



# The Mediation Role of Environmental Performance in the Effects of Green Supply Chain Management Practices on Business Performance

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## Abstract

Natural environment practices attract attention in today's increasing competitive environment, and they are widely approved in practice. These practices have gained importance in customer and consumer dimension and accordingly the competition has evolved in this direction. One of the environmental issue that has become current with the addition of "green" practices to supply chains is green supply chain management (GSCM). GSCM has been studied and examined in various ways with various studies. In this context, the question of the present research was formed as "whether environmental performance (EP) has a mediation role in the effect of GSCM practices on business performance (BP)". Accordingly, the purpose of the present research is defining the relationships between GSCM practices, EP and BP of business that operate in the automotive industry in Konya province. In accordance with this purpose, a questionnaire was implemented on the businesses operating in automotive industry selected through simple random sampling, and the hypotheses were tested. According to the results of the analyses, there are statistically significant and positive relationships between GSCM practices, EP and BP. Additionally, GSCM practices have a positive and significant effects on BP and EP, and EP has a positive and significant effect on BP. Finally, EP has a partial mediation role in the effects of GSCM practices on BP.

**Keywords:** Green Supply Chain Management, Environmental Performance, Business Performance

## Yeşil Tedarik Zinciri Yönetimi Uygulamalarının İşletme Performansı Üzerine Etkisinde Çevresel Performansın Aracılık Rolü

### Öz

Günümüz artan rekabet ortamında doğal çevre faaliyetleri dikkat çekmekte ve uygulamada geniş ölçekte kabul görmektedir. Müşteri ve tüketici boyutunda bu faaliyetlerin önem kazanması ile birlikte rekabet bu yönde evrilmiştir. Çevre ile ilişkili konulardan biri ise tedarik zincirlerine "yeşil" uygulamaların eklenmesi ile birlikte gündeme gelen yeşil tedarik zinciri yönetimidir. Yeşil tedarik zinciri yönetimi, çeşitli çalışmalara konu olmuş ve çeşitli şekillerde irdelenmiştir. Bu bağlamda bu araştırmanın sorunsalı "yeşil tedarik zinciri uygulamalarının işletme performansı üzerindeki etkisinde çevresel performansın aracılık rolü olup olmadığı" şeklinde tasarlanmıştır. Bu kapsamda araştırmanın amacı, Konya ili otomotiv sektöründe faaliyet gösteren işletmelerin yeşil tedarik zinciri uygulamaları, çevresel performans ve işletme performansı arasındaki ilişkileri belirlemektir. Bu amaç doğrultusunda, otomotiv sektöründe faaliyet gösteren işletmelere basit tesadüfi örnekleme yolu ile anket uygulaması yürütülmüş olup kurulan hipotezlerin doğruluğu test edilmiştir. Yapılan analiz sonuçlarına göre; yeşil tedarik zinciri uygulamaları, çevresel performans ve işletme performansı arasında pozitif yönlü ve istatistiksel bakımdan anlamlı bir ilişki olduğu tespit edilmiştir. Bununla birlikte, yeşil tedarik zinciri uygulamalarının işletme performansı ve çevresel performans üzerinde; çevresel performansın ise işletme performansı üzerinde pozitif ve anlamlı bir etkisi olduğu sonucuna ulaşılmıştır. Ayrıca çalışma kapsamında, tedarik zinciri yönetimi uygulamalarının işletme performansı üzerindeki etkisinde çevresel performansın kısmi aracılık rolü olduğu tespit edilmiştir.

**Anahtar Kelimeler:** Yeşil Tedarik Zinciri Yönetimi, Çevresel Performans, İşletme Performansı

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## 1. Introduction

Environmental activities are among the issues that are prominent at global scale recently. As a result of the increase in the human and industrial effects on the environment, environmental issues have become more prevalent (Eltayeb and Zailani, 2009: 93). For this reason, there is an increasing need for the integration of environment friendly activities to the research and practices on supply chain management (SCM) (Srivastava, 2007: 53). In this context, inclusion of environmental interest and green practices in supply chain is an issue in the academic literature (Laosirihongthong et al., 2013: 1088), and GSCM has become a matter of increasing interest in production and supply chain studies (Srivastava, 2007: 53; Luthra et al., 2014: 20).

