# The Effects of Trust and Capability in Supply Chain on Firm Performance through Supply Chain Agility and Collaborative Advantage

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| ARTICLE INFO | ABSTRACT |
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| | **Purpose –** In this research, an integrated model is proposed to explore the effects of trust, agility, collaborative advantage and capability dimensions on firm performance and how they interact with one another. In some of the research in the literature, the effect of the dimensions that are trust in supply chain, supply chain agility, collaborative advantage in supply chain and supply chain capability on firm performance has been empirically proven. Yet, no research exists in the literature that explains the indirect effects of these dimensions through one another. Consequently, this study aims to close this gap in the extant literature.<br><br>**Design/methodology/approach –** Structural equation modelling method was utilised to test the hypotheses of this study. Quantitative data was obtained by means of survey in a five-point Likert scale. Initially, confirmatory faction analyses and reliability analysis were performed respectively to determine the validity and reliability of the scale. The analyses were performed with SPSS and AMOS statistics programs.<br><br>**Findings –** As a result of the data analyses and tests of hypotheses conducted in this study, it has been empirically proven that supply chain agility and collaborative advantage in supply chain are indirectly and directly influenced by trust in the supply chain. These results are in accordance with the extant literature.<br><br>**Discussion –** Knowing the expectations of the customers is crucial for firms in today's business environment. The reason for this is that firms need to manage external business processes in order not to be affected by uncertainty in customers' needs. Therefore, the effects of supply chain management on firm performance have begun to be studied more in recent years. In other words, transformation of the agility into the capability or transformation of the trust into the collaborative advantage can help to explain the effects of these dimensions on the firm performance. |

## 1. INTRODUCTION

From time to time, we can say that the concept of logistics has evolved from the raw material structure of the 1960s to the understanding of the integration stage of the 1980s to the whole supply chain (SC) concept, which end up at the final customer from the raw material. Nowadays, the concept of "Logistics" goes to "SC Management". It can also be stated that logistics and marketing activities in the channels have an intimate relationship, which also has an effect on marketing theory. Bartels (1976) argues that marketing and distribution are as a matter of fact not different things. From this perspective, it can be safely concluded that SC management is directly related to customer demands and expectations. SC management has many definitions in the literature. However, in this study, it is preferred to use the definition that is related to the firm performance (Çemberci, 2012). SC management brings a perspective to control and evaluate the entire flow from the supplier to the end user to produce the best output for the system (Ellram & Cooper, 1990). In this regard, Lambert's definition is closer to the axis of this research. According to Lambert (1992), the SC is the only unit that aims to meet the needs and wishes of the customers and finally the end consumer. SC management is the strategic coordination of the functions of business and plans of such businesses, including all businesses in the chain, in order to increase the long-term performance of the SC and all the firms within the chain (Çemberci, 2012). SC management is among the critical factors affecting firm performance. Chandra and Kumar (2000) have stated that many firms are trying to upgrade their SC management to reach profitable growth with their customers. One of the compulsory factors for SC

management that will affect the firm's performance positively is the relationships among firms in the chain (Chandra & Kumar, 2000). Mentzer et al. (2001) stated that SC management is the management of intimate relationships among businesses and that appreciating partnership is important in enhancing the successful retail-SC relationship. To establish this interaction, firms in the SC need to trust one another. Trust among firms in the SC is positively related to the firm performance (Mentzer et al., 2001). One of the important factors in the SC is business partnership. Bechtel and Jayaram (1997) refer to the fact that in the SC management, a process framework has been created that allows collaborative work rather than inter-firm conflict. In other words, the business partnership between the companies in the chain will have a positive effect on the firm performance (Uca et al. 2017; Yılmaz, 2016; Yılmaz, Çemberci & Uca, 2016).

The collaboration established among the firms in the SC turns into a collaborative advantage after a certain period of time (Yılmaz, Çemberci, & Uca, 2016). Saunders (1997) suggests that the concept of SC consists of successive and interconnected tasks. Therefore, it is expected that the companies in the chain should cooperate with one another while they are fulfilling these duties, and over time they will be able to benefit from this cooperation (Çemberci, 2012). Another important factor in the SC is SC capability. SC capability consists of the different characteristics of the firms in the SC, the joint movements and the combination of other factors, which has an effect on the firm performance (Şahin, 2017; Wu et al., 2006). SC management capability also supports firms in improving their operational capacity. Wu et al. (2006) stated that information technology has an effect on SC capabilities and firm performance (Wu, Yeniyurt, Kim, & Çavuşgil, 2006). Rosenzweig et al. (2003) have pointed to the magnitude of the moderate effect of the firm in its research on the effects of integrated SC dynamics on competitive capabilities and performance (Rosenzweig, Roth, & Dean, 2003). In the study of relationship between SC management and firm performance, Çemberci (2012) stated that enhancing the competitiveness of firms in the SC would increase the firm performance (Çemberci, 2012). The capabilities of the firms in the SC play an important role as a backbone in the constantly changing markets in terms of ensuring the competitive advantage to the companies and enhancing the performance of the firms (Mathivathanan , 2017; Barney, 1991; Teece, 1997).

