European Commission, 2017). According to cohesion policy, regions are obliged to obey specific prerequisites which are called “ex-ante conditionality (European Commission, 2018).” As part of this strategy, European Commission enforces the European regions to design their smart specialization strategy and to have S3, defined as the primary condition to receive fund from ERDF (2014-2020) (Dominique Foray, 2018a).

Defining priority areas is one of the most problematic areas of the regional strategy building process. Smart specialization approach offers a loosely defined but a powerful tool to the problem of regional prioritization. Entrepreneurial discovery process is trying to cover the

answers of *'but how?'* questions for the initial phase of the strategy-building process. EDP is a bottom-up approach to uncover the knowledge embedded into the deep forest of local societal capabilities. It is neither about making a statistically grounded wise selection from a bundle of economic activities nor asking directly to the representatives of public, private, and civil society institutions (D. Foray, 2015). EDP aims to explore and determine new domains of opportunities in order to build future competitive advantages of the region. Recent approaches to EDP define it as a mix of bottom-up and top-down approaches that focuses on to determine investment priorities for a specific territory (Aranguren et al., 2019). EDP constitutes one of the main characteristics of regional innovation policy that enables to discover hidden opportunities to explore new competitive areas. Regional innovation policy based on smart specialization has five fundamental characteristics (Aranguren et al., 2019; D. Foray, 2015; Stancová & Cavicchi, 2018).

- i. Entrepreneurial: The entrepreneurial discovery emphasizes gathering information through digging the embedded local knowledge that might support the decision-making process on regional priorities. It is neither top-down nor bottom-up process that requires collaborative efforts of the main stakeholders in the region.
- ii. Granular: The regional policies based on smart specialization needs to diffuse to the granular level through designing collaborative projects that enable the sprawl of the strategies. The projects are the roots of the strategy that ensure the connectivity among the stakeholders.
- iii. Inclusive: Rather than broadening the target of the strategy, policies based on smart specialization the aim is to include all related parties around the smart specialization strategy. In order to realize this target, everyone in the region needs something in the strategy.
- iv. Progressive: Policies on smart specialization aims to construct the future competitive areas of the region. However, in the future things will inevitably change, and the need to explore new areas of competitiveness for the region will occur. In that sense, the smart specialization policies have to be designed progressively in order not to become outmoded in the future.
- v. Experimental: Smart specialization policies need to be creative and continuously search for new ways of discovering and developing competitive areas for the region. Opening new branches at the growth path of the region requires being innovative and needs a certain level of entrepreneurial courage.

5.1.3.3: Mission Oriented Strategies

The aim of the mission-oriented policy is to organize the process of radical and multi-layered innovation through a set of policy instrument by enforcing the coordinative power of the state. Mission-oriented policies are generally constructed on the ideal to establish new areas of

production based on emerging technologies (Chiang, 1991, p. 339). The responses of mission-oriented strategies to the generic problems of industrial strategy building process constitute a decent prelude for this section of the study. The characteristics of the mission-oriented approach are going to be explored through the reactions of classical questions of industrial policy.

Priority setting is the perennial problem of any kind of policy design that emerges at the very beginning of the process. Choosing missions from among the countless alternatives is the first sub-question of priority setting. Intra-capital contradictions lie at the root of the difficulty of implementing a mission-oriented industrial policy at the regional level. It is a fact that the economic field is not the only source of competitiveness and intervention in policy-making processes can also provide significant competitive advantages for the companies. The value that will emerge as a result of mission-oriented policies will inevitably be distributed unequally among the regional capital owners. Knowing this situation brings the intra-capital contradictions to the forefront and resulted with plans that try to stay at an equal distance to every economic area emerge.

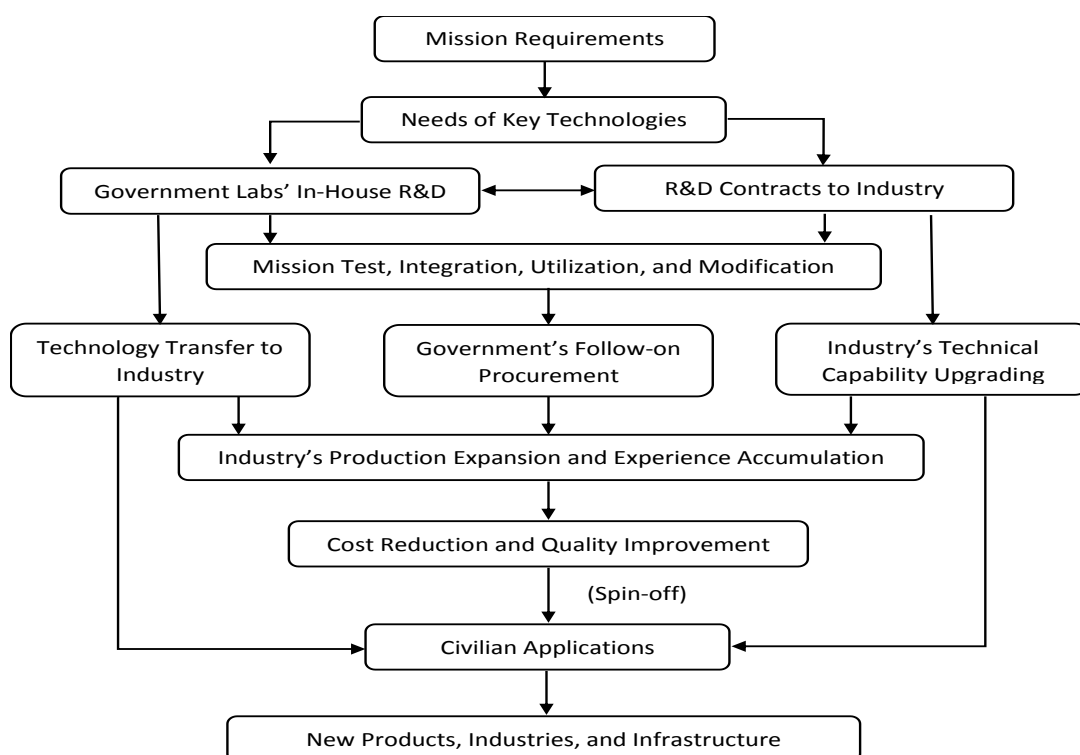


Figure 21 - Mission-oriented and Trickle-down Strategy (Chiang, 1991, p. 340)

The level of granularity is another key point while choosing missions that aims to create new industries. Missions have to be broad enough to invoke a diverse range of sectors, on the other hand, tangible enough to define the problems in front of the mission. The mission of putting a man on the moon was broad enough in order to set wide-ranging sectors to work together and concrete enough that enables to define specific obstacles and solve them (Mazzucato, 2016, p. 141). As the example indicates, the non-neutrality defines the primary peculiarity of the mission-oriented approach that operates under the rule of preferential intervention. In this context, determining a mission instead of choosing a sector makes the level of benefiting from this task implicit and saves time for the planning and implementation processes. Additionally, as in the TOGG example, the fact that the task in question is an attractive output from a social point of view facilitates the achievement of the set target.

5.1.3.4: Regional Innovation Systems (RIS)

System thinking is simply a paradigm that shapes our understanding to the world and provides assumptions and methods to construct theories. It emphasizes a particular set of theory and methodology that has been practiced by several different branches of natural and social sciences. When encountering a challenge, we had learned in the primary school age that the first thing we need to do to find the solution is to understand and analyse the question. The first question we need to ask ourselves about the enquiry is what kind of a problem we are dealing with. Knowing the type of challenge, we are facing is one of the most significant factors that affect our approach to the solution.

The regional innovation system (RIS) literature aims to understand the regional dynamics of value creation by analysing the development paths of the regions comparatively. How and why regions differ from each other in terms of their economic performance and transformation capacity is the primary concern of the RIS approach. However, the linear model of innovation policy was dominant until the 1990s that aims to promote innovation through building R&D infrastructure, financing companies to support innovation, and supporting technology transfer. These type of policies often neglect place-specific requirements to foster innovation such as the absorption capacity and specific local demands generally (Tödting & Trippel, 2005). At the beginning of the 1990s, the scholars who are working on national innovation systems have discovered the relation between innovation and

interaction (Mowery, 1994; Nelson, 1992; Niosi et al., 1993; Patel & Pavitt, 1994). Thus, the interaction between actors and institutions into the innovation processes have become a central theme, and the approach appeals to policymakers and international organizations (Fagerberg, 2017). The conceptualization of national innovation systems has directly sound at the side of the regional policy scholars (P. Cooke & Morgan, 1993; Philip Cooke, 1992). The previous literature has already a particular level of consciousness on the importance of socio-cultural elements and regional policy that aims to foster the economic performance of the regions (Arne Isaksen et al., 2018). The emergence of industrial paths, the stages of place-based development, and the ways of nurturing business ecosystems are the primary research topics of RIS approach. The studies on the new path development welcome the public side to the game again (Grillitsch et al., 2018). However, the emergence of a new growth path is not considered as a particular outcome of the targeted public policy. Evolutionary economic geography [EEG] is aware only a specific type of combination of knowledge, cooperation skills, stratified place-based do-how, and other factors might generate new growth paths for the regions.

A new growth path emerges in a region (1) when several functionally related firms are established; (2) when the firms face an existing or potential demand and market, and (3) when the firms find input factors in a regional innovation system and often gain access to production and knowledge networks outside the region (Arne Isaksen et al., 2018, p. 226).

According to this definition, the new regional industrial path development seems heavily relied on the behaviours of the firms in a particular region. The story has begun with the agglomeration of firms that have diversified in terms of knowledge combination. The emergence or flow of the firms are heavily relied on the availability or potentiality of demand where they are able to find factor of regionally existing inputs. This approach is highly criticized for not taking into consideration the role of the social, cultural and institutional environment of regional economic activities adequately (Hassink et al., 2019).

The adoption of the academic studies to the field of regional policy has produced a series of recommendations for the policymakers. With the help of the international organizations, the following objectives are disseminated among the development professionals: focusing knowledge-intensive high-tech industries; improving research capabilities; attracting high-tech FDIs; supporting entrepreneurship (Tödting & Trippl, 2005).

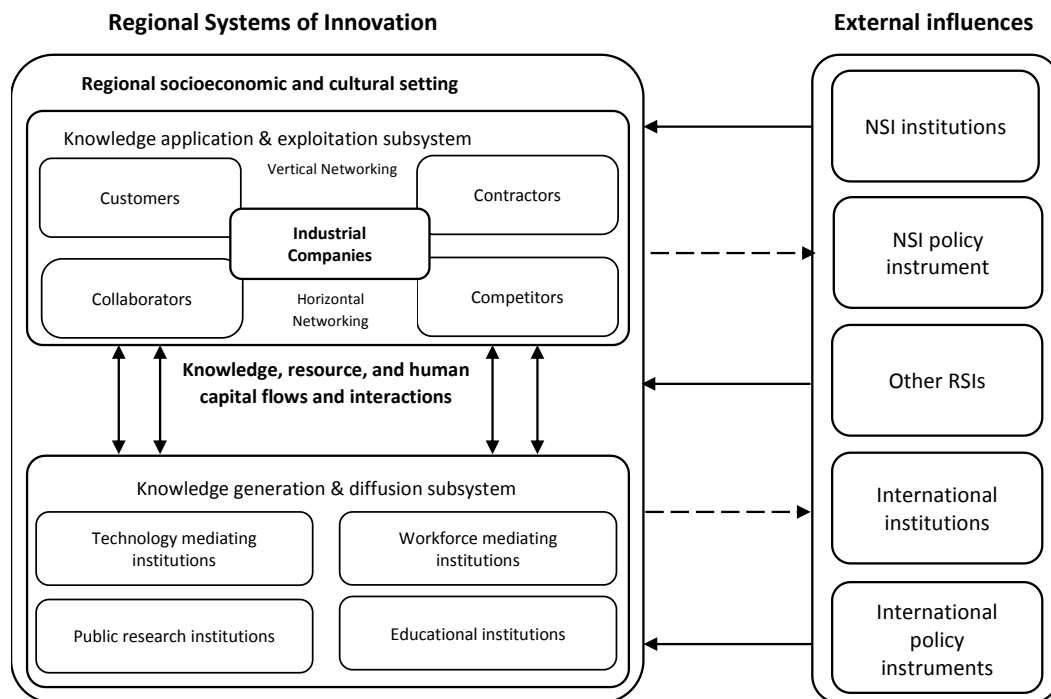


Figure 22 - Schematic Illustration of Regional Systems of Innovation (RSIs) (Autio, 1998, p. 134)

The Figure 22 is one of the early schematic representations of Regional Systems of Innovation (RSIs)²³ which divides RSIs into two interactive subsystems. At the regional socio-economic and cultural setting, knowledge-generating and diffusing institutions are located as both the supporting and being supported by the knowledge application and exploitation subsystem. The dynamic interaction between the two subsystems is maintained through knowledge, resource, and human capital flows. The networking activities of a firm are also bifurcated as vertical and horizontal networks. Vertical networking represents the relations between customers and contractors, and on the other hand, horizontal networking occurs between the industrial companies and its collaborators and competitors. Since RSI is an open system, Autio (1998) defines external powers that have a positive or negative influence on the system.

There are serious communication and interaction within and between these two subsystems through the means of knowledge, resource, and capital flows. The interaction between the institutions and subsystems are supposed to be autonomous, and there is no need to intervene

²³ Today, regional development scholars seems to be in consensus on the term 'Regional Innovation Systems' (Asheim & Isaksen, 2002; Philip Cooke, 1992; Arne Isaksen, 2001; Martin et al., 2018) rather than 'Regional Systems of Innovation.'

in the dynamic exchanges in order to sustain the regional systems of innovation. However, most of the time, the ideal scenario does not occur autonomously. The missing link between these the two subsystems is filled by adding the regional policy dimension to the figure above (Tödtling & Trippel, 2005, p. 1206). The regional policy may ensure the fluidity of the innovation system through facilitating and fostering the interaction between the institutions and subsystems. Additionally, the policy actors are supposed to have an ability to fix the failures of the system and more than that to formulate new ways of interactions with the proper policy tools.

In their rudimentary definitive form, the problems are classified as simple, complicated, and complex. The classification of the problems constitutes a modest but powerful take-off base for the inquiry. Simple problems are solved through following a recipe which is an essential characteristic of the operation to reach the desired outcome. The recipe was previously tested and does not require any specific expertise to implement. However, implementing the recipe repetitively may improve the quality of the final product, diminish the required time for the process or reduce the overall cost of the operation. The improvements are generally occurred through several different types of optimizations at the supply chain and production zone. Following the simplification of the Sholom Glouberman and Brenda Zimmerman (2016, p. 2), cooking by following a recipe is an instance of simple problem. You can master on the implementation of the recipe over time through gaining sleight, improving the quality of ingredients and modifying the kitchen utensils. The recipe ensures the standard of the final product if it is followed properly and being a master of implementation of a specific recipe could eventually improve the process of implementation which could result either an improvement of output quality or a reduction of the operation cost. The best recipes give repetitively better outcomes every time. The improvement of quality or diminishing costs of operations are the targets that could also be reached through fine tuning of the recipe. Understanding the nature of the simple problems is very imperative since according to the one of the main hypotheses of this inquiry, the automotive industry in Turkey operates at the level of simple problems which locates at the bottom of the value creation process.

The second type of problems are called as complicated ones and they contain several subsets of simple problems. However, complicated problems are not simply composed a set of simple problems, they require both expertise and coordination to reach the final output. Success is strongly related with the high level of expertise and advance coordination among the different types of operations. These types of problems are associated with “putting a man on the moon

mission” which is complicated but once has been accomplished, it can be repeated again and again with a high probability of success. The mission is crystal clear and achievable under the current technological maturity. If someone able to organize collaboration among the relevant types of expertise and coordinate the process through dividing the tasks to manageable parts, success is highly probable (Glouberman & Zimmerman, 2016, p. 3). In terms of automotive industry, the developing and manufacturing of automotive sub-systems such as climate control systems, active security systems, emergency braking systems, hydraulic steering systems, etc. are complicated problems. The challenge of private consortium Turkey’s Automobile Joint Venture Group (TOGG) which aims to produce the first domestic car of Turkey is also classified as a complicated problem.

The foremost peculiarity of complex problems comes from the inherent uncertainty of the operational outcome. In most cases the steps and final outputs of the proposed operations are not clear as at the simple and complicated problems. In that sense, planning the process rationally does not guarantee the result output. The policies and strategies that aim to solve a complex problem rationally might create positive and negative externalities at unanticipated layers of related social, economic, and environmental systems. The results of the solutions for the complex problems cannot be reproducible at the different spatio-temporal systems. In this respect, one-size-fits-all policies may not function properly as expected at the different locations and eras. For instance, designing a regional policy framework to establish a smart mobility ecosystem for the East Marmara Region in Turkey is a complex problem that cannot be solved straightforwardly by following the steps of a previously constructed smart mobility ecosystem at somewhere in the world. As indicated by Glouberman and Zimmerman (Glouberman & Zimmerman, 2016, p. 3) raising a child is a complex problem because every child is unique and raising one child well does not guarantee that the other child will be well. Additionally, it is not easy to define the goals objectively since the performance indicator defined as “a well raised child” is a subjective goal.

The table below is a modified form of the Glouberman and Zimmerman’s study (Glouberman & Zimmerman, 2016, p. 2) to compare the characteristics of these three systems more clearly for the automotive industry in Turkey. I have reinterpreted the Glouberman and Zimmerman’s table to reveal the distinction between simple, complicated, and complex problems more clearly. First, following the original table, I have defined five different parameters that are method, objective, knowledge, output, and result. I attempted to re-

evaluate the characteristics of the three types of problems in terms of these parameters. The attempt to define the borders more clearly between the types of problems according to these parameters revealed the accuracy of the categorization at the one hand, on the other hand it made the contradictions of the model more visible.

Table 17 - The Characteristics of Simple, Complicated and Complex Problems

	Simple Problems	Complicated Problems	Complex Problems
Method	Guided	Composed	Created
Objective	Given	Set	Uncertain
Knowledge	Low	High	Not Sufficient
Output	Standard	Standardisable	Sui Generic
Result	Ensured	Expected	Probable

Now we are ready to discuss the position of the automotive industry in Turkey within this framework. If we say the last thing to say from the beginning, the majority of the problems that the automotive and automotive supply industry of Turkey face in the organization of production processes are simple. Although there are some distinctions between the problems of automotive OEMs and suppliers, according to this framework the operations of automotive industry in Turkey are defined under the category of simple problems. First, I will try to explore the characteristics of automotive and automotive supply industry in terms of the dominant method, objective, knowledge requirements, output, and result.

Peter Drucker (1946) in his study²⁴ on the management operations of General Motors defined the automotive as “the industry of industries” to stress the complexity of its supply chain that gathers many industries under the same mission. The mission is the mass production of cars in large amount powered by internal-combustion engine. Automotive supply chain primarily composed of globally distributed sets of service and manufacturing activities. It is apparent that the added value of each service and manufacturing activities are not equal. At its simplest form, the global supply chain of automotive industry is divided among the seven stages of value adding process. In Figure 23 the process of value creation among the automotive

²⁴ The study of Peter Drucker on General Motors which was published under the name “Concept of the Corporation” has an interesting story. General Motors provided full access of resources to Drucker including the right to attend managerial meetings and paid a full salary for the period of his case study research. His research aimed to understand the functions of large corporations in the society and was structured on a single case study: General Motors (GM) (P. Drucker, 1946, p. 10). His study was welcomed by the top management of the General Motors until the study published. However, his recommendations on the decentralisation of company have clearly disturbs top management of the GM (Sloan, 1990).

industry is shown in a linear form and each of the value adding process classified in terms of their level of value added. I have labelled each of the phase of car manufacturing in terms of low, medium, or high value-added activities. Certainly, it is a simplification that denotes the general characteristics of each branch. In that sense, each branch of the value chain contains low, medium, and high value-added materials and activities. The vehicle assembly industry in Turkey with its massive network of suppliers is located at the low and medium value-added industries of the global value chain.

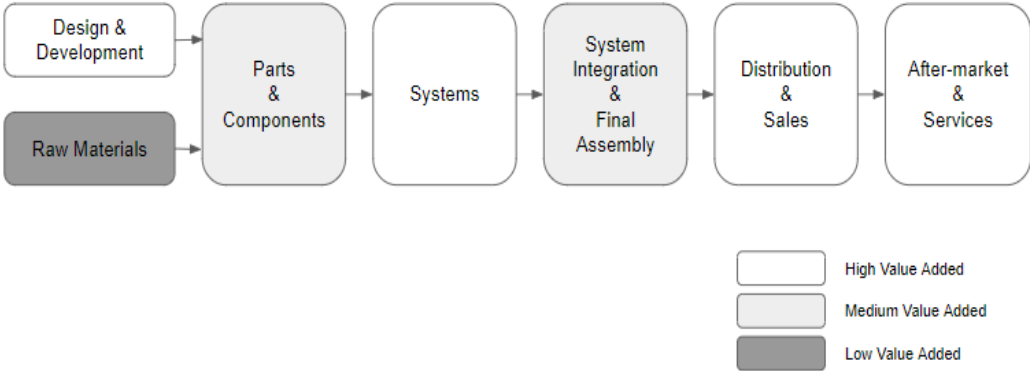


Figure 23 - Automotive Value Chain

Defining each of the industrial branch of the automotive supply chain and the position of Turkey within the whole might clarify the main features of the automotive manufacturing at the periphery in terms of the systems theory.

Each manufacturing facility is a place where raw materials are processing to transform them into goods. Automobile is a giant raw material consumer, and this feature makes automotive industry queen of manufacturing. The manufacturing process of vehicles triggers demand for wide variety of raw materials which contains coal, limestone, and the iron to manufacture steel, moreover plastics, rubber and special fibres are made of petroleum products. In terms of its weight, roughly 80% of an average car consists of steel (J.B. Maverick, 2020). Turkey locates at the 8th position within the global crude steel market with an annual 37.5 million tons of production in 2017 while China dominates nearly half of the global crude steel production. Fundamentally there are two types of crude steel production method which are defined as Basic Oxygen Furnace (BOF) and Electric Arc Furnace (EAF). The integrated facilities which are producing steel through the method of BOF requires high investment cost, but both the value added of the final products and obviously profitability of these type of

crude steel production are also high. The dominant crude steel production method of the steel industry in Turkey is based on EAF and it constitutes %65.9 of the total production in 2016 (Avcioğlu et al., 2018, p. 5).

The share of advanced materials into the automotive industry has been increasing steadily mainly because of the vehicle light weighting which is an operational method to improve fuel economy and reduce CO₂ emissions. The impact of the light weighting on fuel efficiency is visible clearly and the studies have shown that the range of the vehicle is improved 3.5% by reducing 10% of the vehicle weight (Rowe, 2012, p. 1). The main method of light weighting is material substitution by replacing the material with either different type or advanced version of the same one. The primary material of the modern vehicles is plain carbon steel which is a low added material. There is a strong tendency to replace plain carbon steels with “advanced high strength steels, light non-ferrous alloys, such as aluminium, magnesium and titanium alloys, and a variety of composites, including carbon fibre composites, metal matrix composites and nanocomposites (Mallick, 2012, p. 5).” The transition from plain to advanced materials has been radically transforming the position of the raw materials within the value creation process. The transition at the very fundamental levels of the automotive value chain is gradually increase the share scientific knowledge within the principal material used in production process. Previously outsourced materials have been gentrified again by the core countries through substituting plain materials used in the manufacturing process with the advanced ones as a part of reindustrialisation strategies. It is indicated that for almost every product 50% of the cost of a product is material related and the share of labour into the costs is less than 10% (Kotabe & Murray, 2018, p. 365). European Commission also recognized the importance of raw materials and semi-processed good into the reindustrialization strategy and declares six strategic cross-cutting areas of specialisation namely advanced manufacturing technologies, key enabling technologies, bio-based products, sustainable industrial and construction policy and raw materials, clean vehicles, and smart grids (Ambroziak, 2017, p. 100). Advanced materials are seen as strategically important for the industrial future of Europe at the Communication Document of EU Commission under the headline “A New Industrial Strategy for Europe (2020, p. 13).”

The main high value-added stages of the global automotive supply chain are design and development of final product and providing systems to the assembly process that are composed of several components and software. Both of the spheres of the production process

require advanced technological knowledge that is accumulated through constant research and development. On the other hand, the medium or low value-added phases of vehicle manufacturing has been leaved to the assembly plant and their suppliers at the periphery. Generally, the construction designs and specs of vehicles and its parts are provided by the centre of the OEMs to the assembly lines and following the orders according to the information delivered by the centre is the main duty of the vehicle manufacturing at the periphery. Thus, in terms of method, the manufacturing process is completely guided by the principles that has been determined by the OEM headquarters and it is the first feature that locates the manufacturing of automobile and its parts at the periphery into the category of simple problem.

5.2: Trust, Collaboration and Coordination Relations in Supply Chain

“The act of working together to one end (*Online Etymology Dict.*, n.d.)” is the purest definition of cooperation which is formed from the assimilated togetherness of the Latin words com “with, together” and operari “to work.” The definition implies that an act of work has to have two elements to be realized as cooperation. It needs more than one person and must have an aim to realize. In that sense, the participants of cooperation need to know the dedicated end of the cooperation, which might be determined together or dictated by someone. An outsider or a member of the cooperative act can determine the aim of the cooperation, but the cooperation has to be formed and sustained voluntarily by the partners. The timing of goal setting is also another vital aspect to think about collaboration. Logically, the end of the cooperation has to be determined or dictated before the partners form the cooperation. The third dimension of the definition is not explicit as the others. The definition implies the temporary character of the cooperation since each cooperation should have an end; thus, it needs an effort to realize the cooperation until the aim of the togetherness is achieved.

In terms of B2B relations trust, collaboration and coordination between the supplier and customer has determined the characteristic of industry. The theoretical and practical studies on make-or-buy decision in industrial organizations have a long history since the ground breaking work of Ronald Coase (1937) on the nature of the firm. The decision on make-or-buy has also great influence on the collaborative nature of supply chain coordination.

Historically, the mass production of vehicles has always accommodated varying degrees of collaboration across firms that constitute the complex supply chain of the automotive industry. The automotive industry was organized around a vertically integrated structure that was hierarchically organized until the last quarter of the twentieth century. The hierarchic coordination of the automotive production has been governed by transfer pricing accounting practice which enables the company to charge inter-departmental transactions of goods and services. The vertically integrated companies were procured only a limited number of components from the outside of the firm through market transactions. According to the transaction cost economics²⁵, the decision of a company between producing or buying a component was given according to the factors asset specificity, uncertainty, product complexity and sustainability of the procurement (Joskow, 1988, p. 101). Asset specificity of a component is seen as the major determinant of the decision for inhouse manufacturing. The term is used to measure the ability of a component to be used for different objectives. In that sense, a component with a high asset specificity does offer not much opportunity to be applied for another purpose (Riordan & Williamson, 1985, p. 367). The automotive companies were generally preferring to make the high asset specificity components inhouse or through the subsidiaries which were a part of the companies vertically organized coordination mechanism. On the other hand, the automotive parts and components which have low asset specificity were procured from the market. The procurement process of these types of components was structured on low-bid competition among the suppliers and the process was commonly finalized with short-term contracts between the parties. Although the supremacy of vertically integrated supply chain model followed a fluctuating course, it remained as the dominant production system until the 1980s (Macduffie & Helper, 2006, p. 417).

Today, the automotive part and component suppliers are employing three times as many vehicle manufacturers (Lettice et al., 2010, p. 309). The transformation of the relationship between automakers and component suppliers has been rooted into four profound developments in automotive industry. The emergence of Japanese automotive manufacturers as global competitors in 1960s and the establishment of the Japanese manufacturing plants in USA in the beginning of 1980s have resulted with a quality pressure on US car manufacturers.

²⁵ Transaction costs are defined as the costs of producing, managing, and monitoring the exchange of goods and services over a period. The theory of transaction costs aims to assess different systems of good and service exchange according to their prospective costs (Bucheli et al., 2010, p. 861).

Additionally, the lean production philosophy of Japanese manufacturers has started to diffuse to the dominant car manufacturing approach in USA. The impact of Japanese companies on the global automotive manufacturing was counted as the first profound development in the automotive industry of the post-war era. The second trend was the growing dominance of outsourcing against the vertically integration strategy. Starting from the 1970s, vertical disintegration of the automotive companies has been emerged to suppress increasing labour cost. The outsourcing of manufacturing and design to the union-free supplier companies has enabled the main industry both to reduce the cost of the main industry and to increase the focus on core competences. The third trend was the continued necessity of manufacturing automotive production in an integrated manner rather than a modular structure. The integrated structure of automotive parts and components has required a tight connection between the main industry and suppliers. The fourth trend was the global overcapacity of the automotive manufacturing which has created a pressure both on cars and its components. These four trends have led to development of collaboration between the automotive main industry and automotive parts suppliers (Macduffie & Helper, 2006, pp. 419–420).

Starting from end of 1950s, some automotive companies have begun procuring externally rather than producing parts internally within the framework of a vertically organized supply chain model. In the early history of the automotive industry especially until 1920s, automotive parts and components were commonly procured through external procurement rather than making them internally. However, the transition observed in late fifties from vertically integrated supply system to the external procurement has a distinctive characteristic from the earlier experiences. This time, instead of a procurement strategy based on short-term contracts or fed from the spot markets, a system based on long-term relational contracts signed with a limited number of suppliers began to be adopted. In this system, the relation between main industry and suppliers is managed through an understanding of mutual sharing of risks and benefits. The asset specific knowledge is also started to be shared between both parties. The new supply chain coordination system based on long-term contracts enables an efficient coordination between design and production process through the mechanisms of collaboration. On the other hand, it also provided the opportunity to gain benefits from the supplier competition that creates a pressure on the price of the parts and components (Macduffie & Helper, 2006, p. 418). In this way, a new type of production organization was emerged that combines the strengths of vertical integration and market transaction systems, which are two different methods of ensuring supply chain coordination.

The vertically integrated companies of 20th century were seen as the products of the technological advancements in transportation and communication. Ironically, the demise of vertical integration in supply chain coordination and the rise of the outsourcing and decentralised networking were also associated with the additional improvements of transportation and communication systems. In the first stage, it was a strategic decision for companies to choose between making or buying components. On the other hand, as the competitive advantage of a supply chain organized around a small number of suppliers has become more visible, firms have begun to think on the choice of procurement more deeply. As the organization of production processes shifted to the second option, the structure of the relationship between the main industry and the supply industry became increasingly important. In this context, the difference between the approaches dominating the purchasing processes in automotive supply chain with the concepts of "exit" and "voice" adapted from Hirschman's (1970) pioneering study on consumer behaviour. Customer behaviour that ends to stop buying the product is defined as the "exit" option. However, rather than stop buying option for some customers are willing to find channels to express their dissatisfaction which is conceptualised as "voice" option. The framework of Hirschman has been applied to automotive supply chain coordination process to understand the relations between the main industry as customers and automotive component suppliers. The decision between "exit vs. voice" strategies of procurement determine the general management approach of the automotive main industry. The characteristics of the relationships between the main industry and its suppliers in "exit" based strategy are described as short term, cost sensitive, on thin ice and contract driven. On the other hand, the relationships in "voice" approach are defined as long-term, capability-based, supplier-as-a-partner approach and trust-driven. The "exit" approach is generally associated with the US automotive brands while "voice" driven relationships are better suited to the Japan automobile production style (Macduffie & Helper, 2006, p. 418).

Table 18 - The Differences between Exit and Voice Approaches

	Exit	Voice
Duration	Short Term	Long Term
Focus	Cost	Capacity
Status	Fragile	Confident
Governance	Contractual	Trust-based

The duration of relationship between the main industry and suppliers is often expected to be short term in the procurement strategy based on “exit” option. This does not mean that the relationship between the two parties will end in a short time. However, the relationship has been constructed on the demand power of the main industry. In that sense, the fragility of the relation comes from the imbalance of the power between the parties and cost-driven procurement strategy has created a pressure on the supplier side. Some of the automotive manufacturers have focused on cost reduction strategies such as "Dutch auctions" to cut the cost of the parts through putting the suppliers in a race based on price cuts. The suppliers, who are dragged into destructive cost competition among themselves by the vehicle manufacturers, are unable to allocate sufficient resources for the renewal of their machine parks, R&D and innovation processes (Lettice et al., 2010, p. 310). At the point where the supplier cannot meet the expectations of the main industry, there is a possibility that the customer will switch to another supplier at the end of the contract. Even if the relationship lasts for a long time, creating information asymmetries that can be used by both parties is one of the important effects of the exit strategy (Macduffie & Helper, 2006, p. 418).

The spread of just-in-time manufacturing techniques starting from 1980s among the vehicle manufacturers has led to a transition in supply chain coordination which require close collaboration between the OEMs and the suppliers (Lettice et al., 2010, p. 310). The voice approach emphasizes the importance of the long-term relationships between the main industry and suppliers. The attitude to conceptualize the supplier-as-a-partner requires a holistic approach to the production process and a comprehensive coordination mechanism across the supply chain. In that sense, the focus of the main industry shifts from reducing the cost of automotive parts to increasing the capability of the suppliers. In coordination systems that are closer to the voice approach, suppliers and the main industry can work together to solve the problems encountered in production processes together. Although contracts between the parties have an important place in this system, trust appears as the fundamental factor in shaping the relations between the parties.

The vertical disintegration has led to a new type of coordination that transcends the approach of voice. The third phase requires a more comprehensive coordination system that is constructed on the information and material flow across the value chain. The value chain coordination capabilities of the companies have become their main competitive advantage. What caused the emergence of huge companies through vertical integration was the advances

in the fields of communication and transportation. The further developments in communication and transportation broke down the vertically integrated companies and led to form global value chains. To put it more clearly the utilization of railroads and telecommunication tools have led to vertical integration of the companies, while containerization and ICT²⁶ have triggered disintegration of the giant vertically integrated corporations (Helper & Sako, 2010, p. 414).

The traditional “exit” and “voice” approaches have evolved to a collaborative supply chain coordination mechanism in both the design and production processes. The collaborative turn in the organization of automotive supply chain does not really fit into the “exit” and “voice” categories but has led to a singular approach that merge the vehicle manufacturing traditions. The pressure on the companies to be more collaborative have brought American and Japanese approaches closer to each other. The American “exit” approach has been reformed according to the need of collaborative supply chain management through establishing longer-term relationships with suppliers. On the other hand, the traditional *keiretsu*²⁷ approach of the Japanese vehicle manufacturers which is a closed supplier network of relationship has been forced to move a more broader and open supplier coordination mechanism. The increasing importance of coordination and collaboration along the actors of supply chain has led to a “hybrid collaborative mode of relationship (Macduffie & Helper, 2006, p. 429)” between vehicle manufacturers and suppliers. The hybrid collaborative model is more long-term oriented and relational unlike the “exit” approach and more open to construct new relationships with the new suppliers than the “voice” style of supply chain coordination. The hybrid collaborative mode of relationship is distinguished from “exit” and “voice” approaches in seven dimensions and a detailed comparison of these three approaches is presented in Table 19 below.

²⁶ Information and Communication Technologies

²⁷ A sui-generis form of Japanese business grouping that is composed of connected firms offering goods and services across a wide range of markets. The *keiretsu* business network covers original equipment manufacturers, suppliers, logistics service providers and finance institutions which are operating collaboratively under independent companies (Kim et al., 2004, p. 613). The dictionary definition of the term *keiretsu* is translated as “headless combine.”

Table 19 - Exit, Voice and Collaborative Mode of Exchange Approaches (Adapted from Macduffie & Helper, 2006, p. 429)

Dimension	Exit	Voice	Hybrid Collaborative
Context	Arm's length; transactional	Long term; relational	Long term; relational
Network	Open	Mostly closed	Conditional clearance
Competition	Cost-based; Quick-exit	Capability-based; Rare-exit	Competitive assessment; Moderate exit
Design	Simplified design	Controlled design	Outsourced design
Partnership	No equity stake	Often an equity stake	Equity stake on critical technology
Governance	Contract based	Norms/dialogue based	Norm and procedure based
Procedures	Codified	Tacit	Explicit

Although the rise of subcontracting has led to an increase in collaboration between automakers and suppliers, vertical disintegration does not always result in cooperation between the main industry and suppliers. The organization of design and production between two parties is generally divided into three different types of relationships. The first type of relation is called as “supplier proprietary” where the supplier has an ultimate control over the manufacturing and design process of automotive parts. In this system, supplier designs and produces automotive parts and components on its own account and offers them through catalogue to the automakers. In the second type of relationship, OEMs have an ultimate control over the design process of the parts. The design specifications of the parts are determined by the OEM and the supplier is only responsible from manufacturing the part according to the given design specs. Another type of relationship is named as “black box” which gives a certain degree of freedom to the supplier in the design process. In this system, OEM just determines basic performance criteria and parameters for the parts. While this type of purchase enables the supplier to develop an important competence in the field of product design, it also provides favourable conditions for the development of cooperation between the main industry and the supply industry (Macduffie & Helper, 2006, p. 423). In the black box type procurement relationship, the supplier has now risen to the position of co-designers. The roles of automotive part and component suppliers in terms of their relations with vehicle manufacturers have been grouped into four category by Kamath and Liker (1994). The hierarchical categorization of suppliers involves four steps, and each step has been distinguished from each other in terms of responsibilities in the production process.

Table 20 - Four Supplier Roles (Rajan R. Kamath; Jeffrey Liker, 1994)

Role	Description	Responsibilities During Product Development
Partner (Full-Service Provider)	Relationship between equals; supplier has technology, size, and global reach.	Entire subsystem. Supplier acts as an arm customer and participates from the pre-concept stage onward.
Mature (Full-System Supplier)	Customer has superior position; supplier takes major responsibility with close customer guidance.	Complex assembly. Customer provides specifications, then supplier develops system on its own. Supplier may suggest alternatives to customer.
Child	Customer calls the shots, and supplier responds to meet demands.	Simple assembly. Customer specifies design requirements, and supplier executes them.
Contractual	Customer is used as an extension of customer's manufacturing capability.	Commodity or standard part. Customer gives detailed blueprints or orders from a catalogue, and supplier builds

The first-tier companies are divided into four groups according to their relationship with the OEMs. A typical car manufacturer has roughly around between 100 and 200 Tier 1 suppliers which constitute the backbone of the automotive supply chain. Kamath and Liker (1994) stress that “successful partnerships, then, depend on the right balance among a supplier’s technological capabilities, a customer’s willingness to share information, and both companies’ strategic requirements.” However, when this balance between the customer and supplier is established, the supplier can be a "full-service supplier" and gains the right to sit at the table in equal conditions with the OEM. The full-service providers also called as partners consist of a few system providers that occupy the top level among the automotive suppliers. They provide an entire subsystem such as seating, heating, ventilating, and air-conditioning, alternator and exhaust systems to the OEMs and usually attend to the planning process of the new concept at the beginning of the process. The full-service providers have a superior understanding, know-how and technology on their specialisation area in terms of the system and manufacturing processes and they provide solutions to the customers according to their cost and quality projections. They are performing as an arm of the supplier and even have a responsibility to validate the entire system including the sub-components. The partner companies have also an independent R&D process which is not a part of the product-development cycles of the vehicle manufacturers.

The full-system or mature suppliers have also a capability to design and manufacture complex components. However, the design process of the mature suppliers is bounded by the

specifications about the performance and requirements of the component given by the customer. The mature suppliers manufacture the automotive component within the defined borders of the customers and even they can sometimes ask for revisions about the specifications. The responsibility of the validation of components through test process is also taken by the mature suppliers. In that sense, it can be easily stated that the relationship between vehicle producer and mature supplier is similarly constructed on trustworthiness. The communication between the parties begins at the conceptualisation stage and continues until the end of the production process. Finally, unlike partner suppliers, the research and development strategies of the full-system suppliers is largely guided by their customers. The influence of the child suppliers on the design process is far less than the mature suppliers. The role of a child supplier is to carry out fine work of the designing process, manufacturing and testing the prototypes. The critical tests of the parts and components are conducted either by the customer internally or by an accredited independent testing facility. The intensity of the relationship with suppliers in the role of children is low and limited to certain stages of the production process.

The contractual role is generally associated with the simple part and component producers who have strong manufacturing capacity. The aim of the customer is to combine its design capacity with the suppliers manufacturing capacity to enjoy the scale-economy that has been created by the supplier. The need of communication between the customer and supplier is minimum in this type of contractual relations. Table 21 shows the roles of suppliers in the different phases of product development.