Another important factor in the SC is SC agility (SCA). The ability of a company to face competitive advantages and turn it into a competitive advantage is one of the major success factors in today's global market. The dynamic nature of market circles explains why agility is vital for the long-run success of a company and its survival. Agility can be defined as the ability of a firm to overcome unexpected difficulties, the ability to survive the unique threats of the business environment and the ability to transform changes into an advantage as an opportunity. Swafford et al. (2008) stated that the agility of an organization depends on the organization's SCA. They have even claimed to be a function of other capabilities within the organization, such as SC flexibility and adaptation to information technology, to reach SCA. Swafford et al. (2008) found a domino effect between information technology adaptation, SC flexibility, SCA and competitive firm performance in their empirical studies (Swafford, Ghosh, & Murthy, 2008). Yusuf et al. (2004) describe agility as a measure of SC management performance and inquire its effect on the firm performance. The outcomes indicate that agility is an antecedent of SC performance and that an agile SC is critical for the firm performance and its competitive advantage (Yahaya & Yusuf, 2014). Çemberci (2012) showed that the activity in the SC is a positive effect on firm performance. Çemberci (2012) stated that the SC is able to adapt its agility to competitive difficulties and turn those difficulties into a competitive advantage so that firms in the SC can contribute to one another in a flexible way, while at the same time help to eliminate the threats caused by environmental impacts (Çemberci, 2012). Sahin (2017) stated that SCA influenced firm performance positively in the study of the relationship between the firm performance and SCA (Şahin, 2017).

In this study, an integrated model is proposed which investigates the effects of trust, agility, collaborative advantage and capability dimensions on the firm performance by interacting with one another in the SC. When the studies in the literature are examined, it is observed that the indirect effects of these dimensions through one another are still needed to be investigated. In other words, transformation of the agility into the capability or transformation the trust into the collaborative advantage can facilitate to explicate the effects of these dimensions on the firm performance.

## 2. CONCEPTUAL BACKGROUND

In this study, the concepts of TSC, SCA, collaborative advantage in SC, SC capability and firm performance are explained. The effects of these concepts through one another on firm performance have been researched. These effects are presented in the theoretical initial model in Figure 1.
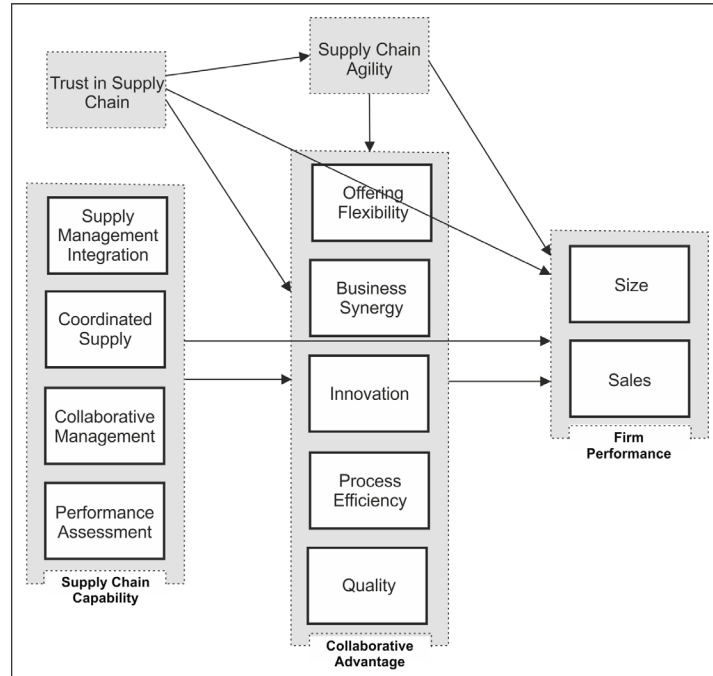


**Figure 1.** Theoretical Initial Model

### 2.1. Trust in SC

Trust is characterized in business relationships as a significant antecedent of positive performance. In Panayides and Lun's (2009) study, the effect on trustworthy innovation and SC performance was investigated. According to the results of the study, TSC affects SC management performance positively. In addition, trust and innovation are the prerequisites for high performance in the SC (Panayides & Lun, 2009). Çemberci (2012) stated that TSC is an indicator of SC management performance and that it has a positive effect on the firm performance (Çemberci, 2012).

Kwon and Suh (2004) found that the effects of trust and commitment levels within a SC relationship, the market reputation of a partner in the SC had a strong influence on the trust-building process (Kwon & Suh, 2004). Yeung et al. (2009) investigated the effect of trust on internal compliance and supplier fit. Their results indicate that trust proliferates internal fit and supplier fit (Yeung, Selen, Zang, & Huo, 2009).

### 2.2. SC Capability

Capability is a company-specific resource that can provide comparative advantage (Day, 1994). Companies need to have updated information and problem-solving skills so as to be able to make the rational logistical decisions and perform the right planning, as required by a successful SC management. According to Barney (1991), organizations that have in particular low valued, valuable and unique resources and capability that can maintain these resources and capabilities will improve their performance as well as gain competitive advantage (Barney, 1991). SC capability makes it easier for the firms to respond to the environmental changes (Teece, 1997). SC capability provides common benefits to all members of the chain in terms of quality, time and cost. This shared benefit also improves performance among SC members (Lyngstad, 2009), and provides the firm with a competitive advantage (Morash, 2001; Liao & Kuo, 2014; Oh, 2016; Mandal, 2016). Supply management capability helps businesses to improve their operational performance (Şahin, 2017).

### 2.3. SC Agility

One of the most critical success indicators in today's global market is the company's ability to face competitive advantages and turn it into a competitive advantage. Today's dynamic competitive conditions reveal the critical importance of agility, which can be described as the ability of a firm to cope with unexpected difficulties, the ability to sustain the unique threats of the business environment and the ability to transform changes into an advantage and as an opportunity. For Swafford et al. (2008), the agility of an organization depends on the organization's SC being agile. (Swafford, Ghosh & Murthy, 2008). Ghatari (2013) stated that agility helps firms to transfer the right products on time (Ghatari, 2013). David & Gligor (2015) have shown that agility ensures the improvement of customer-supplier relationships. Agility is also a prominent feature for the firms to obtain competitive advantage (Wu, Yeniyurt, Kim & Çavuşgil, 2006; David & Gligor, 2015). Çemberci (2012) stated that SCA is a demonstration of SC management performance and that it also exerts a positive influence on the firm performance (Çemberci, 2012).

### 2.4. Collaborative Advantage

Collaborative advantage refers to the collective gain of partners created after resources are collected, changed, and improved (Dyer & Singh, 1998). As per the study of Cao and Zhang (2011), there are five dimensions of collaborative advantage. These dimensions are business synergies, process efficiency, innovation, quality and flexibility. Business Synergy (BSN) refers to the level at which SC partners, associated and subsidiary resources are brought together to achieve extraordinary benefits (Cao & Zhang, 2011). Process efficiency refers to the degree of the efficiency of the collaborative processes in comparison to the competitors' processes (Bagchi & Skjoett-Larsen, 2005). Collective decision making is also a part of process efficiency, which is a sign of profitability and success as well. Competition has shortened product life cycles; therefore, companies need to innovate more often. The innovation dimension of collaborative advantage is that SC partners are working together to develop new processes, products and services. Good communication developed between companies in the SC can improve the product and process development skills of these companies (Kaufman, Wood & Theyel, 2000). The fourth dimension of the concept of collaborative advantage can be defined as the degree to which quality and SC partners jointly develop quality products that create greater value for customers (Li, Ragu-Nathan, Ragu-Nathan & Rao, 2006). Flexibility refers to the extent to which the SC network supports the initiation of new services. This dimension also refers to customer sensitivity. It is expected that companies that can offer new products and services quickly have a higher profitability and market share (Uca, Çemberci, Civelek & Yılmaz, 2017).

### 2.5. Firm Performance

The major purpose of SC management is to constitute a business model that containing members who work in harmony and cooperate with one another by connecting the main processes and functions within the firm and between the enterprises. Performance is a multidimensional concept that refers to the success of a firm. The first concepts that come to mind when it comes to performance dimensions in terms of firms are profit and cost. Later, it is seen that the efficiency factor is added to these two dimensions. As a matter of fact, Drucker points out the importance of efficiency and efficiency by claiming them to be two important aspects of performance. In order to measure organizational performance in the literature, return on investment (ROI), market share, profit margin of sales, ROI growth rate, sales increase, market share increase and competitive position measurement criteria are used (Çemberci, 2012). In the 1990s, these factors added new dimensions such as quality, innovation and quality of working life. It can also be said that the scope of the concept of performance is getting broader. Today, it appears that the classification market share, behaviour, product or market leadership and public responsibility dimensions have been added.

## 3. HYPOTHESIS DEVELOPMENT AND RESEARCH MODEL

In the theoretical model, it is suggested that the dimensions of SC capability are the antecedent of the collaborative advantage. However, after the explanatory factor analysis, there were not enough items left to explain the constructs except the coordinated supply (CSP). Therefore, in the research model, CSP represents SC capability.
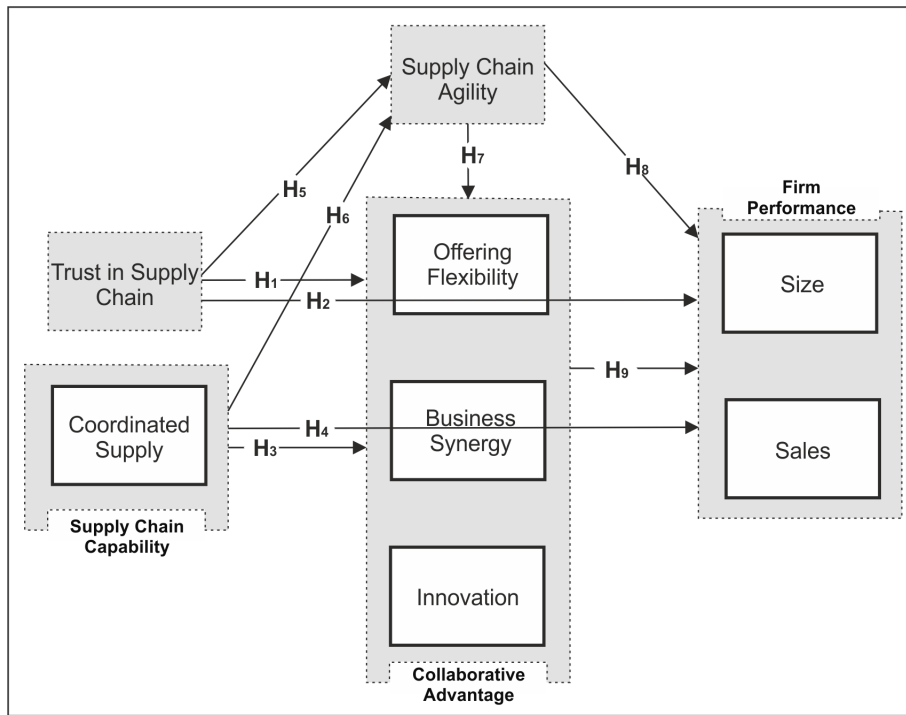
**Figure 2.** Research Model