Table 21 - Supplier Roles in Product Development (Rajan R. Kamath; Jeffrey Liker, 1994)

Role of Supplier	Partner	Mature	Child	Contractual
Design responsibility	Supplier	Supplier	Joint	Customer
Product complexity	Entire subsystem	Complex assembly	Simple assembly	Simple parts
Specifications provided	Concept	Critical specifications	Detailed specifications	Complete design
Supplier's influence on specifications	Collaborate	Negotiate	Present capabilities	None
Stage of supplier's involvement	Pre-concept	Concept	Post-concept	Prototyping
Component testing responsibility	Complete	Major	Moderate	Minor
Supplier technological capabilities	Autonomous	High	Medium	Low

The relationship between the vehicle manufacturers and suppliers occurs in different scope, content, and level in the process of product development. The characteristics of mutual power and trust relationships that arise specific to production processes vary according to different types of customers and suppliers. On the customer side, the perspective difference between the US and Japanese manufacturing practices is decreasing in favour of the Japanese manufacturing tradition, which is shaped on the basis of lean production. In the global automotive manufacturing process, the relationship between customers and suppliers is carried out within the framework of lean manufacturing. Despite the global dominance of the lean manufacturing method, it can be easily said that there are serious differences between the two dominant traditions in automotive production in terms of supplier relations. On the other hand, the type of the supplier is another element that determine the role of the supplier in the product development process. The grading of the suppliers as partner, mature, child and contractual occurs within the framework of the difference between the competence levels that determine the degree of relations with the automotive main industry.

It has long been predicted that the market will shrink for medium-sized and regional suppliers with the monopolization trend in the automotive supply industry. It was asserted that the share of full system providers (partner) and suppliers (mature) in the automotive industry have been increasing against the lower-level suppliers. These types of suppliers are labelled as the mega-suppliers (key systemic suppliers) which has been described as the first biggest 20 automotive supplier companies in terms of the revenue generated. The perception on the superiority of module-based manufacturing lies at the heart of the belief that mega suppliers will play a more important role in the future of automotive manufacturing. The deverticalization process has triggered an increasing demand of automotive modules and systems rather than single components. The modularization enables to change and improve the components more frequently and to organize the production process more feasible way (Özatağan, 2011, pp. 79–80). The decision of Ford Motor Company to reduce the number of suppliers during the last years of 20th century has been read as the primary sign of the monopolization in the automotive supply industry. The expectation on the modularization of the automotive manufacturing have not been realized. However, the speed of the increase in automotive mega-suppliers has been accelerated especially during the last decade (Figure 24). While the number of mega-suppliers with an annual turnover of more than 10 billion dollars has almost quadrupled in the last 20 years, the number of companies with an annual turnover of 2 to 5 billion dollars rose by only 50 percent in the same period.

The integrated structure of the automobile, which is seen as one of the biggest obstacles to reducing costs in the automotive sector, can evolve into a modular system architecture with the electric vehicles. A properly-created modular design will also allow OEMs to provide faster solutions to changing customer demands (Kahn, 2021). There is more opportunity to implement modular platforms and systems to the electrified vehicles (EV) because many car components can be used for a wider scope of purposes. In that sense, modularity-driven rise of mega-suppliers (key systemic suppliers) in automotive industry is expected to be accelerated by the expanding electrification of the vehicles.

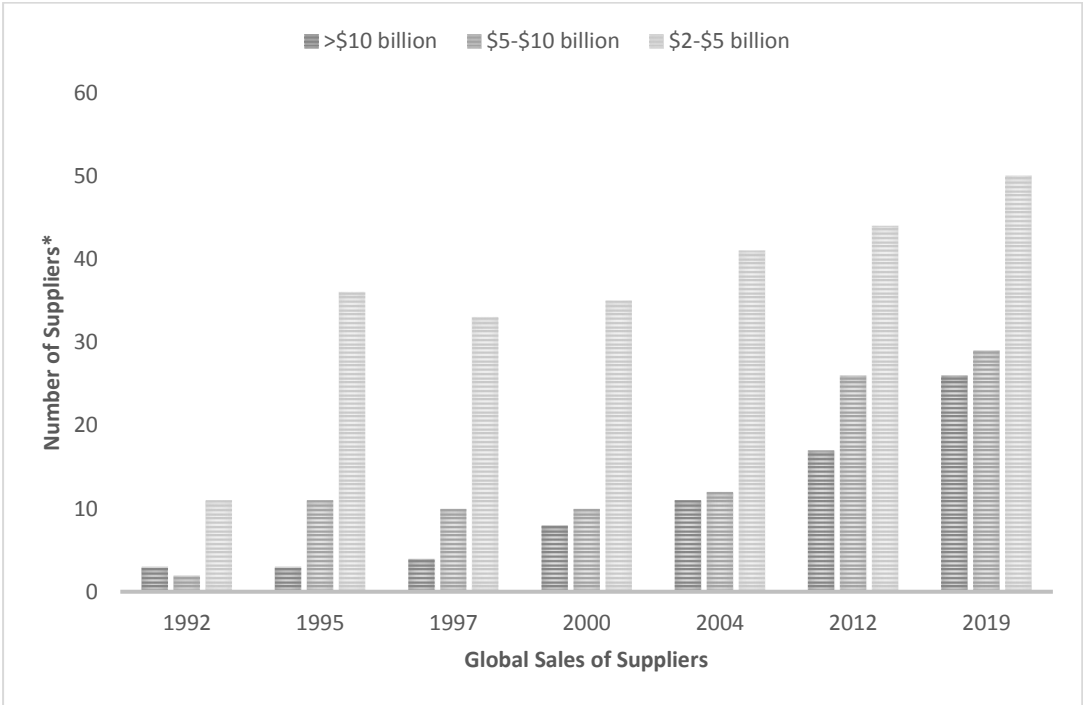


Figure 24 - The Increase in Automotive Mega-suppliers (Berylls Strategy Advisors, 2020; Macduffie & Helper, 2006; PWC, 2013)

* The number of automotive suppliers which were generated revenue between \$2 and \$5 billion in 2019 is an estimation of the author.

Table 22 shows the top ten mega suppliers, their generated revenues and profit margins. The total revenue of the top ten global automotive suppliers was around the 300 billion dollars (Statista, 2021) which was around 250 billion dollars in 2012 (PWC, 2013, p. 4). Mega suppliers operate within the framework of economies of scale in the automotive industry, which traditionally operates with low profit margins. The mega-suppliers are generally located as full-service provider in terms their relations with the vehicle manufacturers. In that

sense, the specifications of the system that is provided by the partner type supplier are determined collaboratively with the customer, but the know-how of design and manufacturing of the entire sub-system is embedded to the supplier. On the other hand, if the transition from the integral to modular manufacturing takes place within the framework of expectations, the structure and form of cooperation carried out throughout the automotive supply chain will change significantly. The sound effects of modular manufacturing on the profit margins of automotive industry may be quite seductive for the main players in the automotive industry. For instance, in the computer hardware industry built on a modular production model, the average net profit margin for 2020 has been determined as 15.41% (CSI Market, 2021) which was only 7,78% on average for the top 10 automotive supply industry companies.

Table 22 - The Top 10 Global Automotive Suppliers (Berylls Strategy Advisors, 2020; Harrison, 2019)

Rank	Company	Origin	Revenue 2019 (Mln.)	Profit 2018 (%)
1	Bosch	DE	47.000 €	7.4%
2	Continental	DE	44.478 €	9.1%
3	Denso	JP	43.307 €	6.3%
4	Magna	CA	35.169 €	7.6%
5	ZF Friedrichshafen	DE	33.597 €	4.1%
6	Aisin	JP	32.012 €	5.7%
7	Hyundai Mobis	KR	29.378 €	5.8%
8	Bridgestone - Firestone	JP	24.230 €	12.9%
9	Michelin	FR	24.135 €	12.6%
10	Valeo	FR	19.477 €	6.3%

It is evident that the relationship between the automotive main industry and the supply industry is structurally shifting towards a cooperation-oriented system. However, there are still serious differences in the approaches among the main industry firms that adopted exit and voice strategies previously. The stickiness of historically structured supply chain coordination modes is hard to overcome especially for the American vehicle manufacturers. It is argued that most of the US manufacturers have responded to the tendency of increasing collaboration by escalating their demands and pressures on their suppliers. Moreover, it is also alleged that the efforts of American manufacturers to take credit for the collaboration trend has created a destructive effect on the suppliers' trust in OEMs. The level of trust in OEMs have even fallen below the standard trust-based relations in the previous non-collaborative “exit” approach. On the other hand, Japanese “voice” pattern in the coordination of supply chain was able to move forward in this transformation process without breaking the

gradual development route in the field of collaboration. The continuity has been maintained by the Japan vehicle manufacturers between the “voice” approach and hybrid collaborative model. The Japanese style of supply chain coordination is conceptualised as “collaboration with trust” and the American pattern is taking place directly opposite of this approach (Macduffie & Helper, 2006, p. 431).

Macduffie and Helper (2006) have given several incidence for the American way of organizing supply chain relationship which they called as “collaboration without trust.” The following events may give clues about the behaviours and methods of the American vehicle manufacturers that undermine the trust factor in their relations with their suppliers. Sharing a collaboratively developed component design with other suppliers in order to cut prices, loading tooling costs traditionally paid by the customer to the supplier, requesting post-contract discount from the supplier, using online “reverse auction” to push the prices, and benchmarking the bids with the prices of Chinese manufacturers are the examples of transaction-cost-based behaviours of the big three American vehicle manufacturers.

The automotive industry with a deep-rooted history and an established structure is an example of manufacturer-driven complex chain which is managed by the transnational corporations (TNCs). The vehicle manufacturers have completed their transition from a vertically integrated structure to a decentralised supply chain network within a couple of decades. They are positioning on the core competencies that are framed as product innovation and brand positioning. The entire automotive supply chain has been stratified into hierarchical levels where each layer was organized around distinct requirements. In that sense, together with the main industry the global suppliers (Tier 0.5) are organized to seek global outreach, qualified white-collar engineers and designers, production, design and innovation capabilities, research and development infrastructure and financial resources. The requirements of tier 1 suppliers are exactly the same with the tier 0.5 suppliers but their demand on global reach is limited comparatively (Özatağan, 2011, p. 80). Tier 2 suppliers are generally working through the specifications given by the assemblers and their requirements are limited with cost, quality and timely delivery which are also standard obligations for the lower-level suppliers.

The asymmetric relations of power among the supply chain have been addressed within the framework of global value chains (GVCs) especially since the early 2000s (Coe et al., 2004; Gereffi et al., 2001; Humphrey & Memedovic, 2005; Özatağan, 2011; Sturgeon et al., 2008).

The GVC analysis aims to decode any globally organized economic value creation process through emphasizing the aspects of linkages, power, and institutions. The geographical and peculiar characteristics of linkages between the tasks in value creation process constitute an important theme of GVC analysis. The distribution of power among the actors of global value chain and the roles of the institutions on the interaction attitudes of the actors of chain are also among the main research areas of the GVC analysis (Sturgeon et al., 2008, p. 298). The GVC analysis seeks to uncover the systemic relations that constitute the methods and practices of the global supply chain coordination mechanisms which are governed through the top-down governance by the primary customers. According to the GVC theory the value chain activities tend to be governed through five different ways which can be associated with three variables. These are

(i) simple market linkages, governed by price; (ii) modular linkages, where complex information regarding the transaction is codified and often digitized before being passed to highly competent suppliers; (iii) relational linkages, where tacit information is exchanged between buyers and highly competent suppliers; (iv) captive linkages, where less competent suppliers are provided with detailed instructions and (v) linkages within the same firm, governed by management hierarchy. These five linkage patterns can be associated with the combinations of three distinct variables: the complexity of information to be exchanged between value chain tasks; the codifiability of that information; and the capabilities resident in the supply base (Sturgeon et al., 2008, p. 307).

The task complexity in value chain relationships is considered as one of the main variables that determines the type of linkages. The degree of a priori ambiguity about the inputs, process and outcome of the task determines the level of complexity of the task (Byström; Järvelin, 1994, p. 194) and the information generated from the task. The second variable that determines the type of linkages is the codifiability of the information which can be transferred and adapted beyond the context which it was developed. In that sense, the codified information requires a certain level of education and expertise to understand rather than a common social background. This type of information is often shown as the major source of scientific and technological progress (Lissoni, 2001, p. 1480). On the other hand, know-how is expected to contain tacit and non-codifiable knowledge which is spatially and culturally embedded to the local value chains. The B2B relationship between the customer and supplier requires a certain degree of knowledge and capabilities to construct a coherent supply chain management. The ability to access to the supplier resources has become one of the main variables to build and maintain competitiveness automotive companies (Koufteros et al., 2007, p. 853). As a result, the various forms of linkages constitute and differentiate the value

chain governance modes which have been built upon dynamic power relationships between the finished car manufacturers and their suppliers.

5.3: From Supply Chain Coordination to Ecosystem Management

Decoding the determinants of how collaboration works and does not work at the regional mobility ecosystem constitutes one of the primary concerns of the field study. The design of the collaboration among the relevant stakeholders, the factors that determine the decision to collaborate and strategies to find the right collaborators are the themes that the study aims to explore through in-depth interviews. Building a collaborative environment with the customers, suppliers, allies, and even competitors is not an option but a must to survive into a competitive transition environment. Although collaboration is described as one of the primary sources of competitiveness, it seems impossible to collaborate with the competitors and even to design a strategy to find allies to cooperate. In general, collaboration stays on the papers. Organizing meetings, attending the industrial events, employing the students from the regional university as an intern, providing scholarship to the vocational school students, being a sponsor to an industry-related conference are seen as the examples of the collaboration. What about working together with the institutions to solve a problem, to create a new market with your competitors, to design a new business model with a start-up and spin-off and to conduct a project for developing a new product. These type of ‘complex collaborations’ needs to be designed with an artisan rigour and managed with patience, tolerance, and grit. Working together with different actors in an innovation process is hard to establish and manage.

The level of complexity of our social and economic systems is continuously rising. So do our grand challenges. We are searching for new ways to understand, analyse, and conceptualize of the economics and social dynamics. The term “business ecosystems” is the product of such an innovative way of conceptualizing a set of economic and social interaction in a particular geography. It appears firstly in the article of Moore (1993) to define cooperative networks that enable the process of co-evolution. He borrows the term “co-evaluation” from an anthropologist named Gregory Bateson. He defines “*co-evolution* as a process in which interdependent species evolve in an endless reciprocal cycle (Moore, 1993, p. 75).”

What are the distinctive characteristics of a business ecosystem from a cluster? Sako (2018) asserts that the primary source of difference lies behind the focus of the two

conceptualization. The business ecosystem focuses on value creation process through innovation and entrepreneurship. On the other hand, clusters are the geographically agglomerated industries. He also describes three distinctive characteristics of the business ecosystems as follows: sustainability, self-governance, and evolution. A business ecosystem covers both humans and environmental structures, which can flourish without any outside intervention or external support. Sustainability is an intrinsic characteristic of a business ecosystem. The ecosystem ensures the exigence of the present while is producing the necessary conditions to survive. The ecosystem does not rely on any outside force or does not enter into service of an internal force. The last idiosyncrasy of a business ecosystem comes from the ability to evolve through experience and competition (Sako, 2018).

Grosso modo, the optimization of the endogenous regional values for tomorrow under the conditions of uncertainties through benchmarking the current situation and ideal destination is the primary aim of a regional plan. Understanding the current situation to illuminate the future constitutes the first step of all kinds of planning efforts. It is believed that without establishing a base with the knowledge of current, it is not possible to shape the future of the subject of a particular plan. However, setting objectives wilfully and sequential assembling of actions are two elements, which are a *sine qua non* for a plan. These are necessary and sufficient condition to realize a document as a plan. The techniques that are used for planning such as statistical methods, quantified evaluations, qualitative and qualitative prediction models can vary according to the type of plan. Recent discussions on planning theory and practices go beyond the fundamental elements and techniques that draw a general framework on the ontology of planning. The delegation of power to the subject of planning requires a complex set of collaborative tools, which make the process of planning more complicated. The work of Patsy Healey (1997) on collaborative planning and a more recent work of Judith E. Innes and David E. Booher (2010) “Planning with Complexity” are two fundamental sources of contemporary planning literature. The last part of this proposal is going to be dedicated to the discussion of collaborative planning which will take a central place into the dissertation.

The theory of collaborative planning of Healey has been deeply grounded on structuration theory of Anthony Giddens and the concept of communicative rationality developed by Habermas (Healey, 1997). The concept of structuration aims to clarify the continual relation between ‘structure and agency’ and the outcomes of this interaction. The central hypothesis

of the theory is “the rules and resources drawn upon in the production and reproduction of social action are at the same time the means of system production (the duality of structure) (Giddens, 1985, p. 19). Authoritative and allocative systems and frames of reference are considered as the dimensions of linkages in which the structures are constructed and sustained. Healey states that in that sense the theory of structuration has provided a new perspective on the “social embeddedness of power relations (Healey, 1997, p. 106)” which constitutes a fertile ground for her institutionalist analysis on planning processes. The role and positions of the participants in the mechanism of governance have been occurred within the structuration processes, which emphasize the qualities of interaction relations. Her study on collaborative planning has integrated the structuration theory with the communicative planning theory, which has been built on the discourse ethics and communicative rationality of Habermas (1979). The perspective of Habermas has provided an intellectual tool for Healey “to develop a critical evaluation framework for assessing the qualities of interactive processes (Healey, 1997, p. 106).” Collaborative planning opens up a new bundle of possibilities both for moderating the discussions on conflicting interests of stakeholders and for building “place-based institutional capacity (Healey, 1997, p. 85). The actions and ways of thinking that might amplify the possibilities both in terms of quality and quantity will be appreciated along with the dissertation. In that sense, both as a concept and as practice, collaborative planning is very open to surprising and unexpected outcomes. The entertaining character of collaborative planning mainly comes from the appreciation of communicative rationality.

Innes and Booher (2010) with their theory of collaborative rationality, offer a positive mediating approach to conflicting interests. Designing new modes of policymaking through moving beyond collaboration practice constitutes the framework of their work. The foundations of the theory have been built on the critique of positivist knowledge generation and lie on three trends in the evolution of planning and policy. The first trend is the transition from the traditional linear models to the nonlinear socially constructed processes, which relies on both experts and stakeholders. Traditionally, planning processes has been divided into three categories, and each of the categories is assigned to a particular group. In that sense, elected officials set goals; experts are responsible for data collection, analysis, and formulation of plans, and finally, stakeholders realize the implementation of the plan.

On the other hand, nonlinear and open-ended interaction among people becomes the primary source of planning. The second trend has risen on the source of knowledge, which is appropriate for planning. Scientifically generated expert knowledge is no longer seen as the only source for the decision-making process. In addition to this type of knowledge, lay knowledge has become an essential source for planning processes. Other types of reasoning strongly appreciate the theory of collaborative rationality without discrediting scientific knowledge. The theory of collaborative rationality is also strongly inspired by new forms of reasoning. The transition has occurred from instrumental rationality to the communicative one. Instrumental rationality presupposes logical steps and objective evidence from ends to means in policy formulation (Innes & Booher, 2010, p. 6). Like in a collaborative planning approach of Healey, Innes, and Boher construct their theory on communicative rationality, which enables face-to-face interaction between the stakeholders.

5.4: Change Management

Stephen Jay Gould as a biologist observes that radical environmental changes might cause a collapse of a natural ecosystem. The changing situations in the ecosystem might enable plants and animals in the periphery to become central figures and vice versa (Moore, 1993, p. 76). The pressure of a blurred change forces the companies to mobilize all the available resources to sustain their competitiveness in the future. In that sense, the transition process provokes collaboration tendencies among the old and new actors of the mobility industry. Collaboration among the different actors of the mobility ecosystem has become an essential ability for the business players. The changing competitive conditions and the blurred future options have forced the companies to cooperate. Cooperation serves as an amplifier on the innovation capacity of the companies and a smart way of cost reduction attitude (Attias, 2016). The change management strategies of both the automotive companies and the whole business ecosystem become more important than their future competitiveness in a chaotic transition process. Most of the actors of the mobility ecosystem are looking for new and undiscovered options to sustain and improve their competitive positions into the new mobility ecosystem. The transition process adds new uncertainties to the market conditions, but it also creates excellent opportunities for the traditional automotive industry and newcomers, which do not have prior experience in the automotive industry. The uneven distribution of sources, knowledge, and experience among the actors of the ecosystem triggers collaborative

tendencies. The technological advancements in information and communication technologies, artificial intelligence, big data, block-chain, machine learning and internet of things have created many opportunities for a diverse range of industries (Toglaw et al., 2018, p. 303). The adaptation and adoption of these technologies to the traditional industries enables the emergence of new markets.

Coping with the process of transition has become a mainstream management strategy for companies. The transition process is also attracting the interest of the academics, policymakers, and regional policy practitioners because of the possibility to lead a success story on opening up a new growth path at the regional and national levels. In that sense, creating sustainable business ecosystems, direct and indirect subsidies, and other intervention strategies that leverage the upgrading process of the companies become popular among the supporting institutions.

In the management literature, the issue of change management has become more popular in the last decades (Cameron & Green, 2012; Hayes, 2014; Luecke, 2003). Everything around us is changing, and the change creates opportunities and threats for every organism, institution, and system. The entities are exposed to the outcomes of change need to improve their skills, capabilities, and capacities to respond to the new conditions appropriately. Change management is about transforming and creating the relations among the elements within and between the systems to diversify the desired options of the target entity. Improving the quality of progressive relations among the actors, establishing new types of relations on existing communication, and creating a relation with a new element constitute the dialogic options of managing change. Change management is a process that includes different types of connected actions, interactions and reactions to break the undesired paths and to open new ways to reach undiscovered opportunities (Hayes, 2014; Kettinger & Grover, 1995).

There are two different approaches to the process of change: incremental and transformational (or radical; discontinuous) change. Incremental changes are embedded in life and do not require immediate intervention. In that sense, time is changing, and we adapt ourselves to the changing conditions slowly. The incremental business process improvement approaches are offering to develop an organizational culture that can keep up with the ongoing change. It is generally less traumatic and requires iterative turns of continuous improvement and reengineering (Kettinger & Grover, 1995, p. 20). The incremental change requires small steps

adapting to the changing conditions organizationally, and because of this inherent nature, it can be managed efficiently by adjusting organizational culture to a continuous change (Luecke, 2003).

On the other hand, transformational change is generally dreadful, hard to manage, and contains a severe threat to the routines of the organizations. However, the fun and excitement also begin here. The radical change forces us to transform into something unknown and unexplored areas of novelties. The change at the societal systems occurs subtly through a series of implicit and explicit actions of the transformative forces. The systemic viewpoint to transformational change focuses on systems and process that studies the process of change at different levels. The systemic approach tries to uncover the underlying mechanisms of a societal change to diversify the possibilities in directing the actors and systems to the desired position (Rotmans & Loorbach, 2010, p. 106).

Lewin suggests that social change have the nature of a “process” rather than the nature of a “thing” (1947, p. 340), and he defines three aspects of change. He describes the first step as “unfreeze,” which refers to melt the frozen conventional behaviours and attitudes. At this stage, the equilibrium between push (driving forces) and pull (restraining forces) factors are distorted intentionally and deliberately to open up the system to the influence of change. The action happens at the second stage that aims to reorganize driving and restraining forces to reach a new steady-state situation. At the third and final phase, Lewin offers to refreeze the position of opposing forces of driving and restraining through strengthening new types of behaviours and attitudes (Hayes, 2014, p. 23; Kurt Lewin, 1947, p. 344). Recent critiques on Lewin’s method of change management emphasize the continuous change of today’s world. In a turbulent environment and a fluid relation is driven corporate system, the refreezing phase is strongly accused of being unrealistic (Burnes, 2004, p. 989). However, despite all critiques, Lewin’s model of change management has dominated the organizational change literature for more than 40 years with its powerful simplicity.

Managing change is still attracting the attention of scholars from different fields, and especially since the last quarter of the twentieth century, many models have been developed to explain and manage change. Morgan (1980) conceptualize models of change according to their associate metaphors to categorize the approaches. He defines four metaphors to explore the underlying assumptions of the overwhelming number of change management models,

namely (i) machine; (ii) political system; (iii) organism; (iv) flux and transformation. The metaphors machine and organism usually associated with the orthodox view of change management that has deep roots in the works of classical management theorists (Fayol, 1949; Taylor, 1911). The imaginary thought of mechanical understanding indicates a rationally functioning machine that has a particular goal, emphasizes the relations between means, and ends. The Newtonian mechanistic understanding conceptualizes the world like a clock which is functioning through a deterministic way (Ralph D. Stacey, 2000, p. 17) in coherence with Newton's first law of motion that indicates that a body remains in a state of unchanging rest or motion unless acted upon by an external force. The metaphor of an organism is used to define a system, which contains mutually connected parts and elements. In terms of their function, a machine and an organism operate in the same manner, but the organism is a living creature, which is subject to mutation and evolution. According to the organism metaphor, change is realized as a process of adaptation to the altering conditions in the environment (Cameron & Green, 2012, p. 147). The metaphor of political system stresses the power relations and conflict of interests among the society. Through emphasizing the social dimension of organizational change gives particular attention to the force and conflict (Morgan, 1980). The final metaphor flux and transformation focuses on a real chaotic environment of change and does not offer specific formulas and steps to implement change management. From this perspective, change cannot be managed, but it merely appears. It is normal to be confused and frustrated under the conditions of chaotic transformation. The flux and transformation approach relies on the second law of thermodynamics, which states energy, cannot be created or destroyed only it can change from one form to another. A Nicaraguan poet Ernesto Cardenal (Ernesto Cardenal, 1993, p. 29) describes it as follows:

The second law of thermodynamics!
energy is indestructible in quantity
but continually changes in form.
And it always runs down like water.

The primary strategy of flux and change metaphor is to open new communication channels and reinforce the existing ones to cope with the wind of changes (Cameron & Green, 2012). Since the approach seems more relevant to the research objectives of this study, it is necessary to understand the underlying assumptions and practicality of the flux and transformation approach.

The representatives of complexity and radical change school in organizational theory are interested in the involvement and reactions of all the related parties during the process of change. According to this school, the change is not external to the drivers of change or managers, and they are part of the change. Thus, rather than controlling and managing the change, the flux and transformation approach emphasizes the mechanisms of participation and involvement in the flux of change. According to this view, conflicts are seen as the primary drivers of the process of change. In that sense, the leaders need to encourage a flexible conflict environment between the members of an organization to enable the emergence of new paths. The basic strategy of the approach is to follow the rhythm of change while trying to understand and coordinate the actions of participants (Cameron & Green, 2012, p. 154; Ralph D. Stacey, 2000, p. 193).

5.5: Conclusion

A grounded theory research is not initiated with a literature review because the purpose of the GTM is not to test the existing hypothesis of the grand theories but to construct an original theory from the data. The researcher is expected to begin the research with a rough idea or concept without any prior knowledge about the literature. The method increases both the originality of the research and the ambiguity of the research process. The comparison of the research findings with the literature review aims to improve the robustness of the emerging theory in GTM. In that sense, the literature review section of the study has been conducted after the emergence of the theory. However, like the traditional presentation of the thesis, the literature review covers only the related literature about the topic of the thesis not a comparison between the emerging theory and the literature.

The literature review section of the study consists of four main parts which are structured around the industrial policy, supply chain relationships, ecosystem management and change management. The revival of industrial policy as a response to the financial crisis 2008 has been discussed through four major place-based industrial policy concepts which are clusters, smart specialisation strategies, mission-oriented strategies, and regional innovation systems. The reflections of these approaches which has an important place in regional development processes can clearly be observed through regional policy design and implementation processes in the BISK region. Although clusters do not have a significant importance in

Turkey's local development policies, it should be noted that TAYSAD claims to build a mobility ecosystem through stressing the cluster form of the organization. On the other hand, the design process of East Marmara smart specialization strategy, right after the strategy was defined as a major policy tool accepted by the European Union, reveals the effects of academic and semi-academic studies on the policy making process. The mission-oriented strategies approach, on the other hand, is clearly observed in the story of the emergence of TOGG as a national policy. Finally, the regional innovation system approach shows itself clearly in the process of building a mobility ecosystem. The fact that all four aforementioned approaches have been implemented in the context of the automotive sector and the mobility ecosystem reveals the weight and importance of the sector for the BISK region.

The section on supply chain management explores the types of relations between the main and supplier industry. The primary strategies of the automotive companies in their relations with the suppliers have been classified into two broad category "exit" and "voice." While questioning the relations between the main industry and the supply industry, one of the apparent conclusions of the analysis was the assertion that the main industry companies differ according to their origins in terms of behavioural patterns. However, I did not note the instance as a factor that directly affects the relations of trust, collaboration, and coordination, but as a matter to be considered. When I have determined that there were in-depth studies on the subject in the literature, I thought it would be beneficial to share the findings in order to strengthen the study in the section of literature review.

The topic of ecosystem management is one of the main central points of the dissertation which aims to show the discerning dynamics of automotive industry and mobility ecosystem. It has been determined that the supply chain is organized in a strict hierarchical structure by the main industry companies under the "orbital motion", and it has been stated that the main industry, whose power has decreased with the ecosystem transition, can no longer fulfil this role alone. Within the framework of our analysis, it has been said that ecosystem development studies can only be possible with active regional policy tools and the creation of environments that will increase inter-institutional interaction. In this context, it is thought that the collaborative planning approach, which adopts open-ended and non-linear interaction between individuals and institutions, can play an important role in the creation of mechanisms that will accelerate the transition to the mobility ecosystem. The last section of the literature review deals with the problem of managing transition and an apparent subsidiary of the

previous section. Ecosystem building is defined as establishing relations among the different types of institution which was one of the main outcomes of the dissertation “sprawl” which characterizes the foremost behaviour pattern of the existing institutions. They are trying to establish bridges with the other industries and some of the pioneers of the quadruple transition venturing to the areas where they are not previously engaged with. The general framework of the study seems to succeed to find evidence for the existing literature and to explore new and innovative ways of explanations to the transition process from automotive industry to the mobility ecosystem.

CHAPTER 6

CONCLUSION

6.0: Introduction

The tale of an instinctive regional agglomeration of automotive industry is not a product of a well-planned industrial policy. This is the story of an emerging automotive industry that took advantage of the chance of being in the right place, at the right time. It is evident that the customs union agreement was a critical turning point in the investment decisions of the automotive OEMs to the BISK region and the supply industry around these facilities developed rapidly as a dependent variable. The automotive industry, which has been one of the most important industrial branches of the country for many years with its forward and backward connections, is facing a great wave of transformation. The process of quadruple transformation is likely to have devastating effects for the main and supply industry companies both at the local and global levels. On the other hand, the transition bears various opportunities for the supplier industry to move up the global value chain. Within the scope of this study, the effects of the transformation process on BISK automotive agglomeration were examined in terms of inter-institutional relations through trust, collaboration, and coordination cycle.

6.1: Key Findings

The overall structure of the dissertation has been designed to explore inter-institutional interaction of a particular geographically agglomerated industry under the transformation process. The changing nature of behavioural patterns of the industry has been explored through analysing trust, collaboration, and coordination relations among the actors of the BISK automotive cluster. Since the dynamic character of the research object necessitates the analysis within the framework of two different system conceptualizations, two different

systems have been defined under the phenomena of "automotive cluster" and "mobility ecosystem". By considering these two systems, one of which sprouted from the other to a large extent, the differences of both systems in the relational context were determined through a careful and in-depth analysis of the data gathered from different sources. The research design has been built upon constructivist grounded theory methodology which empowers the research with a set of tools and step-by-step guideline.

The concepts of trust, collaboration and coordination are used as a bottom-up analytic analysis framework that enables to understand the dynamics of inter-institutional interaction under the conditions of potentially destructive transformation. The TCC cycle framework serves to evaluate and compare different types of systemic value creation processes through the lenses of a relational perspective. This analytic framework also helps us to understand the reactions of regional actors to the transformation process. Therefore, the TCC cycle provides a template for understanding the multi-layered structure of a socially constructed value creation ecosystem. The sensitising concepts of trust, collaboration and coordination have become an analytic framework to understand relational dynamics of regional development. The initial concept of trust has become a tool to understand the nature of the value creation process. In that manner, during the process of analysis the transformation of trust base in terms of context, conditions, objectives, actors, expected outcomes and impact have eventually affected the inherent meaning of trust as a sensitising concept. The analysis of trust from the different perspectives of inter-institutional relations has also illuminate its relationship with the power that imposes an implicit guiding principle in the formation of trust relations. The imbalances between the actors have determined the very nature of trust relations which are incorporated with the relations of power. The changing nature of trust base has obviously a tremendous effect on the dynamics of collaboration and coordination. The determination of the laws of motion of the pendulum swinging between trust and power has a leading role in the establishment of collaboration and coordination relations.

In order to conduct a comparative analysis on the changing nature of inter-institutional interactions, I have defined two systems that represent the conventional automotive industry and emerging mobility ecosystem. In that manner, the primary defining characteristics of the automotive cluster and mobility ecosystem have emerged from the data as "orbital motion" and "sprawl" respectively. The core category "orbital motion" defines the dominant position of the OEMs on building trust, collaboration, and coordination relations along the supply

chain and beyond. There is no doubt that the centre of this system is the main industry companies, and the supply industry and the other actors act within the framework of the rules determined by the main industry companies, which are seen as the reason for the existence of the system. Although there are different levels of cooperation between the main industry companies in the central countries where R&D activities are carried out, no collaboration activities have been observed between the manufacturing facilities of the OEMs in the surrounding countries. The distance between the production facilities of the main industrial companies in the periphery of the automotive value chain does not allow the formation and development of basic relational ties. Although the supply industry companies work with many OEMs simultaneously, the limited cooperation opportunities between the key industry companies have confined the relations between the main industry and the supply industry within the narrow patterns of the purchasing process. The main behavioural patterns that define the “orbital motion” are described as *accumulation* and *protection*.

The process of *accumulation* has been defined just beyond the capital accumulation and extended to the realm of intangibles. In the supply chain, which is organized under the guidance of the main industry, the production processes of each manufacturer must be designed according to the price and quality expectations of the final product. The organization of production process according to the requirements of the main industry has become a learning challenge for the supplier companies. With the adaptation of modern production techniques, supplier industry companies operating in the automotive industry, which has risen to the status of the most developed industrial branch of the peripheral countries, have been able to maintain their competitiveness in the focus of their manufacturing abilities. However, the supply industry companies, aware of the fragility of a competitiveness built on the organization of production, display a very cautious stance about their products, production techniques and business connections. The main behaviour pattern of the supply industry, which takes its competitiveness not from the product it produces, but from the production process, has been shaped on *protection*. In short, the accumulation of capital and know-how on the one side, the protection of the product and business capital on the other side constitute the primary behavioural patterns of the automotive industry agglomerated in the BISK region. It has been determined that a mobility ecosystem, quite different from the automotive cluster in terms of relational perspective, has sprouted out of this dominant structure. The emerging mobility ecosystem has been detected as a reaction of some of the actors to the quadruple transformation of the automotive industry. The core category of the emerging mobility

ecosystem has been defined as *sprawl*. The term of *sprawl* defines the major behavioural pattern of the actors of the emerging mobility ecosystem. The focus of the analysis has been expanded to include the supporting actors at the regional level from the main and supply industry relations within the scope of the supply chain, which is the focal point of the automotive industry. It is evident that while examining the behavioural patterns of the main actors of the emerging ecosystem, it has become necessary to develop a perspective beyond the supply chain. The reaction of *sprawl* has been occurred under two major behavioural patterns of the ecosystem actors named *bridging* and *venturing*. The concept of *bridging* defined as the temporal and sectoral inter-action efforts of the ecosystem actors in order to understand the dynamics of upcoming transformation. Together with the *venturing* behaviour, the *sprawl* of the actors within the automotive industry has created a new form of interaction pattern that constitutes the mobility ecosystem. In this context, that some actors in the automotive industry have developed new types of relations and organizations within the framework of *bridging* and *venturing* strategies constitute the emerging mobility ecosystem. The formation and subsistence of trust-based relations in two systems have been built upon different inter-institutional interaction mechanisms. The system of *orbital motion* relies on the power of final product manufacturers that has been derived from the oligopolistic procurement structure of the industry. Trust relationships come to life and bear a meaning in the supply chain under the shadow of the oligopolistic power of the main industrial companies. On the other hand, the emerging mobility ecosystem has a power to create a trust-based supra-industrial milieu. The trust-based ecosystem has flourished beyond the supply-chain relations through mobilising tangible and intangible assets at the supra-industrial level. Redefining mutual trust relationships outside of purchasing processes will expected to be strengthened the cross-relationships between these assets and accelerate the value creation process. It should not be overlooked that these defined features are most likely temporary, since they are the primary behaviour patterns required by a system in the emerging phase. The fact that the entrepreneurial discovery process inherent to the ecosystem thinking is financed with the surpluses from the old accumulation process and with great profit expectations. It can be considered as a proof that this new system is not a break, but only a new and more collaborative value creation system.

In this context, collaboration is built on the basis of trust established at the supra-industrial level. The basic approaches to collaboration are discussed in depth in order to be able to trace the differing trust relationships within the framework of both systems and to put them on a

more visible ground. In this context, the basic features of *orbital motion* and *sprawl* systems have been intended to be explained through collaborative behaviours. The different typologies within the automotive industry according to their response to the quadruple transformation have been categorized through analysing collaboration relations among the actors. Four broad categories have been determined according to their reactions to the quadruple transformation which are stationaries, product seekers, collaborative product developers and ecosystem builders. Stationaries constitute a broad category who are designing the game according to the assumption that the transition will not affect their products and businesses. They are following the path of orbital motion with no excuse. All of the other three categories are action-oriented strategies that have been built on to get share from the changing conditions or at least to preserve the current competitiveness of the company. The first group named as *product seekers* who are looking for new products that match their current capabilities. The purpose of this group is simply substituting their current product with the new one that belongs to new type of vehicles. The product seekers are also trying to follow the path through supplying new types of parts and components to the electrified and autonomous vehicles. If the reduction in the number of parts with the transition to electric vehicles could be ignored, it would be reasonable to produce a new product that overlaps with the competence set of company instead of their product that will soon become obsolete. Even if the number of parts of the electric motor and the internal combustion engine is compared, it is clear that this assumption is not correct. Therefore, considering that they are already competing in the lowest value-added part of the value chain, it would not be wrong to say that the end of the road is approaching for many companies that adopt this strategy. Companies that see the glass half empty in terms of developing a new product using their existing skill sets are working on new and more complex products by collaborating with young companies experienced in software and electronics. Companies that have adopted this strategy have been able to show the courage to go out of the path that has been formed before by forming collaborations outside the existing supply chain. Very few companies are now breaking down their product-oriented thinking patterns and presenting a multidimensional strategy for the leadership of the emerging ecosystem. Such companies carry out activities to incorporate the function of an open innovation platform in order to be at the focal point of innovative ideas.

It is evident that the coordination relations among the actors of automotive industry and mobility ecosystem have different characteristics in nature. The coordination among the

automotive supply chain under the system of orbital motion have been organized through the main industry. Since the main industry companies are the absolute rulers of the coordination relations that are embedded in the supply chain, the interventions made to this system have been dissolved within the dynamics of the orbital motion system. In order to explore the coordination mechanism inherent to the system, the transformation in regional financial support programmes of East Marmara Development Agency have been analysed in terms of their power of their steering capacity. At this point, the reason behind the failure of the interventions carried out in the field of regional policy within the framework of the orbital motion system lies that the nature of system guided by the main industry based on accumulation and protection. After examining the existing support programs, we had the opportunity to make some inferences about the basic features of an ecosystem-based support mechanism within the framework of the *sprawl* system. In that manner, the primary features of the new industrial policy which have been derived from the analysis of current support mechanisms and the characteristics of *sprawl* system can be summarised under the titles of (i) anchoring long-term societal interest; (ii) discovering through collaboration; (iii) thinking from the end; (iv) taking the risk and (v) breaking the walls. These features, which are determined within the framework of the interpretation of the analysis results, include the issues to be considered in the ecosystem nurturing processes.

6.2: Regional Industrial Policy for Supply Industry

In the analysis on coordination relations, the basic features of the support mechanism were discussed in the mobility ecosystem. Under the heading of ecosystem management in the conclusion section, I will take a step back and try to address regional policy approaches in the supply industry, regardless of the sector. I will try to re-evaluate the findings of the study into a wider context of part and component supply industry to address a three-dimensional upgrading opportunity. Using a wider-angle lens will be useful to show that the hypotheses I have developed for the automotive sector and the mobility ecosystem can be addressed within a broader policy framework. In addition, I intend to expand the target group and thus the geographical scope to eliminate the risks of re-examining the issues related to regional industrial policy in the conclusion section through taking them out of context, which have already been covered in different chapters of the text. In that manner, I hope that I can provide a clearer understanding of the difference between agglomerated industrial production and the

ecosystem approach by moving the issue beyond the automotive sector. Finally, I expect to avoid making somewhat speculative inferences targeting a specific region by moving the issue beyond the automotive industry.