### 3.1. The Relationship between Trust in SC and Collaborative Advantage

Simatupang and Sridharan have studied the conditions under which the proposed advantages of a firm's collaboration with its suppliers will be realized (Simatupang & Sridharan, 2005). SC collaboration affects the firm performance (Stank, Keller & Daugherty, 2001). To create the competitive advantage, revenue increase, cost reduction, flexibility, efficiency, collaborative advantage, new product ideas, effective use of market opportunities and to meet customer requirements are the outstanding benefits emerged by SC collaboration (Kalwani & Narayandas, 1995; Lee, Padmanabdan, & Whang, 1997; Uzzi, 1997; Jap, 1999; Robert & Handfield, 2002; Simatupang & Sridharan, 2005; Sheu, Yen & Chae, 2006; Nyaga, Whipple & Lynch, 2010). Trust is extremely essential in every relationship, so it is equally important in SC collaboration. Özalp et al. (2011) state that trust increases SC collaboration (Özalp, Zheng & Chen, 2011). Yilmaz (2016) examined the intermediary role of collaborative advantage in the effect of trust on firm performance in SC. Additionally, this research concluded that trust in the SC affects the collaborative advantage positively (Yılmaz, Çemberci & Uca, 2016). The other studies in the literature explain the relationship among trust in the SC and collaborative advantage (Patterson, Grimm & Tho, 2003; Simatupang & Sridharan, 2005; Lambert, Knemeyer & Gardener, 2004). Uca et al. (2017) resulted in a positive relationship between trust and collaborative advantage in the SC (Uca N. , Çemberci, Civelek & Yılmaz, 2017).

$H_1$: Trust in SC has a positive effect on Collaborative Advantage.

$H_{1a}$: Trust in SC has a positive effect on Offering Flexibility.
$H_{1b}$: Trust in SC has a positive effect on Business Synergy.
$H_{1c}$: Trust in SC has a positive effect on Innovation.

### 3.2. The Relationship between Trust in SC and Firm Performance

In the literature, there are studies researching the relationship among trust in the SC and firm performance. Wu et al. (2006) showed confidence in their research among the behavioural dimensions of SC management. The results of the research indicate that trust in SC (TSC) improves SC management performance and hence firm performance (Wu, Yeniyurt, Kim & Çavuşgil, 2006). Handfield and Bechtel (2002) indicated that they contribute to trustworthy SC performance in the SC. In the research model, the result is that the purchaser's performance improves SC performance and thus firm performance by increasing supplier responses by constructing confidence only, without creating any control mechanism with the suppliers of the buyers (Handfield & Bechtel, 2002). Hua et al. (2002) found that increasing the trust relationship within the SC would increase the firm performance (Hua, Chatterfee & Kang, 2002). Çemberci (2012) stated that SCA is a

demonstration of SC management performance and also has a positive effect on the firm performance (Çemberci, 2012). Şahin et al. (2017) also revealed that trust in the SC has a positive effect on the firm performance (Şahin, Çemberci, Civelek & Uca, 2017).

H2: Trust in SC has a positive effect on Firm Performance.

> H2a: Trust in SC has a positive effect on Size.
> H2b: Trust in SC has a positive effect on Sales.

### 3.3. The Relationship between Coordinated Supply and Collaborative Advantage

Luzzini (2015) revealed the power of SC capability. According to the results of this research, it is stated that collaborative advantage in SC and SC capability have a positive effect on the firm performance (Luzzini, 2015). Wang et al. (2015) pointed out that SC capability positively affects market and financial performance (Wang, 2015).

H3: Coordinated Supply has a positive effect on Collaborative Advantage.

> H3a: Coordinated Supply has a positive effect on Offering Flexibility.
> H3b: Coordinated Supply has a positive effect on Business Synergy.
> H3c: Coordinated Supply has a positive effect on Innovation.

### 3.4. The Relationship between Coordinated Supply and Firm Performance

There are many studies in the literature that indicate that SC capability provides a competitive advantage to the firm (Morash, 2001; Liao & Kuo, 2014; Oh, 2016; Mandal, 2016; Lyngstad, 2009). According to Barney (1991), organizations that have in particular low valued, valuable and unique resources and capabilities that can maintain these resources and capabilities will improve their performance as well as gain competitive advantage (Barney, 1991).

H4: Coordinated Supply has a positive effect on Firm Performance.

> H4a: Coordinated Supply has a positive effect on Size.
> H4b: Coordinated Supply has a positive effect on Sales.

### 3.5. The Relationship between Trust in SC and SC Agility

There are studies in the literature that show that there is a relationship between TSC and SCA. Yang (2014) stated that trust in the SC plays a critical role in the daily business life as well as bilateral relations in the supplier-buyer relationship, revealing that trust of suppliers positively affect the technical capacity of a firm and the agility of the SC (Yang, 2014). Narasimhan et al. (2008) found that SC trust is positively related to SCA (Narasimhan, Mahapatra & Arlbjorn, 2008). Şahin et al. (2017) proved that trust in the SC has a positive effect on the SCA in the SC; and therefore, clarified the role of agility (Şahin, Çemberci, Civelek & Uca, 2017).

H5: Trust in SC has a positive effect on SC Agility.

### 3.6. The Relationship between Coordinated Supply and SC Agility

Harrison and Hoek (2008) considered SCA and SC capability as separate dimensions. As a result of this study, it was seen that the supply capabilities supported the agile SC (Harrison & Hoek, 2008). Şahin (2017) resulted in a positive relationship between SC capability and SCA in a study on the role of SCA in relation to the firm performance and SC (Şahin, 2017).

H6: Coordinated Supply has a positive effect on SC Agility.

### 3.7. The Relationship between SC Agility and Collaborative Advantage

Narayanan et al. (2015) investigated the effect of collaboration on agility performance via trust (Narayanan, Narasimhan & Schoenherr, 2015). In their study, they put forward that SCA has a positive effect on the collaboration advantage in the SC.

H7: SC Agility has a positive effect on Collaborative Advantage.

> H7a: SC Agility has a positive effect on Offering Flexibility.
> H7b: SC Agility has a positive effect on Business Synergy.
> H7c: SC Agility has a positive effect on Innovation.

### 3.8. The Relationship between SC Agility and Firm Performance

Agility is one of the key factors in improving SC performance (Kabra & Ramesh, 2016). Çemberci (2012) stated that SCA is one of the performance indicators of the SC management and that it has a positive effect on the firm performance (Çemberci, 2012). DeGroote and Marx (2013) explained the effect of SCA on the firm performance (DeGroote & Marx, 2013). In addition, Blome, Schoenherr and Rexhausen (2013) have also conducted studies describing the effect of SCA on the firm performance (Blome, Schoenherr & Rexhausen, 2013). In addition to the study of Blome et al., (2013) Eckstein, Goellner, Blome and Henke (2015) noted that SCA has a positive effect on operational performance as well as cost performance (Eckstein et al, 2015). David & Gligor (2015) found that SCA affected the firm's financial performance (David & Gligor, 2015). Şahin et al. (2017) stated that agility influenced the firm performance positively in their study on the effect of SCA on the firm performance (Şahin, 2017).

H$_8$: SC Agility has a positive effect on Firm Performance.

   H$_{8a}$: SC Agility has a positive effect on Size.
   H$_{8b}$: SC Agility has a positive effect on Sales.

### 3.9. The Relationship between Collaborative Advantage and Firm Performance

Cao and Zhang (2011) demonstrate that SC collaborative advantage directly increases the firm performance (Cao & Zhang, 2011). Yilmaz (2016) found that collaborative advantage affects the firm performance positively in the study of TSC and the mediator role of collaborative advantage with regard to its effects on firm performance (Yılmaz, 2016). Yılmaz et al. (2016) found that the collaborative advantage in the SC positively affects the firm performance in their research regarding the role of collaborative advantage concerning the effect of SC collaboration on the firm performance (Yılmaz, Çemberci & Uca, 2016). Uca et al. (2016) found that collaborative advantage has a positive effect on the firm performance in their studies of SC collaboration and collaborative advantage and trust in the SC and their effect on the firm performance (Uca N. , Çemberci, Civelek & Yılmaz, 2017).

H$_9$: Collaborative Advantage has a positive effect on Firm Performance.

   H$_{9a}$: Offering Flexibility has a positive effect on Size.
   H$_{9b}$: Offering Flexibility has a positive effect on Sales.
   H$_{9c}$: Business Synergy has a positive effect on Size.
   H$_{9d}$: Business Synergy has a positive effect on Sales.
   H$_{9e}$: Innovation has a positive effect on Size.
   H$_{9f}$: Innovation has a positive effect on Sales.

## 4. RESEARCH METHODS

The scales were taken from literature. Quantitative data were obtained by means of survey in a five-point Likert scale. Initially, confirmatory faction analyses and reliability analysis were performed respectively to determine the validity and reliability of the scale. Structural Equation modelling as a multi variable statistical technique was utilised to test the hypotheses of the research model of the studies (Meydan & Şen, 2011). This technique was utilised to explain the indirect and direct effects in the conceptual model (Civelek, 2018). This technique has been selected to remove measurement errors (Byrne, 2010). The analyses were performed with SPSS and AMOS statistics programs.