The part and component supply industry which is the sub-category of a cross-cutting domain of supply industry constitute a crucial part of national manufacturing capability of Turkey. The industry has an important place in the value chain of the household appliances, automotive, aviation, defence and space between the raw material and the final product manufacturers. Traditionally the component supply industry has been divided into the sectoral silos despite the products of the suppliers are quite similar and the transition of a supplier from an industry to the others are common. Additionally, some of the supplier companies are providing parts to the different industries at the same time. Due to these facts, a holistic approach to improve the component supplier industry has to be determined which has been threatened by the multi-dimensional transition processes. The focus on supply of part and component has become more relevant after the supply crises caused by COVID-19. In that sense, increasing the resilience of the part and component supply through improving its complexity and technology level have become more crucial for the health of the industrial base of both Turkey and Europe.

The Figure 25 below represents the primary axis of potential development and upgrading areas of the part and component supply industry.

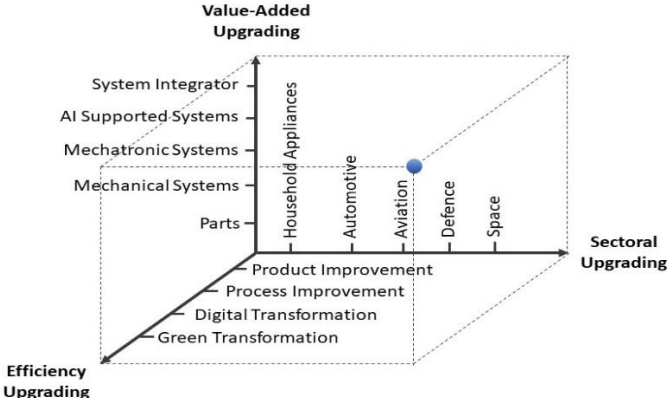


Figure 25 - Axes of Upgrading for the Supplier Industry

The part suppliers in Turkey are generally serving at the bottom of the global value chains and they are usually providing metal or plastic parts or mechanical systems to the OEMs. In order to upgrade the traditional component supplier industries, three different upgrading process can be employed through regional industrial support mechanisms. However, under the pressure of the high level of competition, component supplier companies cannot be easily maintaining the triple transition simultaneously without a to-the-point support of regional innovation ecosystem actors.

It is apparent that the component supplier industry has an opportunity to upgrade itself through adapting three different transitions. Improving sectoral transitivity of the component supplier companies among the different industries is an efficient way to improve the resilience of the companies against the possible future financial turmoil. Establishing a place-based innovation ecosystem without the restrictive barriers of the sectoral and hierarchical segmentation probably provides a more suitable environment for the diversification of the customers for the component supply industry. On the other side, the efficiency transition of the components supplier industry has been accelerated with the twin enforcement of legal arrangements and main industries. However, the component supply industry requires an intense support from the scientific community in order to maintain the efficiency upgrading process with a low cost and high accuracy. The third upgrading is the most complex and hard-to-achieve transition that aims to improve the value-added level of the component suppliers within the supply chain. In that manner, the value-added transition requires more complex systems of collaboration among the institutions of quadruple helix. The three axes of industrial upgrading may provide a framework to construct a better understanding of the regional policy potentialities. As a result, the formation of a place-based ecosystem will provide a valuable contribution to the triple transition of component supply industry. Each of the upgrading process will be discussed thoroughly.

Sectoral Upgrading:

The plastic and metal part suppliers are mainly serving for the industries of household appliances, automotive, aviation and space. Although the requirements of main industries can radically change from one to another, the production process of the component industry is quite similar. The major difference among the part suppliers comes from the quantity of the manufactured items which is clearly related with the characteristics of the industry. Passenger car and household appliance are two major industries which are based on economies of scale.

For instance, the annual market size for refrigerators are around 200 million units against 78 million passenger cars. Both of the industries buy in large number of parts from the suppliers. On the other hand, vehicles such as bus, minibus and truck, planes, etc. are manufactured in small numbers and the parts or components are also manufactured for the small numbers. The quantity produced from a part or component is the main determinant of the mode of production. Therefore, it can be expected that there will be pass-through among suppliers of products based on economies of scale. In this context, it is possible to support companies to expand their customer portfolios by designing financial assistance programmes to enable supplier companies to serve different industries according to their mode of production. It can be ensured that supplier companies improve their level of competence in the fields of different materials, specifications, and production methods to increase their sectoral pass-through. Although there is no need for any ecosystem support to ensure the transitivity of supply industry companies between different sectors, it is thought that the programs to be designed with the support of main industry companies will increase the chance of success. In the sectoral approach, in which inter-institutional relations are shaped within the framework of the "orbital motion" system, it would be appropriate to demand the leadership of the main industry companies in order to support sectoral diversify of the supplier companies. The diversification of the customer bundle will also increase resilience of the supplier companies against the different types of crises. Since the main purpose of the supply industry companies is to ensure the continuity of their capital and know-how accumulation, it will not be meaningful to provide support for collaboration while implementing sectoral upgrading policies, as they are likely to display a protective behaviour on their products and production processes. Instead, it can be ensured that companies specialize in supplying parts to the industries with higher profit margins such as defence, aviation, and space, with the consultancy to be provided for competence development programs and certification processes together with the main industry companies.

Efficiency Upgrading:

The supplier companies have to adapt the successive transformation processes to their production processes and products simultaneously. Under the *orbital motion* system, the product and process improvements have been enforced by the main industry companies in order to reduce the cost and improve the quality of the products. The twin transformation of digitalization and sustainability have accelerated continuous improvement processes for companies and created a burden far beyond what companies can bear alone. Apart from the

financial dimension of the transformation, the weakness of the complementary ecosystems that will support the said twin transformation stands out as another issue that prolongs the adaptation processes of the companies. Building strong ecosystems in the horizontal areas of digital and sustainable transformation will enable supplier companies to overcome this process more easily. However, it should not be overlooked that the system in which the supplier companies operate is orbital motion and this system is coordinated by the main industry companies. Therefore, it is inevitable that the programs to be designed will be carried out under the leadership or support of the main industry companies in a way that will bring social benefit to the fore. In the areas of digitalization and sustainability, which we define as supportive ecosystems, ecosystem formation and development supports will increase the speed of the process and significantly reduce the cost. Just like sectoral upgrading, efficiency upgrading is not a strategy that can improve the place in the value chain by increasing the added value of the products produced by the companies. However, the supply industry has to carry out such efficiency-enhancing activities continuously in order to maintain and improve its competitiveness under the coordination of main industry. In this context, supplier development programs to be co-constructed with the main industry companies can be designed as a new regional industrial policy tool.

Value-added Upgrading:

As it will be remembered, I have defined four different types of companies in the context of the strategies developed by the supplier industry companies against the quadruple transformation in the automotive sector. The supplier companies that belong to typologies of *collaborative product developers* and *ecosystem builders* have a strategy to adjust their positions in the global value chain through improving the complexity of their product. It has been determined that the establishment of on-the-job collaborations for both strategies, albeit at different levels, is not an option but a necessity. The myth of gradual advancement of the supplier companies within the global value chain through gaining the ability to produce technologically more advanced components and systems has been busted throughout the study. However, the upcoming transition in the automotive and probably in the other industries, provides an opportunity for the supplier companies to be a part of the emerging ecosystems. In that sense, the value-added upgrading of the companies can only be realized under the realm of emerging ecosystems not in the already established industries. It is precisely in this intervention point that the development and implementation of regional industrial policies is of vital significance. The foundation of trust in the emerging ecosystem

should be ensured and the creation of structures to support results-oriented collaboration mechanisms should be designed as a regional policy tool, since there is no longer an *orbital motion* system operating under the coordination of main industry.

The three axes of the supplier upgrading have provided a conceptual framework for a set of policy bundle that aims to improve regional competitiveness through fostering supply industry. Starting from this point, it is possible to create a roadmap for practitioners by identifying some of the possible regional support tools for an industry in transformation. Table 24 contains recommendations for key policy tools in all three axes for the supplier companies in the transition from a traditional industry to an ecosystem-style value creation process. The majority of the policy recommendations listed are implemented by various institutions in different contexts and contents. However, since there is no clarity about which policy tool will yield what results, a significant part of the support programs designed cannot reach their expected results and impacts. It would be especially useful to be able to define the domains of such classification support programs in order to design more impactful programmes.

Table 23 - Regional Policy Matrix

	Automotive Industry	Transition	Mobility Ecosystem
Sectoral	Certification	Test & Validation	- / Bridging
Efficiency	Lean Manufacturing	Digitalisation	Greenifying
Value-added	- / Bridging	Common Use	Ambidexterity

In order to create and develop ecosystems that do not have a single-centred coordination mechanism, it will be useful to start from the basic features of the trust foundation on which the system is built. From the perspective of ecosystem thinking, regional industrial policy concentrates on the formation of a cross-sectoral and inclusive trust-based environments and plans to support mission-oriented collaborative activities of value creation in order to solve local and global challenges. As trust-based affairs overflows from the supply chain, the presumed linear relationship between means and ends have been surpassed by the multilateral and multi-functional character of the ecosystem and the linear way of reasoning fails to satisfy the transition demand of the institutions. In order to create ecosystems focused on local and global challenges, it is of great importance to develop mechanisms that will keep these problems on the agenda. The fact that the expected outputs have shifted from the product to the solution also brings about a temporal break. Designing and implementing solutions that

are believed to be successful require a long-term approach than launching a product. For this reason, there are usually many start-ups that offer similar solutions to a problem which are locating at the centre of ecosystems, and unfortunately only a very small percentage of them can survive in order to realise their desires. It is not reasonable to expect institutionalized firms to behave in a similar way. However, the proliferation of platforms that bring corporate companies and start-ups together is being implemented as a solution that will accelerate the transformation of supply industry companies on the one hand and increase the survival rates of start-ups on the other. While creating an ecosystem-based regional policy design, it is not a coincidence that interface structures are tried to be created that will bring together different institutions and organizations at different levels in a result-oriented manner. Therefore, the creation of interface structures that will enable them to create value by bringing together those who do not understand each other easily is used as the main policy tool of the ecosystem approach. However, today it is not possible to implement linearly constructed support mechanisms at the regional level, but the implementing institutions of the regional policy needs to be involved into the ecosystem. Thus, from the perspective of the ecosystem thinking, the financial and technical support should be injected selectively, not inclusively, to increase the functionality of these systems. Of course, such a policy design brings the need to understand and interpret the structure and function of each actor much more closely. Trying to replace the declining power of the main industry with public power in order to be a part of the ecosystem will not yield any result. Because the requested credibility is not defined internally to the institutions but is provided by the individuals representing the institutions. Instead of bureaucrats who hide behind public power, curious and reliable representatives of institutions are the basic condition of ensuring this credibility.

The establishment of TOGG, which is one of the most tangible results of the mission-oriented national industrial policy, is thought to make serious contributions to the formation of a mobility ecosystem at the regional level. The beginning of the story has been designed within the framework of the orbital motion strategy. After, the fall of the expected gradual rise strategy of the automotive supply industry in the value chain has been correctly analysed, the necessity to establish a new and domestic coordination centre has become the primary priority of the industrial policy. However, when it was understood that there would be no difference in the current equation since the desired production figures could not be reached in a short time, a strategy of launching a product to be born within the mobility ecosystem was adopted wisely. Although it is unclear whether this strategy will be successful or not, it is of great

importance for TOGG to be successful if an active mobility ecosystem is to be established within the borders of the country.

6.3: Recommendations for Future Research

The automotive industry is still one of the most attractive topics for the scholars from the different fields of study. There are many studies on the automotive industry in the context of production processes (Bürken, 2014; Rubenstein, 2001), organization of production (Coffman et al., 2019b; Mock, 2016; Sadler, 2001; Taymaz & Yilmaz, 2017), and industrial policies (Calabrese et al., 2013; Kamp & Tözün, 2010; Sturgeon et al., 2008). In this study, I tried to analyse the transformation process from automotive industry to the mobility ecosystem at the regional level within the scope of the TCC cycle which was designed as an analytical framework to understand inter-institutional interaction. Examining the relations between the institutional structures that are the primary elements in the formation of these two different systems, one of which sprouted from the other, provided important clues about the nature of the transformation. However, there is a need for in-depth studies on the research methods and relational context of the transformation. Additionally, in terms of national and regional industrial policy the analysis of emerging ecosystems and leveraging the transition process can be hot topics for the scholars.

The application of innovative and profound ways of research to illuminate the transition process of the industry may led to robust, tick and interesting academic studies. In particular, I think that grounded theory-based action and case study research methodologies have a strong potential to reveal the numerous dimensions of industrial transformation. Since the studies on transition deal with dynamic interactions among the institutions and actors, the application of action-based research methodologies may provide valuable insight our desire to explore network of implicit relationships. I think that the possibilities of using the TCC cycle analytical framework that I developed within the scope of this study and developing this tool in line with the needs of the researcher can be applied to the research on the relational foundations of transformation processes. Understanding trust, collaboration, and coordination relations among the actors of an ecosystem enables us to recognize the underlying dynamics of the value creation process at the regional level.

Regional ecosystems often represent dense networks of relationships with the potential to create tangible and intangible value. Studies on the nature of the relations between institutions and individuals that make up the ecosystem are essential to understand the dynamics of the system, which is in a constant dynamism. Within the scope of this dissertation, a study was carried out that puts the automotive supply industry at the centre while trying to understand the mobility ecosystem. This situation points to some limitations in understanding regional ecosystems, which we define as a multidimensional and layered network of relations. Although other actors within the mobility ecosystem were also included in the analysis within the scope of the study, the main actors of the study are the automotive main and supplier companies. It is thought that the studies to be carried out especially from the perspective of the software and electronics sectors, which have different industrial backgrounds, or start-ups, which is one of the most important elements of the ecosystem, can reveal the relational dynamics of the ecosystem. Studies that will uncover the structural transformation requirements of public institutions and universities within the framework of the ecosystem-based thinking may complete the picture. In addition to the complementary institutions that make up the ecosystem, case studies focusing on automotive supplier companies that invest in this field with the vision of ecosystem leadership will provide a better understanding of the two-system model. Likewise, the studies to be carried out for the supply industry companies stuck in the orbital motion system are also important in terms of revealing the bottlenecks in the transformation process.

Especially in the mobility ecosystem, in-depth studies can be conducted on each defined concept of trust relations. By using one or more of these concepts as sensitizing concepts, an in-depth grounded theory study of trust relationships in the mobility ecosystem can be carried out. Especially the notions of *openness* and *credibility* which construct the conditions of a trust-based ecosystem can be studied to show different aspects of the mobility ecosystem. Again, in this context, an in-depth examination of the concept of *entrepreneurial discovery*, which I borrowed from the smart specialization literature, can enable the development of different approaches to both the integration process of the industrial companies into the mobility ecosystem and the policy-making processes.

Another issue that needs to be addressed in detail within the framework of the two-system model is the field of national and regional industrial policy development. In particular, studies on the analysis of the basic dynamics of the mobility ecosystem in the relational context and

using it as an input in policy-making processes may bring innovative approaches in the field of public policy. Although not handled as a separate title, the implications of policy options in the field of supporting ecosystems are discussed in detail throughout the thesis, but especially in the section on *coordination*. The study provides important inputs to the field of regional policy, but policy analysis is among the secondary outputs of the research. In that manner, there is a need for a holistic approach to the ecosystem-based regional industrial policy based on the basic features of the mobility ecosystem, which is among the main outputs of the study. In addition, since there are not many strategy studies yet, examining the planning studies to be done on creating and managing ecosystems at the national and regional level can provide important clues on the role and function of the public in the quadruple helix.

Recently, creating and strengthening the linkages among the institutions of quadruple helix beyond the developed countries has become one of the primary place-based development priorities of European Union. The diffusion of scientific and industrial excellence, especially to the 13 countries that joined the Union after 2004, is a necessary but also a difficult target to reduce regional development disparities. The basis of the said difficulty is that these countries have either few or no national main industry companies. Considering that R&D and innovation processes in traditional industries are carried out under the guidance of main industry companies, it is certain that innovative policies regarding the transformation of the supply industry need to be executed at the regional level. Considering the outputs of the study in this context, it may be beneficial to use this general framework to build a regional innovation system focused on the supply industry in developing countries.

6.4: Conclusion

Within the scope of the study, I tried to deal with the effects of the quadruple transformation, which is defined as the transition to the mobility ecosystem in the automotive sector, in the context of inter-institutional trust, collaboration, and coordination relations. I had the opportunity to make a comparative analysis of the dual system conceptualization and the transformation process in relational context. Within the scope of these two systems, which are defined as orbital motion and sprawl, a basic framework on the dynamics of transformation has been developed by following the transformation process of trust, cooperation, and coordination relations. I think that the study contains important indications

especially for academicians and practitioners working in the field of transition, industrial policy, and regional development.

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APPENDICES

A. LIST OF INTERVIEWEES AND CODES

CODE	DATE	PLACE	TYPE	POSITION
I1	17.11.2018	Ankara	Central Government	Manager
I2	17.11.2018	Ankara	Regional Government	Manager
I3	27.09.2019	Kocaeli	Supplier Company	Owner
I4	27.09.2019	Kocaeli	Supplier Company	Owner
I5	02.10.2019	İstanbul	Main Industry / University	Manager
I6	02.10.2019	İstanbul	Entrepreneur / University	Owner / Manager
I7	02.10.2019	Kocaeli	Main Industry / Intermediary	Manager / Manager
I8	02.10.2019	İstanbul	Central Government	Manager
I9	03.10.2019	Kocaeli	Non-governmental Organization	Manager
I10	03.10.2019	İstanbul	Consultant	Owner
I11	03.10.2019	İstanbul	Start-up	Owner
I12	25.10.2019	Sakarya	Main Industry	Manager
I13	30.10.2019	İstanbul	Main Industry / Start-up	Engineer / Owner
I14	11.08.2019	İstanbul	University	Researcher
I15	13.11.2019	Kocaeli	Main Industry / Supplier Company	Manager
I16	13.11.2019	İstanbul	Central Government	Expert
I17	20.11.2019	İstanbul	Non-governmental Organization	Manager
I18	27.11.2019	Sakarya	Main Industry / Supplier Company	Owner
I19	28.11.2019	Wolfsburg	Main Industry / Research Institute	Manager
I20	12.02.2020	Bursa	Main Industry / Supplier Company	Engineer / Owner
I21	21.02.2020	Kocaeli	Main Industry / Research Institute	Engineer / Engineer
I22	25.02.2020	İstanbul	Main Industry / NGO	Engineer / Manager
I23	25.02.2020	İstanbul	Main Industry / Intermediary	Manager / Manager
I24	28.02.2020	Ankara	University / Research Centre	Academic / Manager

B. ETHICAL PERMISSSION

UYGULAMALI ETİK ARAŞTIRMA MERKEZİ
APPLIED ETHICS RESEARCH CENTER



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04 EKİM 2019

Konu: Değerlendirme Sonucu

Gönderen: ODTÜ İnsan Araştırmaları Etik Kurulu (IAEK)

İlgi: İnsan Araştırmaları Etik Kurulu Başvurusu

Sayın Prof.Dr. Melih PINARCIOĞLU

Danışmanlığını yaptığınız Devrim ŞAVLI'nın "Regional Dynamics of Trust, Collaboration and Coordination: A Case Study on an Emerging Reegional Mobility Ecosystem" başlıklı araştırması İnsan Araştırmaları Etik Kurulu tarafından uygun görülmüş ve 347 ODTÜ 2019 protokol numarası ile onaylanmıştır.

Saygılarımızla bilgilerinize sunarız.

[REDACTED]
Başkan

Prof. Dr. Tolga CAN

Üye

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C. CURRICULUM VITAE

PERSONAL INFORMATION

Surname, Name: ŞAVLI, Devrim

Nationality: Turkish (TC)

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EDUCATION

Degree	Institution	Graduation
PhD	METU Urban Policy Planning and Local Governments	2022
MS	METU Eurasian Studies	2004
BS	BILKENT UNIVERSITY Economics	2001

WORK EXPERIENCE

Year	Place	Enrolment
2021 - ...	UNITED NATIONS DEVELOPMENT PROGRAMME	Innovation Centre Director
2010 - 2020	EAST MARMARA DEVELOPMENT AGENCY	Head of Monitoring and Evaluation

FOREIGN LANGUAGES

Advanced English, Basic German

D. TURKISH SUMMARY / TÜRKÇE ÖZET

Endüstriyel dönüşüm için kurumlar arası işbirliğini sağlamak için tasarlanmış tüm bölgesel araçların şaşırtıcı derecede etkisizliği, araştırma fikrinin oluşum aşamasının temel sorunsalı oluşturmaktadır. Koordinasyon boşluğunu keşfetmek için çalışma, bölgesel güven ve işbirliği dinamiklerini analiz etmek ve anlamak için potansiyel olarak yıkıcı dönüşüm altındaki otomotiv endüstrisine odaklanıyor. Bu anlamda çalışmanın nihai amacı, ekosistem yönetimi için tutarlı bir bölgesel politika tasarımını desteklemek için otomotiv endüstrisinden hareketlilik ekosistemine dönüşüm üzerine bir çerçeve çizmektir. Açıkçası, bu zorlu görevin önünde bir dizi engel bulunmaktadır. Bu engellerin başında, dönüşümün bölgesel otomotiv değer zinciri kurumları üzerindeki etkisi hakkındaki çok sınırlı bilgimiz bulunmaktadır. Araştırma projesinin ana eksenini söz konusu bilgi boşluğunun giderilmesi üzerine inşa edilmiştir. Bu çerçevede araştırmanın konusu bölgesel otomotiv değer zincirinde faaliyet gösteren kurumların bu dönüşüme karşı tutumlarının yan sanayi perspektifinden incelenmesidir. Dönüşümün ilişkisel etkilerinin deşifre edilmesiyle birlikte sektörün teknolojik dönüşümünü tetiklemeyi hedefleyen aktörlerin yöntem ve araçları hakkında derinlemesine bir analiz fırsatı ortaya çıkacaktır. Bu nedenle konuya taze bir bakış açısı kazandırmak amacıyla otomotiv endüstrisinde yaşanan dönüşümü aktarmak için yapılandırmacı (constructivist) kuram temelli bir araştırma yöntemi kullanılmıştır. Öte yandan, dönüşüm sürecinde ortaya çıkan bölgesel endüstriyel koordinasyon açığından yola çıkarak Doğu Marmara Kalkınma Ajansı'nın bölgesel strateji oluşturma ve programlama süreçleri çerçevesinde dönüşümün ilişkisel dinamiklerinin bölgesel politika ile uyumluluğu incelenmiştir.

Sanayi devriminin öncüsü olarak otomotiv endüstrisi, potansiyel olarak yıkıcı bir dönüşümün eşiğinde bulunuyor. Otomotiv sektöründen hareketlilik ekosistemi kavramına geçiş çok boyutlu bir olgu olarak karşımızda durmaktadır. Bu boyutlardan birincisi, otomotiv endüstrisinin, müşterilerin arabaları bir ulaşım aracı olarak yorumlama ve kullanma şeklindeki radikal değişikliklere gebe olduğu düşünülmektedir. Kentsel hareketliliğin zorluklarına yenilikçi, verimli ve sürdürülebilir çözümler sunan araç paylaşımı, araç çağırma,

diğer akıllı telefon tabanlı ulaşım sistemleri ve mikro hareketlilik'ye dayalı gelişen iş modelleri, binek araç pazarında her geçen gün artan bir baskı yaratıyor. Öte yandan, iklim değişikliğine karşı küresel mücadele, hükümetleri CO2 emisyonlarına yasal kısıtlamalar getirmeye zorlamakta ve teknolojik gelişmeler, araçların elektrifikasyonunu artan bir oranda teşvik etmektedir. Bu anlamda elektrikli otomobil satışı 2019 yılında 2,1 milyona, dünya stoku ise 2014 yılından bu yana yıllık ortalama yüzde 60'lık bir büyüme oranıyla 7,2 milyona ulaştı (IEA, 2020, s. 11). Elektrifikasyon ve diğer fosil olmayan yakıt alternatifleri üstel bir büyüme hızına sahipken, içten yanmalı motorlar hala ulaşım pazarında baskın ticarete konu ürünler olarak ön plana çıkmaktadır.

Tüm ulaşım sistemimizi büyük olasılıkla değiştirecek bir başka yıkıcı yenilik ise otonom ve bağlantılı araç teknolojileri olarak adlandırılıyor. Bu teknolojiler, araç içini bir yaşam alanı olarak tanımlayarak hareketlilik kavramını yeniden şekillendirme potansiyeline sahiptir. Tüm bu gelişmeler, gelecekte otomobillerin hareketlilik çözümlerinin en önemli parçalarından biri olmaya devam edeceğini, ancak bunun şimdikinden çok farklı bir şekilde olacağı konusunda önemli ipuçları vermektedir. Otomotiv endüstrisinin bu dört ana eğilimi, otonom sürüş, bağlantılılık, elektrifikasyon ve paylaşımlı hareketlilik (ACES) olarak ortaya çıkmaktadır. Hareketlilik ekosisteminin temel özelliklerini oluşturacak bu trendler tezin bundan sonraki bölümlerinde otomotiv sektöründeki dörtlü dönüşüm olarak isimlendirilecek.

Otomotiv sektörünün köklü geçmişine bakıldığında, Türkiye son dönemde küresel otomotiv değer zincirinin bir parçası olarak araç ve araç parçaları üretiminde önemli bir aktör olarak ortaya çıkmıştır. 1960'lı yıllarda gelişmeye başlayan Türk otomotiv sanayii, 1996 yılında Türkiye ile AB arasında imzalanan gümrük birliği anlaşmasının ardından, doğrudan yabancı yatırımlarla güçlenerek endüstriyel imalatın lokomotif sektörlerinden biri haline geldi (Taymaz ve Yılmaz, 2017, s. 2). Küresel araç üretim değer zinciri yıllar içinde öncü sektörlerden biri haline gelirken, dörtlü dönüşümün sektör üzerinde önemli etkileri olacağı aşikâr. Türkiye'deki otomotiv sektörünün bu geçiş sürecine tepkisi, muhtemelen sektörün küresel tedarik zincirindeki gelecekteki konumunu belirleyecektir.

Bu çalışmanın temel odak noktası, hareketlilik ekosistemine geçiş sürecinde otomotiv sektörü oyuncularının temel davranış kalıplarını kurumlar arası etkileşim perspektifinden değerlendirmektir. Kurumlar arasındaki etkileşimin değişen doğasına yapılan vurgu, güven, işbirliği ve koordinasyon ilişkilerinin evrimi üzerinden değerlendirilecektir. Daha önce de

belirtildiği gibi, çalışmanın ikincil amacı, bölgesel sanayi politikasını otomotiv endüstrisinin ilgili aktörleri arasındaki kurumsal etkileşimin değişen doğası üzerinden değerlendirmektir. Özellikle ana ve yan sanayi arasındaki güven, işbirliği ve koordinasyonun değişen yapısının analiz sonuçlarının, bölgesel düzeyde sanayi politikası ve destek mekanizmalarına ilişkin farklı bir bakış açısı sunması beklenmektedir. Bu anlamda, otomotiv endüstrisinin dörtlü geçiş koşullarında küme düzeyinde ilişkisel analizi, iki sistem arasındaki farkı yakalamamızı sağlayacaktır. Bu bağlamda, bölgesel sanayi tabanının yenilikçilik kapasitesini geliştirerek rekabet gücünü artırmayı hedefleyen bölgesel sanayi politikasının, hareketlilik ekosisteminin gereksinimlerine göre yeniden tasarlanması için olanakların değerlendirilmesi yerinde olur.

Çalışmanın amacı, bölgesel sanayi politikası kapsamında Bursa, İstanbul, Sakarya ve Kocaeli (BİSK) otomotiv kümesi ve gelişmekte olan hareketlilik ekosisteminin aktörleri arasındaki güven, işbirliği ve koordinasyon ilişkilerini araştırmaktır. Bu çerçevede, BİSK bölgesinde saha çalışması yapılmıştır. Seçilen coğrafi alan, araç ve araç parçaları üretimi etrafında kümelenmiş çok sayıda ekonomik ve sosyal aktiviteyi içermektedir. Otomotiv sektörü ve bu sektöre parça üreten firmalar ise BİSK otomotiv kümesinin bel kemiğini oluşturmaktadır. Çalışmada bu birincil kurumlar üzerinde durulsa da hizmet odaklı bir hareketlilik sektörüne dönüşüm sürecine ışık tutmak amacıyla dernekler, üniversiteler, kamu kurumları, aracı kurumlar gibi destekleyici kuruluşlar da gerekli görüldüğünde analize dahil edilmiştir. Bu anlamda, BİSK bölgesinin hareketlilik ekosistemi, mekan tabanlı bir sanayi politikası ortamında güven, işbirliği ve koordinasyon dinamiklerini anlamak için araştırmanın arka planını oluşturmaktadır. Radikal bir teknolojik dönüşümün olduğu bir dönemde, BİSK otomotiv kümelene oyuncularının diğer aktörlere karşı tutumları ve diğer destekleyici kurumlarla bağlantıları bölgesel endüstriyel strateji tasarım sürecine değerli girdiler sağlayabilir. BİSK otomotiv kümesi, yeni bir hareketlilik ekosistemine geçiş için kendini hazırlamaya ve yenilemeye çalışmaktadır. Bu bölgenin geleneksel sanayi üssü, BİSK bölgesinde faaliyet gösteren OEM'ler etrafında örgütlenmiş olan otomotiv endüstrisine güçlü bir şekilde bağımlıdır. Otomotiv kümesinin aktörlerinden bazıları geçiş ortamında hayatta kalmak için farklı stratejiler uygulamaya çalışmakla kalmayıp, bu stratejilerini hayata geçirebilmek için çeşitli işbirlikleri geliştirmektedir. Bu bağlamda, daha gelişmiş bir bölgesel üretim sistemine geçiş süreci, otomotiv endüstrisinin oyuncularını gelecek stratejilerine uyum sağlamak zorunda bırakmıştır. Otomotiv kümesi oyuncuları arasındaki güven, işbirliği ve koordinasyonun rolünü anlamak, bölgesel politikanın yeni yol geliştirme sürecini hızlandırabilecek seçeneklerini dönüştürecek ve çeşitlendirecektir. Çalışma, aktörler arasında

interaktif deęer yaratma sürecinin deęişen doğasına kapsamlı bir ilişkiyel bakış açısı sunmaktadır. Deęişimin diyalektięi, güven-işbirlięi-koordinasyon döngüsünün merceęinden dinamik olarak gözlemlenir. Son olarak, BİSK otomotiv kümesi aktörlerinin dörtlü geçişle başa çıkma taktikleri, endüstriyel yükseltmeyi teşvik etmeyi amaçlayan mekân tabanlı bölgesel kalkınma stratejileri açısından deęerlendirilmektedir.

Tez dönüşüm çalışmaları temelinde tedarik zinciri yönetimi ve ekonomik coęrafyayı ele alan disiplinler arası bir alana odaklanmaktadır. Belirli bir tedarik zincirinde faaliyet gösteren şirketler arasındaki ilişkiler bağlamında deęer yaratma süreçlerini inceleyen sınırlı sayıda çalışma bulunmaktadır ve bu çalışmaların çoęu tedarik zinciri yönetimi üzerine çalışan sosyal bilimciler tarafından yürütölmektedir (Coase, 1937; Fynes vd., 2005; Gulati & Nickerson, 2008; Yardımcı & Sako, 2010; Kim ve ark., 2004; Macduffie & Yardımcı, 2006). Öte yandan, ekonomik coęrafya ile ilgili çalışmalar küresel deęer zincirleri (Coe vd., 2004; Gereffi vd., 2001; Sturgeon ve ark., 2008) ve bölgesel inovasyon sistemleri (Asheim & Isaksen, 2002; Philip Cooke, 1992, 2016; A. Isaksen vd., 2018; Tödtling & Trippel, 2005) alanlarına yoğunlaşmaktadır. Otomotiv tedarik zinciri içindeki firma düzeyinde etkileşim ve ekonomik coęrafya literatürü için özel olarak üretilen bilgi, dörtlü geçiş baskısı altında olan BİSK otomotiv kümesinin analizi çerçevesinde ele alınacaktır.

Bölgesel yığınlaşmalar üzerinde çalışma kararının ardından, araştırma tasarımı için verilecek ilk karar sektör seçimi oldu. Doęu Marmara Kalkınma Ajansında çalıştığım için amacım Doęu Marmara'nın önde gelen sektörlerinden birinde çalışmaktı. Deniz taşımacılıęı, kimya endüstrisi, kompozit malzemeler ve kümes hayvanları otomotiv endüstrisinin rakipleriydi. Otomotiv endüstrisi, sistem üretiminin kraliçesi olarak adlandırılmakta, çeşitli öncül ve ardıl bağlantıları olan bir üretim faaliyeti olarak öne çıkmaktadır. Kraliçe kuralı belirler. Otomotiv endüstrisinin örgütlenme şekli ve otomotiv tedarik zinciri koordinasyon mekanizmaları dięer imalat sanayileri tarafından yakından takip edilmektedir. Otomotiv endüstrisinin yeni üretim teknikleri, koordinasyon yaklaşımları ve organizasyon tarzları dięer sektörler tarafından kabul edilmektedir. Ayrıca otomotiv endüstrisi Türkiye ekonomisi ve hedef bölge için de büyük anlam taşımaktadır. Ayrıca, Doęu Marmara Bölgesi, Türkiye'de bulunan altı otomobil üretim tesisinden dördüne ev sahiplięi yapmaktadır. Sektörü seçerken dikkate aldığım bir dięer faktör de otomotiv sektörünü derinden etkilemesi beklenen dörtlü dönüşümün kapıda olmasıydı. Bu dönüşüm sürecinin öncülleri, hareketlilik algımızı potansiyel olarak deęiştirecek yıkıcı teknolojiler ve trendler ufukta. Son olarak, belki de sektör seçiminin

altında yatan en önemli faktörlerden biri, görevimin bir parçası olarak otomotiv kümelenme aktörleriyle olan yakın ilişkidir.

Sektör, farklı alanlardan birçok akademisyenin ilgisini çekmektedir (Attias, 2016; Bailey vd., 2015; Gereffi vd., 2001; Spulber & Dennis, 2016; Sturgeon vd., 2008). Otomotiv endüstrisi ve endüstri ile ilgili konular, özgün bir çalışma yaratmanın zor olduğu, üzerinde fazla çalışılmış bir araştırma alanıdır. Konuyu daha az çalışılmış bir alana taşımak için aklıma gelen ilk yöntem, 2010 yılından bu yana profesyonel olarak çalışmakta olduğum bölgesel kalkınma alanı ile birleştirmek oldu. Bölgede otomotiv sektörünün yığılması üzerine çalışmaya karar verdim ancak ilgili literatür kapsamında yapılan çalışmaları inceledikten sonra (Ketels, 2016, 2017; Porter, 1985; Scott, 1995, 2006; Sölvell vd., 2009; Tödtling & Trippel, 2005), orijinal bir çalışma oluşturmak için daha derine inmem gerektiğine karar verdim. Görevim gereği katıldığım çeşitli toplantılarda defalarca duyduğum, Türk toplumunun kültürel olarak işbirliğine meyilli olmadığına dair yaygın kanaat üzerine düşünmeye başladım. Bölgesel kalkınma literatüründe işbirliği odaklı çalışmaların yaygınlaşması sonucunda kurumlar arası işbirliğini geliştirecek programların tasarlanması gerekliliği gündeme gelmeye başlamıştı. Aslında, Türkiye'deki imalat sanayinin diğer şirketlerle işbirliğine dayalı ilişkiler geliştirmeme eğiliminde olduğu sonucuna varmak için güçlü destekleyici göstergeler bulunmaktadır. Örneğin, özel sektöre yönelik hazırlanan mali destek programlarında en az bir ortağı olan projelere önemli bir avantaj sağlanmış olmasına rağmen, Doğu Marmara Kalkınma Ajansı kuruluşundan bu yana ortaklık tek bir özel sektör proje başvurusu almamıştır. Bölgesel inovasyon sistemleri literatüründe işbirliği ilişkilerine verilen önem, çalışmanın mantığını kurumlar arası işbirliği etrafında inşa etme kararında (Macduffie & Helper, 2006; Planko, 2018; Schroth & Häußermann, 2018) büyük bir etkiye sahiptir. Yine de Türk imalat sanayisinin düşük işbirliği düzeyini iş kültürü ile ilişkilendiren yaklaşımlardan uzak durmaya çalışarak, bu durumun sebeplerini derinlemesine araştırmaya karar verdim. Araştırmanın hemen başında, kurumlar arası işbirliği meselesinin pratik uygulama eksikliğinden kaynaklandığı konusunda bir ön kabulüm oluşmuştu ama tez kapsamında konuyu derinlemesine inceleme ve daha yeterli bir açıklama oluşturmayı amaçlıyorum. Bu nedenle, endüstriyel üretim süreçlerinde kurumlar arası işbirliği uygulamalarının eksikliğinin maddi koşullarını, dönüşümün eşliğinde olan bir sektör üzerinden incelemeye karar verdim.

Kurumlar arası işbirliğini ayrı bir kavram olarak ele almak yerine, güven, işbirliği ve koordinasyon döngüsüne ilişkin bütünsel bir analiz aracı oluşturmayı tercih ettim. Bu

bağlamda, güven kavramı işbirliği eylemini başlatmak için uygun koşulları temsil ederken, koordinasyon kavramı, ilgili kurumlar arasında hem güven ortamını hem de işbirlikçi eylemleri teşvik etmeyi ve sürdürmeyi amaçlayan yönetim ve bölgesel politika araçlarını sembolize eder. Tedarik zinciri içindeki ve dışındaki kurumlar arası ilişkileri dörtlü dönüşüm sürecine özgü bir şekilde incelemek için özgün bir analiz aracı geliştirme ihtiyacı, gömülü teori yöntemi araştırma sürecinin doğasında bulunan belirsizlikle mücadelede bir rehber olarak kullanılmaya çalışılmıştır. Bu anlamda güven-işbirliği-koordinasyon (TCC) döngüsü, bölgesel otomotiv kümelenmesindeki dörtlü dönüşümü sembolik etkileşimci yaklaşımın merceğinden incelemek için bir analiz aracı olarak tanımlanmıştır. TCC çerçevesi, BİSK otomotiv kümelenmesi kurumları arasındaki etkileşimi keşfetmeyi amaçlayan gömülü teori yöntemine derinlik ve genişlik sağlar. TCC aracı, endüstriyel üretimin ilişkisel koşullarını karşılaştırmak için bir şablon sağlayarak otomotiv sektöründeki dönüşüme tepkinin maddi koşullarını araştırmak için çalışmayı güçlendirmek için tasarlanmıştır. Araştırma aşamasında ortaya çıkan bu yöntemle iki farklı üretim sistemi olarak kavramsallaştırdığım otomotiv endüstrisi ile hareketlilik ekosistemi arasında ilişkisel bir karşılaştırma yapma fırsatı buldum. TCC döngüsü, gelişmekte olan hareketlilik ekosisteminin ilişkisel temelleri hakkında derinlemesine bir iç görü sağlamak ve bu da endüstrinin geleceği için tutarlı bir bölgesel sanayi politikası tasarlama fırsatlarını artırmaktadır.

Gömülü teori metodolojisinde önerildiği gibi, araştırmanın arka planını belirlerken, analizin son aşamasına kadar herhangi bir literatür incelemesi yapmadım. Ancak uzun süre bölgesel gelişim uzmanı olarak çalıştığım ve otomotiv sektörü temsilcileriyle birçok proje yürüttüğüm için Glaserian klasik gömülü teorisinin birincil tavsiyesi olan araştırmacının saha çalışmasına “tabula rasa” olarak başlaması gerektiği tavsiyesine uyamadım. Öte yandan hem bölgesel kalkınma alanında hem de otomotiv değer zincirinde daha önce edindiğim görüşü (doxa) göz ardı edemesem de kişisel deneyimlerimden kaynaklanan örtük bilginin verilerden ortaya çıkan teoriyi kirletmesine izin vermemeye çalıştım. Bu çerçevede, tez çalışması kapsamında araştırmanın temel kategorileri inşa edildikten sonra literatür taraması yapılmıştır.