### 4.1. Measures and Sampling

The dimensions in the initial model of the study were measured by the scales taken from previous research. The Likert scale in 5-point was used from a strong disagreement to strong acceptance. Sample of this research consists of the firms listed in İstanbul Chamber of Industry 2018 ranking (ISO500, 2018). Population of this research contains first 150 firms in this list. Therefore 150 were distributed and 98 valid questionnaires from various industry representatives were collected. According to Saunders et al. sample size in 95 pct confidence interval is acceptable (Saunders, Lewis, & Thornhill, 2003). In order to measure trust in the SC, the trust scale suggested by Doney and Cannon (1997) together with 8 questions was used (Doney & Cannon, 1997). In order to measure SC capability, the capability scale suggested by Day et al. (2015) was used (Day, Lichtenstein & Samouel , 2015). The scale suggested by Cao and Zhang (2010) was utilised to

measure collaborative advantage. To measure the firm performance construct, the scale of Akgün et al. (2007) taken from Ellinger et al. (2002), was utilised.

## 4.2. Construct Validity and Reliability

At the beginning, exploratory factor analysis (EFA) was used for the data purification process. So as to understand convergent validity, confirmatory factor analysis (CFA) was utilised. This analysis was applied on the remaining 27 items (Anderson & Gerbing, 1988). The findings of the CFA determined the fit of the structural model. The Likelihood Ratio Chi-Square Test shows compliance with the original model and the acquired model (Bagozzi & Yi, 1990). χ2/DF was found as 1.446. This χ2/DF ratio is under the limit point of 3. Additionally, other fit indices also show acceptable results (i.e. CFI=0.889, IFI=0.894, RMSEA= 0.068).

Table 1 shows the CFA Results. As provided in the table, standardized factor loads for each item are obtained as significant (larger than 0.5). Average variance extracted values were near or above the limit point (i.e. 0.5) (Byrne, 2010). These results proved the convergent validity of the constructs. To appraise discriminant validity, the square roots of AVE values of each variable were obtained. In Table 2, the diagonals indicate the square root of AVE values. The reliability of each structure was calculated separately. Composite reliability and Cronbach $\alpha$ values are near or more than the limit point which is recommended as 0.7 (Fornell & Larcker, 1981).

**Table 1.** Confirmatory Factor Analysis Results

| Variables | Items | Standardized Factor Loads | Unstandardized Factor Loads |
|---|---|---|---|
| Trust in SC (TSC) | TSC0720 | 0.851 | 1 |
| | TSC0619 | 0.744 | 0.806 |
| | TSC0114 | 0.543 | 0.632 |
| SC Agility (SCA) | SCA0428 | 0.793 | 1 |
| | SCA0327 | 0.574 | 0.676 |
| | SCA0630 | 0.560 | 0.668 |
| | SCA0731 | 0.628 | 0.873 |
| Coordinated Supply (CSP) | CSP0337 | 0.675 | 1 |
| | CSP0236 | 0.811 | 1.163 |
| | CSP0135 | 0.768 | 1.100 |
| Offering Flexibility (OFX) | OFX0455 | 0.739 | 1 |
| | OFX0354 | 0.758 | 0.886 |
| | OFX0253 | 0.750 | 0.945 |
| | OFX0152 | 0.625 | 0.759 |
| Business Synergy (BSN) | BSN0257 | 0.852 | 1 |
| | BSN0156 | 0.878 | 1.091 |
| Innovation (INV) | INV0467 | 0.623 | 1 |
| | INV0366 | 0.559 | 0.802 |
| | INV0265 | 0.703 | 0.951 |
| Size (SZE) | SZE0471 | 0.631 | 1 |
| | SZE0370 | 0.742 | 1.026 |
| | SZE0269 | 0.785 | 1.153 |
| | SZE0168 | 0.668 | 0.994 |
| Sales (SLS) | SLS1077 | 0.796 | 1 |
| | SLS0976 | 0.530 | 0.541 |
| | SLS0673 | 0.512 | 0.601 |
| | SLS1178 | 0.810 | 0.937 |

p<0.01 for all items

Descriptive statistics of the dimensions, Cronbach $\alpha$ and composite reliabilities, average variance extracted values and Pearson correlations among the dimensions are presented in Table 2.

**Table 2.** Construct Descriptives, Reliability and Correlation

| Variables | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1. Trust in SC | (.724) | | | | | | | |
| 2. SC Agility | .515* | (.646) | | | | | | |
| 3. Coordinated Supply | .595* | .532* | (.787) | | | | | |
| 4. Offering Flexibility | .536* | .579* | .391* | (.719) | | | | |
| 5. Business Synergy | .403* | .504* | .175* | .380* | (.864) | | | |
| 6. Innovation | .396* | .394* | .319* | .385* | .149 | (.630) | | |
| 7. Size | .556* | .445* | .333* | .606* | .465 | .396* | (.709) | |
| 8. Sales | .548* | .536* | .506* | .601* | .386* | .310* | .579* | (.677) |
| Composite reliability | .762 | .737 | .830 | .811 | .856 | .663 | .801 | .764 |
| Average variance ext. | .524 | .417 | .622 | .518 | .748 | .398 | .503 | .458 |
| Cronbach $\alpha$ | .725 | .727 | .790 | .808 | .709 | .695 | .799 | .757 |

*p < 0.01

Note: Values in diagonals are the square root of AVEs.