Gömülü teori metodolojisinde araştırma süreci ilk aşamada bir araştırma sorunu gerektirmez. Oluşturma ve sına arasında hiyerarşik konumlandırma olmasa da, yürütme yönteminde ciddi farklılıklar vardır. Teori yapım süreci, araştırmacı tarafından ele alınması gereken uzun vadeli bir belirsizlik içerir. Bir araştırma sorunu yerine, konstrüktivist temelli bir teori metodolojisi, araştırmanın gevşek oyun alanını belirleyen genel anahtar kelimelerle başlar.

Glaser ve Strauss'un belirttiği gibi "iyi teori, şanslı bir zihin kombinasyonu, zengin deneyim ve uyarıcı veriler tarafından üretilir (1967, s. 14)."

Buna göre, araştırma sürecinin sonraki aşamalarında verilerden araştırma sorunu ortaya çıkmıştır. Analizin yapısı üç keşif aşaması üzerine inşa edilmiştir. İlk aşama, BİSK bölgesinde otomotiv endüstrisi ve hareketlilik ekosistemi olarak tanımlanan otomotiv yığınlaşması için iki farklı değer yaratma sistemi tanımlayarak geçiş sürecini kavramsallaştırmayı amaçlamaktadır. İkinci aşama, tedarik zinciri ve ekosistem seviyelerinde değişen güven, işbirliği ve koordinasyon ilişkilerinin doğasını keşfetmeye odaklanmaktadır. Bu anlamda, küme aktörleri arasındaki etkileşim, otomotiv endüstrisinde ve hareketlilik ekosisteminde iki değer yaratma süreci sistemi altında güven, işbirliği ve koordinasyon ilişkileri perspektifi ile analiz edilmiştir. Üçüncü aşamada, otomotiv kümesi içindeki güven, işbirliği ve koordinasyon ilişkilerinin değişen doğası, bölgesel politika oluşturma süreci perspektifinden analiz edilmiştir. Üçüncü aşamanın odak noktası, otomotiv kümesi kurumlarını destekleyen teknik ve finansal destek programlarıdır. Doğu Marmara Kalkınma Ajansı'nın hem tedarik zincirinin rekabet gücünü hem de hareket ekosistemine geçişi teşvik etmeyi amaçlayan koordineli rolü, yarı-vaka-çalışma araştırması olarak tasarlanmıştır. Doğu Marmara Kalkınma Ajansı'nın durumu, bölge otoritelerinin sanayi politikası açısından koordinasyon gücü hakkında değerli bilgiler sağlayacaktır.

Endüstriyel dönüşüm koşullarında güven, işbirliği ve koordinasyon kavramları çalışmanın arka planı oluşturmaktadır. Daha spesifik olarak, otomotiv endüstrisindeki değişimin doğasını anlamak için, çalışma küresel otomotiv değer zincirinin mekânsal ve zamansal anlık bir görüntüsüne dayanan güven, işbirliği ve koordinasyon ilişkilerinin dinamiklerine odaklanacaktır. Bu anlamda BİSK otomotiv kümesi çalışmanın çekirdeğini oluşturmaktadır. Dörtlü geçiş koşullarında belirli bir coğrafya, zaman ve değer zinciri içinde güven, işbirliği ve koordinasyon ilişkileri üzerine yapılan keşifler, bölgesel sanayi tabanın teknolojik dönüşümünü teşvik etmeyi amaçlayan bölgesel sanayi politikasına ışık tutma potansiyeline sahiptir. Otomotiv değer zinciri aktörlerinin dörtlü geçiş tepkileri teorinin ilk aşamasını ve genel çerçevesini oluşturmaktadır. Bu aşamada karşılaştırmalı bir analiz yapabilmek için otomotiv değer zincirini oluşturan aktörlerin tarihsel karşılıklı konumlandırılması ile dönüşüm çerçevesinde oluşan hareketlilik ekosistemi, iki değer yaratma sistemi olarak tanımlanarak birbirinde ayrılır.

Otomotiv tedarik sanayinin özellikle araç üreticileri ile ilgili koşulları ve konumlandırılması, üç aşamalı araştırma yapısının ikinci aşamasının temelini oluşturmaktadır. İlk aşamada otomotiv kümelenme aktörleri arasında bölgesel düzeyde kurulan ve dönüşen güven, işbirliği ve koordinasyon ilişkilerine odaklanılırken, araştırmanın ikinci aşaması bu kümelenmeyi oluşturan başlıca unsurlar olan araç üreticileri ile tedarik sanayi arasındaki ilişkilerin dönüşümüne odaklanıyor. Çalışma kapsamında karmaşık otomotiv tedarik zinciri firmaları arasında işbirliğinin büyümesi, otomotiv üretiminin organizasyonu bağlamında tartışılmıştır. Tümevarım yaklaşımı ile oluşturulmuş veri odaklı teorinin literatürle araştırma sonrası karşılaştırması araştırmanın ikinci aşamasında incelenmektedir.

Araştırmanın son aşaması, Doğu Marmara Kalkınma Ajansı'nın otomotiv endüstrisi ile ilgili faaliyetlerini inceleyerek bölgesel sanayi politikasının belirli bir endüstrinin rekabet gücü ve teknolojik dönüşüm süreci üzerindeki rolünü anlamak için tasarlanmıştır. Tedarik zinciri boyunca veya ekosistem aktörleri arasında değer yaratma süreçlerinde inşa edilen ilişkinin modu, hedef endüstrinin rekabet gücünü artırmayı amaçlayan teknik ve finansal destek mekanizmalarını detaylandırmak için önemli bilgiler sağlamıştır. Ancak maliyetleri düşürerek ve mevcut ürün kalitesini artırarak küresel değer zincirinin bir parçası olarak bölgesel düzeyde faaliyet gösteren bir sektörün rekabet gücünü artırmaya çalışan bölgesel sanayi politikaları hızla eskimeye başlamıştır. Bu bakımdan TCC dinamiklerinin küresel değer zincirlerinde değişen doğası, bölgesel sanayi politikası yapım süreçlerine yön verme potansiyeline sahiptir.

Araştırmanın özel amacı, endüstriyel geçiş bağlamında BİSK bölgesel hareketlilik ekosistemi arasındaki güven, işbirliği ve koordinasyon ilişkilerini araştırmaktır. Otomotiv endüstrisi, yeni teknolojilerin ilerlemesiyle doğrudan şekillenen yıkıcı bir geçişin eşiğindedir. Bu teknik ilerleme sadece araçları dönüştürmekle kalmayıp, aynı zamanda üretim şeklimizi de değiştirecektir. Bu anlamda, otomotiv endüstrisindeki üretim organizasyonu muhtemelen köklü değişikliklerle karşı karşıya kalacaktır, ancak teknolojik gelişmelerin imalat tarafındaki etkileri hala belirgin değildir.

Tüm soruların çalışmayı yönlendirmek için bir soruya (veya bazen birkaç soruya) ihtiyacı olsa da, nicel araştırmanın ele aldığı sorunlarla karşılaştırıldığında, nitel araştırma sorularının doğada daha geniş ve genel olması muhtemeldir (Corbin & Strauss, 2015, s. 54). Ancak nitel araştırma yöntemleri arasında araştırma sürecinde araştırma sorusunun ne zaman oluşması

gerektiği konusunda farklı prosedürler önerilmektedir. Gömülü teori metodolojisinin konstrüktivist versiyonunda, araştırma süreci başlangıçta herhangi bir hipotez veya ayrıntılı bir araştırma sorusu gerektirmez (Bryant, 2017, s. 27). Glaserian ve konstrüktivist temelli teori metodolojisinde sıkça vurgulanan önemli bir dönüm noktası, araştırma sorununun verilerden ortaya çıkacağıdır. Araştırmanın ilk başlangıç noktası genel bir soru veya veriyle izlenebilen ve araştırma sürecinde geliştirilebilen bir kavram olabilir.

Konstrüktivist yaklaşımın ardından, Bursa, Sakarya ve İstanbul üçgeni içindeki otomotiv endüstrisi yığılması üzerine araştırmayı başlatmak için bir dizi kavram seçilmiştir. Değişim koşullarında güven, işbirliği ve koordinasyon, BİSK bölgesinde mekansal olarak yığılmış olan Türkiye'deki otomotiv endüstrisinin doğasını araştırmak için başlıca kavramlar olarak seçildi. Görüşmelerin ilk dalgası bu kavramlar üzerine inşa edildi. Çalışmanın ilk aşamasında, ilk veri analizinden aşağıdaki araştırma sorusu ortaya çıkmıştır.

Araştırma Sorusu: BİSK otomotiv kümelenmesi kurumları geliştirmekte olan bölgesel hareketlilik ekosistemine nasıl tepki veriyor?

Çalışmanın odak noktası, otomotiv değer zinciri aktörlerinin otomotiv endüstrisinde yaklaşan dönüşüme tepkileri etrafında tasarlanmıştır. Bu noktada, otomotiv endüstrisindeki ve geliştirmekte olan hareketlilik ekosistemindeki ilişkilerin değişen aktörleri ve özellikleri, verilerden aşağıdaki alt soruların ortaya çıkmasına neden olmuştur.

Araştırma Alt Sorusu 1: Otomotiv endüstrisi ile hareketlilik ekosisteminin kurumsal etkileşim kalıpları açısından farkları nelerdir?

Alt araştırma sorusu, otomotiv endüstrisi ve hareketlilik ekosistemi olarak ayırt edilen iki farklı sistem açısından güven, işbirliği ve koordinasyon ilişkilerinin araştırılmasına yol açtı. Bu iki sistem üzerindeki güven, işbirliği ve koordinasyon ilişkilerinin gözetilmesi, analizin dinamik bir çerçevede oluşturulmasını sağladı. Bu anlamda, farklı düzeylerde ve farklı aktörlerin katılımıyla gerçekleştirilen bu üç farklı ilişki biçiminin iki sistem çerçevesinde analizini sağlayan diyalektik bir yaklaşım benimsenmiştir.

İkinci araştırma alt sorusu, geçiş sürecinde değişen etkileşim koşullarına ilişkin analizi bölgesel politika ile ilişkilendirmek için tasarlanmıştır. Koordinasyon mekanizmalarının

değişen koşullara ne ölçüde uyum sağladığının değerlendirilmesi bu alt soru çerçevesinde incelenmiştir.

Araştırma Alt Sorusu 2: Güvenin değişen doğasının, kurumlar arası işbirliğinin bölgesel koordinasyonu üzerindeki sonuçları nelerdir?

Araştırmanın teorik doygunluğu elde edildikçe, verilerden ikinci bir alt soru daha ortaya çıktı. İkinci alt soru, ekosistem yaklaşımının değişen gereksinimlerini araştırmak için tasarlanmıştır. Koordinasyon mekanizması, bölgesel endüstriyel planlama (veya strateji oluşturma) ve programlama süreçlerini kapsayan bölgesel sanayi politikası çerçevesi açısından analiz edildi. Otomotiv endüstrisinden hareketlilik ekosistemine geçişe paralel olarak, tutarlı bir bölgesel sanayi politikasının gereklilikleri kökten değişmektedir, çünkü tedarik zinciri koordinasyon süreçlerinin desteklenmesi artık bölgelerin bölgesel rekabet gücünü korumak için yeterli değildir. Bu bağlamda, bölgesel politika ekosistem yönetimi çabalarını kolaylaştırmak için tasarlanmak zorundadır.

Güven, işbirliği ve koordinasyon (TCC) döngüsü, değer yaratma sistemlerinin kuruluşları arasındaki etkileşimin doğasını anlamayı ve karşılaştırmayı sağlayan analitik bir çerçevedir. Güven, işbirliği ve koordinasyon süreçlerinin bir değer yaratma sürecinde nasıl gerçekleştiğine odaklanarak dönüşümü yakalamak için tasarlanmıştır. Çerçeve, her paydaşın konumsal bakış açılarını kaybetmeden aktörler arasındaki etkileşimi daha geniş bir bağlamda araştırmak için yararlıdır. Bu anlamda araştırma, TCC Döngüsü analitik çerçevesini kullanarak otomotiv endüstrisindeki etkileşimin değişen doğasını açıklığa kavuşturuyor. Örgütlerin tepkileri diğerlerinin eylemlerinden ayrılamaz ve genellikle kurumlar arası geçici veya kalıcı koalisyonlar kurarak birbirleriyle veya birbirlerine karşı hareket ederler. TCC, kurumlar arası etkileşimlerin dönüşen doğasını araştırmak için ikincil bir analiz olarak kullanılır.

Araştırma tarafından oluşturulan çekirdek kategoriler, TCC döngüsü aracını kullanarak sahadan toplanan verilerin analizinden türetilir. Araştırmamızda, birçok temel teori çalışmasından farklı olarak, kodlama sürecinin sonunda tek değil, iki temel kategori ortaya çıkmıştır, çünkü aynı bölgesel ekosistem içinde baskın ve gelişmekte olan etkileşim sistemlerini ayırt etmek için iki sistem tanımlanmıştır. Bu bakımdan bölgesel olarak yığılmış konvansiyonel otomotiv endüstrisini tanımlayan temel kategori *yörüngesel*

hareket iken, gelişmekte olan hareketlilik ekosisteminin temel kategorisi (*fonksiyonel yayılma*) olarak görünmektedir. Her iki temel kategori de bölgesel otomotiv yığınlaşması ve ekosistem aktörlerinin baskın ve bazen çelişkili stratejilerini tanımlamaktadır. İki etkileşim sistemi tanımlamak, bölgesel otomotiv yığınlaşması aktörlerinin otomotiv endüstrisinin yaklaşan yıkıcı geçişine karşı sınırlı tepkilerini ayırt etmemizi sağlar. Az sayıda kurum, her geçen gün artsa da ontolojik temelini oluşturan geleneksel faaliyetlerini sürdürürken, yeni duruma ayak uydurmak için yeni stratejiler geliştirmektedir. Bu stratejiler güven, işbirliği ve koordinasyon ilişkilerini, gelişmekte olan hareketlilik ekosisteminin oluşumuyla güçlü bir şekilde ilişkili yeni bir alana dönüştürmüştür. İki sistemin özellikleri, aktörler arasındaki etkileşimlerin geçişini gözlemleyerek araştırma boyunca izlendi.

BİSK bölgesinde otomotiv yığınlaşmasını temsil eden ilk sistem *yörüngesel hareket* terimi ile tanımlanmıştır. Yörüngesel hareket kategorisi, otomotiv endüstrisinde ana araç üreticileri ve çevresinde örgütlenen değer yaratma sürecini temsil eder. Bu sistemde tüm tedarik zinciri ana endüstri tarafından koordine edilmektedir. Bu sistemin genel yapısı OEM'lerin karakteriyle güçlü bir şekilde ilişkili olsa da, TCC ilişkileri tedarikçi ve müşteri ilişkilerinin nispeten yakın döngüsü içinde gerçekleşir. BİSK otomotiv kümesi aktörlerinden derlenen birinci elden verilere göre, tedarikçi sanayi perspektifinden yörüngesel hareket sistemindeki ilişkiler, *koruma* ve *biriktirme* olarak iki kavram etrafında tasarlandı. BİSK otomotiv kümesindeki tedarikçi sanayi, sermaye ve know-how birikimini sürdürmek amacıyla iş ilişkilerini ve ürün özelliklerini korumaya yönelik bir strateji uygulama eğilimindedir.

Öte yandan dördümlü geçiş, BİSK otomotiv kümesi içindeki kuruluşları, bu küme içinde ve dışında faaliyet gösteren diğer aktörlere karşı tutumlarını değiştirmeye zorladı. Otomotiv kümelenmesi içindeki kuruluşların temel tepkisi ise *yayılma* kavramı altında kategorize edilmiştir. İşlevsel yayılma, bazı otomotiv kümesi aktörlerinin dördümlü geçiş tepkilerini ve kategorinin *köprüleme* ve *venturing* olarak adlandırılan iki stratejiye ayrılmıştır. Öncelikle *köprüleme* stratejisine göre, bazı kuruluşlar değer zincirindeki mevcut konumları ile gelecekte potansiyel değer yaratma alanları arasında köprüler kurmaya çalışıyor. Bu kurumlar, gelişmekte olan hareketlilik ekosisteminin geleneksel otomotiv endüstrisindeki faaliyetleri üzerindeki sonuçlarını değerlendirmeye ve analiz etmeye çalışmaktadır. İkinci köprüleme stratejisi, otomotiv endüstrisi ile başta yazılım endüstrisi olmak üzere diğer ilgili endüstriler arasında yeni bağlantılar kurmayı amaçlamaktadır. Venturing, yayılma kategorisini oluşturan ikinci kavramdır. Strateji, hareketlilik ekosisteminin ortamına doğal

olarak uygun zihin setlerine sahip yeni kurumlar kurarak ve kurumlarını otomotiv endüstrisinde yaklaşan geçişe adapte olma isteklerini gösteren yeni eğitim amaç ve hedeflerini ele alarak kuruluşların değişimini kolaylaştırmaktadır.

Türkiye'deki konvansiyonel otomotiv tedarik endüstrisi, düşük katma değerli faaliyet düzeyinde rekabet güçlerini sürdürmek için ticari faaliyetlerini başkalarının gözünden gizleme içgüdüğü üzerine inşa edilmiştir. Bu yaklaşım sadece küresel değer zincirinde bir üst seviyeye çıkmalarını engellemekle kalmaz, aynı zamanda varlıkları için potansiyel bir tehdit oluşturur ve orta ve uzun vadede piyasanın dışına itilmelerine neden olabilir. Türkiye'de otomotiv tedarik endüstrisinin koşullarının, güvene dayalı yenilikçi bir hareketlilik ekosistemi kurmak için içsel bir tutum, motivasyon veya yetenek göstererek ciddi bir dönüşüm girişimine izin vermediği ileri sürülebilir. Bu anlamda otomotiv endüstrisinde güven ortamının olmadığını ileri sürdüler ve sektörel toplantı ve etkinliklerde rutin iş ilişkilerinin dışında işletme sahiplerinin bilgi paylaşımı konusundaki tutumlarına ilişkin gözlemlerine göre bakış açılarını esas alındı.

Her iki sistem çerçevesinde oluşturulan güven ilişkileri farklı karakterlere sahiptir. Güven ilişkilerinin temeli, otomotiv endüstrisi ve hareketlilik ekosistemi için bağlam, koşullar, hedefler, aktörler, beklenen çıktılar ve etki açısından temelde birbirinden farklıdır. Elbette bu iki sistem arasındaki farkları güven ilişkileri temelinde bu kadar net gösterirken, sistemler arasında bir geçiş olmadığını iddia etmiyoruz. Bu bağlamda, ortaya çıkardığımız farklılıkların çoğu, güvene dayalı ilişkilerin iki uç noktada nasıl farklılık gösterdiğini araştırmayı amaçlamaktadır. Birçok durumda bu iki sistemin aynı anda var olduğunu ve sistemler arasındaki geçişkenlik düzeyinin geçişin hızını belirlediğini belirtmek gerekir. Değişimi yönetme arzusuyla tasarlanan politikalar için müdahale alanlarının belirlenmesinde iki sistem arasındaki farkların tanımlanması zorunludur.

İki sistem arasındaki güven ilişkileri ile ilgili ilk ve en temel fark, bu ilişkilerin nerede gerçekleştiği analiz edilerek gözlemlenebilir. Bu anlamda, güven ilişkileri çerçevesinde bağlamı anlamak, bir endüstrinin aktörleri arasındaki ilişkinin doğası hakkında önemli kanıtlar içerir. Güven ilişkilerinin bağlamını incelemeye başlamadan önce, *bağlam* kavramından ne anladığımızı açıklığa kavuşturmamız gerekir. En genel anlamda, bağlam terimi "bir olayı veya nesneyi çerçeveleyen koşullar kümesini tanımlamak için kullanılır (Bazire & Brézillon, 2005, s. 29)." Bu tanıma dayanarak, güven ilişkilerini anlamak için

yapmamız gereken şey, olayın nerede gerçekleştiğine odaklanmaktır. Yanıtlayanların güven ilişkilerini hangi durumlarla, olaylarla veya nesnelere ilişkilendirdiği sorusuna cevap vermeye çalışarak başlayabiliriz.

Belirli bir sistemdeki güven tabanı, işbirlikçi eylemler için teşvik edici bir ortam oluşturur. Güven ilişkileri tarafından önceden hazırlanmış bir alanda işbirliği eylemleri gerçekleştiğinden, güven ve işbirliği ilişkilerini özellikleri açısından ayırt etmek mümkün değildir. Bu bağlamda iki farklı sistemdeki güven ilişkilerinin bağlam, koşullar, hedefler, aktörler, beklenen sonuçlar ve etkiler açısından özellikleri işbirliği ilişkileri açısından da geçerlidir. Tek bir başlık altında birleşme veya güven ve işbirliği ilişkilerinin iki başlığa ayrılması kararı, tezin yazım sürecinde sıkça karşılaştığım ve belki de sonuçlanması en zor kararlardan biriydi. Son olarak, güven ve işbirliği konularını iki farklı bölümde ele almaya karar verdim. Bu noktada tekrarlardan kaçınmak için, işbirliği ilişkilerinin belirli örnekler üzerinden iki sistem çerçevesinde nasıl şekillendirildiğini göz önünde bulundurarak güven ilişkileri bağlamında analizlerimizi derinleştirmeye çalıştık.

İşbirliği, değer yaratmak amacıyla birlikte çalışmanın gönüllü bir eylemidir. İş birliğinin gönüllü karakteri güven ilişkilerinin varlığını zorunlu kılsa da güce dayalı sistemlerde işbirliğinin geliştirilmesi mümkün değildir. Asimetrik güç ilişkileri üzerine inşa edilen sistemlerde, işbirliği ilişkisi gibi görünen aktörler arasındaki etkileşimler, kısa vadeli ticari kazanımlara dayalı olarak birlikte çalışmanın zorunlu uygulamalarıdır. Otomotiv ana sanayi ile tedarik sanayi arasındaki güç ilişkilerinin hakimiyeti, tedarik endüstrisinin sağladığı parçaların katma değeri ile ters orantılıdır. Otomotiv tedarik endüstrisinin düşük katma değerli ürün yelpazesine sıkıştığı bölgesel yığılmasında, alıcı lehine asimetrik güç dengesi (OEM veya Tier1) işbirliğini engelleyen en önemli faktörlerden biridir. Bu bağlamda tedarikçi sanayi firmalarının işbirlikçi ürün geliştirme projeleri ile daha karmaşık parçalar, bileşenler ve hatta sistemler üreterek otomotiv değer zincirinin üst basamaklarına çıkacağı beklentisini doğrulamak oldukça zordur. Ürün paketinin düşük karmaşık düzeyi, üreticilerin koruma içgüdüsünü tetikler ve alıcı ile tedarikçi arasında kapalı bir döngü oluşturur. Yörüngesel hareket sistemindeki ürün ve ilişkilerin korunması süreci, otomotiv endüstrisindeki işbirlikçi tutumlar için güçlü bir kesin güce sahiptir.

Koruma refleksi, üretilen ürün ve tedarikçiler tarafından üretim sürecini sürdürmek için kurulan ticari ilişkiler etrafında şekillenmiştir. Bu korku, üretilen ürünü taklit etmek ve doğru

bağlantılarla piyasaya sürmek için giriş engellerin oldukça alçak olmasından kaynaklanmaktadır. Bu bağlamda, BİSK otomotiv yığılaşmasında kurumlar arası işbirliği mekanizmalarının işleyişinin önündeki en büyük engellerden biri, ürün ve ağı gizlemeye yönelik hassasiyettir. BİSK otomotiv yığılaşmasında otomotiv tedarikçilerinin ana odak noktası, üretim süreçleri üzerinde sermaye ve know-how biriktirmektir. Öte yandan, ekosistem aktörleriyle güçlendirilmiş bazı otomotiv tedarikçilerinin gelişmekte olan hareketlilik ekosistemine birincil tepkileri, *köprüleme* ve *venturing* olmak üzere iki kavram üzerinde yoğunlaşmıştır. Değişim arayışında olan aktörler, zamansal ve sektörel boşlukları doldurmak için eylem arıyor. Zamansal boşluk, bugünü ve geleceği uzlaştırmak yoluyla doldurulmaya çalışılıyor. Öte yandan, boşluk diğer sektörlerle bağlantı kurmaya çalışarak hareketlilik ekosisteminin gerektirdiği çok boyutluluğu aşmaya çalışıyor. Venturing davranışı, zamansal ve sektörel boşlukları işgal etmeyi amaçlayan yayılmanın ikinci aşaması olarak kavramsallaştırılabilir. Risk almaya istekli aktörler tarafından ortaya konan aktif bir stratejidir. Strateji oluşturma, terra nullius olarak görülebilen gelişmekte olan hareketlilik ekosistemini işgal etmek için venturing davranışının bir parçasıdır. Kimseye ait olmayan bu alanda yapılan keşif çalışmalarını takip eden strateji oluşturma çalışmaları ile hem şirketler hem de kurumlar için bir hakimiyet alanı belirleme yarışına dönüşmektedir. Ancak, çok az kurum bu gelişmekte olan alana yatırım yapmaya cesaret ediyor. Bu öncü yatırımların ortaya çıktığı alanın riskleri ve fırsatları netleştikçe, yeni işbirliği modelleri ile birçok kurumun halkın desteği ile bu alana yatırım yapacağı beklenebilir.

Otomotiv endüstrisinin içgüdüsel bir bölgesel yığılaşma hikayesi, iyi planlanmış bölgesel bir sanayi politikasının ürünü değildir. Bu, doğru yerde, doğru zamanda olma şansını fırsat bilen gelişmekte olan bir otomotiv endüstrisinin hikayesidir. Gümrük birliği anlaşmasının otomotiv OEM'lerinin BİSK bölgesine yatırım kararlarında kritik bir dönüm noktası olduğu ve bu tesislerin etrafındaki tedarik endüstrisinin bağımlı bir değişken olarak hızla geliştiği aşıkardır. Dörtlü dönüşüm sürecinin hem yerel hem de küresel düzeyde ana ve tedarik sanayi şirketleri için yıkıcı etkileri olması muhtemeldir. Öte yandan, geçiş, tedarikçi endüstrisinin küresel değer zincirinde yukarı taşınması için çeşitli fırsatlar taşımaktadır. Bu çalışma kapsamında dönüşüm sürecinin BİSK otomotiv yığılaşmasına etkileri güven, işbirliği ve koordinasyon döngüsü ile kurumlar arası ilişkiler açısından incelenmiştir.

Tezin genel yapısı, dönüşüm süreci kapsamında otomotiv endüstrisini oluşturan kurumlar arası etkileşimi araştırmak için tasarlanmıştır. Güven, işbirliği ve koordinasyon kavramları,

potansiyel olarak yıkıcı dönüşüm koşullarında kurumlar arası etkileşim dinamiklerini anlamayı sağlayan aşağıdan yukarıya analitik analiz çerçevesi olarak kullanılmaktadır. TCC döngü çerçevesi, farklı türdeki sistemik değer oluşturma süreçlerini ilişkişel bir perspektifin mercekleri aracılığıyla değerlendirmeye ve karşılaştırmaya yarar. Bu analitik çerçeve, bölgesel aktörlerin dönüşüm sürecine tepkilerini anlamamıza da yardımcı oluyor. Bu nedenle, TCC döngüsü, sosyal olarak oluşturulmuş bir değer yaratma ekosisteminin çok katmanlı yapısını anlamak için bir şablon sağlamakta. Güven, işbirliği ve koordinasyon kavramları, bölgesel kalkınmanın ilişkişel dinamiklerini anlamak için analitik bir çerçeve haline gelmiştir. İlk olarak güven kavramı, değer yaratma sürecinin doğasını anlamak için bir araç haline gelmiştir. Bu şekilde, analiz sürecinde güven tabanının bağlam, koşullar, hedefler, aktörler, beklenen sonuçlar ve etki açısından dönüşümü, sonunda güven kavramının duyarlı bir kavram olarak kalıtsal anlamını etkilemiştir. Kurumlar arası ilişkilerin farklı açılarından güvenin analizi, güven ilişkilerinin oluşumunda örtülü yol gösterici bir ilke dayatıcı güçle ilişkişelini de aydınlatmıştır. Aktörler arasındaki dengesizlikler, güç ilişkileriyle bir araya gelen güven ilişkilerinin doğasını belirlemiştir. Güven tabanının değişen doğasının işbirliği ve koordinasyon dinamikleri üzerinde muazzam bir etkisi olduğu aşıkardır. Güven ve güç arasında savrulan sarkacın hareket yasalarının belirlenmesi, işbirliği ve koordinasyon ilişkilerinin kurulmasında öncü bir role sahiptir.

Kurumlar arası etkileşimlerin değişen doğası hakkında karşılaştırmalı bir analiz yapmak için, geleneksel otomotiv endüstrisini ve gelişmekte olan hareketlilik ekosistemini temsil eden iki sistem tanımladım. Bu şekilde, otomotiv kümesi ve hareketlilik ekosisteminin birincil belirleyici özellikleri verilerden sırasıyla "yörüngesel hareket" ve "yayıma" olarak ortaya çıkmıştır. Temel kategori "yörüngesel hareket", OEM'lerin tedarik zinciri ve ötesinde güven, işbirliği ve koordinasyon ilişkileri kurma konusundaki baskın konumunu tanımlar. Hiç şüphe yok ki bu sistemin merkezi ana sanayi şirketleridir ve tedarik endüstrisi ve diğer aktörler, sistemin varlık nedeni olarak görülen ana sanayi şirketlerinin belirlediği kurallar çerçevesinde hareket eder. Ar-Ge faaliyetlerinin yürütüldüğü merkez ülkelerdeki ana sanayi firmaları arasında farklı düzeyde işbirliği olmakla birlikte, çevre ülkelerdeki OEM'lerin üretim tesisleri arasında herhangi bir işbirliği faaliyeti gözlemlenmemiştir. Otomotiv değer zincirinin çerperinde yer alan ana sanayi firmalarının üretim tesisleri arasındaki mesafe, temel ilişkişel bağların oluşmasına ve gelişmesine izin vermemektedir. Tedarik sanayi şirketleri birçok OEM ile aynı anda çalışsa da, kilit sanayi şirketleri arasındaki sınırlı işbirliği olanakları, ana sanayi ile tedarik endüstrisi arasındaki ilişkileri satın alma sürecinin dar kalıpları içerisine

hapsetmiştir. "Yörüngesel hareketi" tanımlayan temel davranış kalıpları *birikim* ve *koruma* olarak tanımlanır.

Birikim süreci sermaye birikiminin hemen ötesinde tanımlanmış ve somut olmayanlar alemine kadar uzanmıştır. Ana sanayi rehberliğinde düzenlenen tedarik zincirinde her üreticinin üretim süreçlerinin nihai ürünün fiyat ve kalite beklentilerine göre tasarlanması gerekmektedir. Üretim sürecinin ana endüstrinin gereksinimlerine göre düzenlenmesi, tedarikçi firmalar için bir öğrenme zorluğu haline gelmiştir. Modern üretim tekniklerinin adaptasyonu ile çevre ülkelerin en gelişmiş sanayi kolu statüsüne yükselen otomotiv endüstrisinde faaliyet gösteren tedarikçi sanayi firmaları, üretim yeteneklerinin odağında rekabet güçlerini koruyabilmiştir. Bununla birlikte, tedarik endüstrisi şirketleri, üretimin organizasyonu üzerine inşa edilen bir rekabet gücünün kırılabilirliğinin farkında olarak, ürünleri, üretim teknikleri ve iş bağlantıları konusunda çok temkinli bir duruş sergiliyorlar. Rekabet gücünü ürettiği üründen değil, üretim sürecinden alan tedarik sektörünün temel davranış modeli koruma üzerine şekillenmiştir. Kısacası, bir tarafta sermaye ve know-how birikimi, diğer tarafta ürün ve işletme sermayesinin korunması, BİSK bölgesinde birleştirilmiş otomotiv endüstrisinin birincil davranış kalıplarını oluşturmaktadır.

İlişkisel yaklaşımın bakış açısından otomotiv kümesinden oldukça farklı bir hareketlilik ekosisteminin bu baskın yapıdan filizlendiği tespit edilmiştir. Gelişen hareketlilik ekosistemi, bazı aktörlerin otomotiv endüstrisinin dörtlü dönüşümüne karşı geliştirdikleri bir strateji olarak ortaya çıkmıştır. Gelişmekte olan hareketlilik ekosisteminin temel kategorisi yayılma olarak tanımlanmıştır. Yayılma terimi, gelişmekte olan hareketlilik ekosisteminin aktörlerinin temel davranış modelini tanımlar. Analizin odak noktası, otomotiv tedarik zinciri kapsamında ana ve tedarik sanayi ilişkilerinden bölgesel düzeyde destekleyici aktörleri kapsayacak şekilde genişletildi. Gelişmekte olan ekosistemin ana aktörlerinin davranış kalıplarını incelerken, tedarik zincirinin ötesinde bir bakış açısı geliştirmenin gerekli hale geldiği açıktır. Yayılmanın tepkisi, ekosistem aktörlerinin *köprüleme* ve *venturing* adlı iki ana davranış modeli altında meydana gelmiştir. Köprü kurma kavramı, ekosistem aktörlerinin yaklaşan dönüşümün dinamiklerini anlamak için zamansal ve sektörel ara eylem çabaları olarak tanımlanmıştır. *Venturing* davranışı ile birlikte, otomotiv endüstrisindeki aktörlerin yayılması, hareketlilik ekosistemini oluşturan yeni bir etkileşim modeli yarattı. Bu bağlamda otomotiv endüstrisindeki bazı aktörlerin köprüleme ve venturing stratejileri çerçevesinde yeni

tip ilişkiler ve organizasyonlar geliřtirmeleri geliřmekte olan hareketlilik ekosistemini oluřturmaktadır.

Güvene dayalı ilişkilerin iki sistemde oluřumu ve geçimi, kurumlar arası farklı etkileşim mekanizmaları üzerine inşa edilmiştir. *Yörüngesel hareket* sistemi, endüstrinin oligopolistik tedarik yapısından elde edilen nihai ürün üreticilerinin gücüne dayanır. Güven ilişkileri, ana sanayi şirketlerinin oligopolistik gücünün gölgesinde tedarik zincirinde canlanarak anlam taşıyor. Öte yandan, geliřmekte olan hareketlilik ekosistemi güvene dayalı bir supra-endüstriyel milieu yaratma gücüne sahiptir. Güvene dayalı ekosistem, supra-endüstriyel düzeyde somut ve maddi olmayan varlıkları harekete geçirerek tedarik zinciri ilişkilerinin ötesinde geliřti. Karşılıklı güven ilişkilerinin satın alma süreçleri dışında yeniden tanımlanmasının bu varlıklar arasındaki çapraz ilişkilerin güçlendirilmesi ve değer yaratma sürecinin hızlandırılması beklenecektir. Bu tanımlanmış özelliklerin büyük olasılıkla geçici olduđu göz ardı edilmemelidir, çünkü bunlar ortaya çıkış aşamada bir sistemin gerektirdiđi birincil davranış kalıplarıdır. Ekosistem düşüncesinin doğasında bulunan girişimci keşif sürecinin eski birikim sürecinden gelen birimlerle ve geleceđe ilişkin büyük kar beklentileriyle beslendiđi unutulmamalıdır. Bu yeni sistemin bir kırılma olarak algılanmaması, sadece yeni ve daha işbirlikçi bir değer yaratma sistemi olduđu düşünölmektedir.

Bu bağlamda işbirliđi, supra-endüstriyel düzeyde tesis edilen güven temelinde inşa edilir. Her iki sistem çerçevesinde farklı güven ilişkilerinin izini sürebilmek ve daha görünür bir zemine oturtabilmek için işbirliđine yönelik temel yaklaşımlar derinlemesine tartışılmaktadır. Bu bağlamda, *yörüngesel hareket* ve *yayıma* sistemlerinin temel özelliklerinin işbirlikçi davranışlarla açıklanması amaçlanmıştır. Dörtlü dönüşüme verdikleri tepkiye göre otomotiv endüstrisindeki farklı tipolojiler, aktörler arasındaki işbirliđi ilişkilerini analiz ederek kategorize edilmiştir. Bu çerçevede, sabit, ürün arayan, işbirlikçi ürün geliřtiricileri ve ekosistem oluřturucuları olan dörtlü dönüşüme verdikleri tepkilere göre dört geniş kategori belirlenmiştir. Sabitler, geçişin ürünlerini ve işletmelerini etkilemeyeceđi varsayımına göre oyunu tasarlayan geniş bir kategori oluřturur. Hiçbir mazereti olmadan yörüngesel hareket yolunu takip ediyorlar. Diđer üç kategorinin tümü, deđişen kořullardan pay almak veya en azından şirketin mevcut rekabet gücünü korumak için inşa edilmiş eylem odaklı stratejilerdir. Mevcut yeteneklerine uygun yeni ürünler arayan *ürün arayanlar* olarak adlandırılan ilk grup. Bu grubun amacı, mevcut ürününü yeni tip araçlara ait olan yeni ürünle ikame etmektir. Ürün

arayanlar, elektrikli ve otonom araçlara yeni tip parçalar ve bileşenler sağlayarak da yolu izlemeye çalışıyor. Elektrikli araçlara geçişle birlikte parça sayısındaki azalma göz ardı edilebilseydi, yakında eskiyecek ürünleri yerine şirketin yetkinlik kümesiyle örtüşen yeni bir ürün üretmek mantıklı olacaktı. Elektrik motorunun ve içten yanmalı motorun parça sayısı karşılaştırılsa bile, bu varsayımın doğru olmadığı açıktır. Bu nedenle, değer zincirinin en düşük katma değerli kısmında zaten rekabet ettiklerini düşünürsek, bu stratejiyi benimseyen birçok şirket için yolun sonuna yaklaşıldığını söylemek yanlış olmayacaktır. Mevcut beceri setlerini kullanarak yeni bir ürün geliştirme açısından bardağın yarısını boş gören şirketler, yazılım ve elektronik alanında deneyimli genç firmalarla işbirliği yaparak yeni ve daha karmaşık ürünler üzerinde çalışıyor. Bu stratejiyi benimseyen şirketler, mevcut tedarik zincirinin dışında işbirlikleri oluşturarak daha önce oluşan yoldan çıkma cesaretini gösterebilmiştir. Çok az şirket şu anda ürün odaklı düşünme kalıplarını yıkıyor ve gelişmekte olan ekosistemin liderliği için çok boyutlu bir strateji sunuyor. Bu tür şirketler, yenilikçi fikirlerin odak noktasında olmak için açık inovasyon platformu işlevini bünyesine katacak faaliyetler yürütürler.

Otomotiv endüstrisi ve hareketlilik ekosisteminin aktörleri arasındaki koordinasyon ilişkilerinin doğal olarak farklı özelliklere sahip olduğu açıktır. Otomotiv tedarik zinciri arasında yörüngesel hareket sistemi kapsamındaki koordinasyon ana sanayi üzerinden düzenlenmiştir. Ana sanayi şirketleri tedarik zincirine gömülü koordinasyon ilişkilerinin mutlak yöneticileri olduğu için bu sisteme yapılan müdahaleler yörüngesel hareket sisteminin dinamikleri içinde çözülmüşlerdir. Sistemin doğasında bulunan koordinasyon mekanizmasını araştırmak amacıyla Doğu Marmara Kalkınma Ajansı'nın bölgesel mali destek programlarındaki dönüşüm, direksiyon kapasitelerinin gücü açısından analiz edilmiştir. Bu noktada, bölgesel politika alanında yörüngesel hareket sistemi çerçevesinde yapılan müdahalelerin başarısızlıkla sonuçlanmasının ardındaki neden, ana sanayinin birikim ve korumaya dayalı yönlendirdiği sistemin iyi analiz edilmemesinden kaynaklanmaktadır. Mevcut destek programlarını inceledikten sonra, *yayıma* sistemi çerçevesinde ekosistem tabanlı bir destek mekanizmasının temel özellikleri hakkında bazı çıkarımlar yapma fırsatı bulduk. Bu şekilde, yeni sanayi politikasının mevcut destek mekanizmalarının analizinden ve yayılma sisteminin özelliklerinden elde edilen temel özellikleri (i) uzun vadeli toplumsal ilginin dayandırılması; (ii) işbirliği ile keşfetmek; (iii) sondan düşünmek; (iv) risk almak ve (v) duvarları kırmak. Analiz sonuçlarının yorumlanması çerçevesinde belirlenen bu özellikler, ekosistem yetiştirme süreçlerinde dikkat edilmesi gereken hususları içermektedir.

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