### 4.3 Test of the Hypotheses

Maximum likelihood estimation method was utilised to test the hypotheses. It is the main estimation method of covariance-based structural equation modelling (CB-SEM). CB-SEM is a confirmatory method (Civelek, 2018). Therefore, in this research, it is used to confirm the hypotheses which are developed by depending upon the base theories. To assess the structural model, the goodness of fit indices were utilised. The absolute goodness of fit indices are the root mean square error of approximation (RMSEA) and the $\chi 2$ goodness of fit statistic.
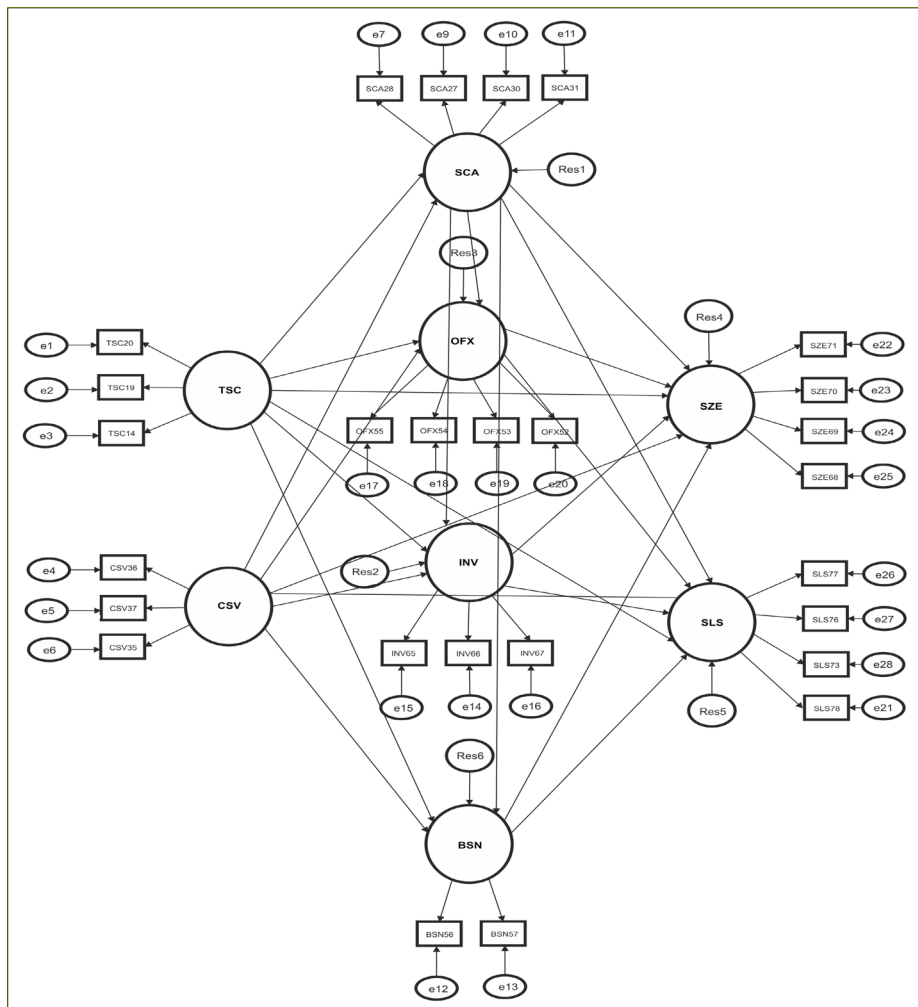


Note: $\chi 2/DF = 1.597$, CFI = 0.847, IFI = 0.854, RMSEA= 0.079

**Figure 3.** Results of the SEM Analysis

The relative goodness of fit indices are incremental fit index (IFI) and comparative fit index (CFI). As ~~the~~ Figure 3 shows, fit indices structural regression model satisfactorily determines fit of the model. $\chi2$/DF value is 1.597 and between limit points (i.e. between 2 and 5). CFI is 0.847, IFI is 0.854. RMSEA is 0.079. These are adequate values.

**Table 3.** Hypotheses Test Results

| Relationships | Standardized Coefficients | Unstandardized Coefficients | Hypotheses | Results |
|---|---|---|---|---|
| TSC → OFX | 0.289 | 0.279 | $H_{1a}$ | Not Supported |
| TSC → BSN | 0.374 | 0.370 | $H_{1b}$ | Not Supported |
| TSC → INV | 0.276 | 0.168 | $H_{1c}$ | Not Supported |
| TSC → SZE | 0.222 | 0.158 | $H_{2a}$ | Not Supported |
| TSC → SLS | -0.144 | -0.142 | $H_{2b}$ | Not Supported |
| CSP → OFX | -0.168 | -0.205 | $H_{3a}$ | Not Supported |
| CSP → BSN | -0.613* | -0.768* | $H_{3b}$ | Supported |
| CSP → INV | -0.012 | -0.009 | $H_{3c}$ | Not Supported |
| CSP → SZE | 0.164 | 0.148 | $H_{4a}$ | Not Supported |
| CSP → SLS | 0.538* | 0.673* | $H_{4b}$ | Supported |
| TSC → SCA | 0.348* | 0.328* | $H_5$ | Supported |
| CSP → SCA | 0.395* | 0.471* | $H_6$ | Supported |
| SCA → OFX | 0.644* | 0.659* | $H_{7a}$ | Supported |
| SCA → BSN | 0.840* | 0.882* | $H_{7b}$ | Supported |
| SCA → INV | 0.291 | 0.188 | $H_{7c}$ | Not Supported |
| SCA → SZE | -0.667* | -0.503* | $H_{8a}$ | Supported |
| SCA → SLS | -0.294 | -0.308 | $H_{8b}$ | Not Supported |
| OFX → SZE | 0.668* | 0.493* | $H_{9a}$ | Supported |
| OFX → SLS | 0.450* | 0.461* | $H_{9b}$ | Supported |
| BSN → SZE | 0.552* | 0.397* | $H_{9c}$ | Supported |
| BSN → SLS | 0.434 | 0.433 | $H_{9d}$ | Not Supported |
| INV → SZE | 0.166 | 0.194 | $H_{9e}$ | Not Supported |
| INV → SLS | 0.187 | 0.303 | $H_{9f}$ | Not Supported |

*$p < 0.05$

## 5. CONCLUSION

$H_1$ hypothesis including sub-hypotheses is not supported. This means TSC does not have a direct effect on CA. $H_2$ hypothesis including sub-hypotheses is not supported. This means TSC does not have a direct effect on FP. $H_3$ hypothesis including $H_{3a,3c}$ hypotheses is not supported. On the other hand, $H_{3b}$ hypothesis is supported. This means that CSP has a direct effect on BSN but does not have a direct effect on OFX and INV. $H_4$ hypothesis including $H_{4a}$ hypothesis is not supported. This means that CSP does not have a direct effect on SZE. $H_{4a}$ hypothesis is supported. This indicates that CSP has a direct effect on SLS. $H_5$ hypothesis is supported. This means that TSC has a direct effect on SCA. $H_6$ hypothesis is supported. This means that CSP has a direct effect on SCA. $H_7$ hypothesis including $H_{7a,\ 7b}$ hypotheses is supported but $H_{7c}$ hypothesis is not supported, which indicates that SCA has a direct effect OFX and BSN but does not have a direct effect on INV. $H_{8a}$ hypothesis is supported but $H_{8b}$ hypothesis is not supported. This means that SCA has a direct effect on SZE but does not have a direct effect on SLS. $H_9$ hypothesis including $H_{9a,\ 9b,\ 9c}$ hypotheses on SZE and SLS, BSN has a direct effect on SZE, BSN does not have a direct effect on SLS, INV does not have a direct effect on SZE and SLS.

TSC has an indirect effect on the two dimensions (OFX and BSN) of CA through SCA ($H_1$, $H_5$, $H_7$). This indicates that despite having TSC, without agility, the trust cannot increase collaborative advantage in SC. Thus, firms in SC not only establish trust with one another, but also increase agility in order to attain a collaborative advantage. TSC has an indirect effect on FP through SCA ($H_2$, $H_5$, $H_8$). This means that SCA plays an important role in increasing the firm performance of TSC. CSP has a direct effect on BSN but an indirect effect on OFX through SCA ($H_{3b}$, $H_{3a}$, $H_{7a}$). CSP has an indirect effect on SZE through SCA ($H_{4a}$, $H_{8a}$),

while CSP has a direct effect on SLS (H$_{4b}$, H$_{8b}$). According to the analyses results it can be said that coordinated supply exerts positive influence on sales dimension of the firm performance and also supply chain agility exerts positive influence on size dimension of firm performance. Trust in supply chain indirectly effects firm performance through supply chain agility.

## 6. DISCUSSION

Knowing the expectations of the customers is crucial for firms in today's business environment. The reason for this is that firms need to manage external business processes in order not to be affected by the uncertainty of the customers' needs. Therefore, the effects of SC management on the firm performance have begun to be studied more over the recent years. In the literature, the effect of the dimensions that are TSC, SCA, collaborative advantage in SC and SC capability on firm performance has empirically been proven. Yet, the indirect effects of these dimensions with one another are still needed to be investigated. In other words, transformation of the agility into the capability, or transformation of the trust into the collaborative advantage can serve to explain the effects of these dimensions on firm performance.

Nowadays in supply chains, the effect of supply chain management on firm performance has become dependent upon several interrelated factors. In traditional supply chain management, the factors such as capability, agility and flexibility exert certain amount of effect on firm performance. But today, these factors do not have effect by themselves. So, understanding the interaction mechanism among these factors has become more important. The data analyses and tests of the hypotheses conducted in this study have empirically verified that SCA and collaborative advantage in SC are indirectly and directly influenced by CSP and trust in the SC. These results are in accordance with the extant literature. Today unprecedented changes take place in the technological environment. Therefore organizations should attach importance to digitalization of business processes in order to improve agility and flexibility. This plays vital role for the organization because supply chain agility and collaborative advantage play important role in turning supply chain capability into firm performance.

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