Among the most common GSCM practices are organizations that evaluate EP of suppliers, require measure that ensure the environmental quality of the products of suppliers, and measure waste costs for business systems (Darnall et al., 2008: 33). Additionally, the reflection of environment friendly activities on supply chains has led to a transformation in all business and organization structures. In this context, the present research aims at defining the relationships between GSCM practices, EP and BP of businesses and measuring the mediation role EP in the effect of GSCM practices of business on their BP. The review of the related literature shows that GSCM has been studied by various studies, which investigated the effects on performance. However, the present research is believed to contribute to the related literature by examining the mediation role of EP in the effects of GSCM practices on BP, as this method has been adopted by only a few studies before.

Based on the information presented above, a conceptual framework is formed for the present research first. Following this, findings obtained from the questionnaire conducted to test the hypotheses formed based on the main purpose of the research.

## 2. Conceptual Framework

### 2.1. Green Supply Chain Management

Businesses need to meet the changes in the demands of their customers immediately. As today's customers start to demand environment friendly products and services that are produced through processes that do not harm environment, businesses need to operate their activities in a way to reflect their customers' demands (Green et al., 2019: 26). Indeed, it has become a critical issue that businesses take environment into consideration in their long-term strategies. More radical changes in the managerial and consumer perspectives in addition to the changes in regulatory and organizational environments have led many businesses to change their approaches from reactive to proactive in order to deal with environmental issues (Walls et al., 2011: 72). In this context, GSCM refers to a proactive approach to the improvement of EP of processes and products in order to meet the requirements of environmental regulations (Hsu and Hu, 2008: 205).

GSCM emerged as an organizational philosophy, which is important in reaching organizational profit and market share goals by increasing ecological efficiency of businesses and their partners and decreasing environmental risks and effects (Zhu et al., 2008: 261). This philosophy is based on both environment management and SCM. Additionally, it includes the "green" element in the SCM in dealing with effects and relationships between the SCM and the natural environment the businesses operate in (Srivastava, 2007: 54).

Hervani et al. (2005) defines GSCM as the combination of green purchasing, green production/material production, green distribution/marketing and reverse logistics. Zhu and Sarkis (2007) define GSCM as the eco-initiatives that cover the all phases of the life cycle of a product from the phases of product design, production and distribution to its use and disposal at the end of its useful life by the ultimate consumer (Abdallah and Al-Ghwayeen, 2020: 491).

Green supply chain (GSC) strategies are attempts to minimize the negative effects of businesses and supply chains on the environment (Mollenkopf et al., 2010: 15). Additionally, GSC is a broad strategy adopted to manage material flow during value chains at different stages, such as source, production and distribution. This was, environment can be protected by protecting the natural resources, and decreasing the global warming and carbon footprints (Ageron et al., 2012: 171).

Practices that can be called as green supply enable the improvement of the EP of the purchased product/service or the supplier. At this point, GSC involves practices, such as the recycling and packaging of waste in cooperation with shareholders, gathering information on products, processes or suppliers, and cooperative product development (Bowen et al., 2001). GSCM practices are handles differently in the related literature (Zhu et al., 2005; Eltayeb and Zailani, 2009; Zhu et al., 2010; Perotti et al., 2012; Green et al., 2012; Hsu et al., 2013; Laosirihongthong et al., 2013; Lin, 2013; Luthra et al., 2014; De Sousa Jabbour et al., 2015; Sharma and Gandhi, 2016; Abdallah and Al-Ghwayeen, 2020). The present research studies these practices as eco-design (ED), green purchasing (GP), cooperation with customers (CWC) and internal environment management (IEM) (Abdallah and Al-Ghwayeen, 2020), which can be defined as follows:

*Eco-design:* ED is the systematic evaluation of design performance in accordance with environment, health, safety and sustainability objectives throughout the whole product and process lifecycle (Liu et al., 2017: 183), and it is considered as one of the GSC initiatives. Green design integrates environmental dimensions to the product design process by taking the whole flow of the product within the supply chain into consideration. It is of utmost significance since most of the environmental effects resulting from the production, consumption and disposal of the product are direct results of the decisions made during design process (Eltayeb and Zailani, 2009: 97).

*Green purchasing:* Purchasing activity is very important in a business's reaction to environmental activities (Zsidisin and Siferd, 2001: 61). GP refers to how innovations in SCM and industrial purchasing areas are evaluated within the context of environment. Recycling aims at re-using and enabling the resource reduction (Liu et al., 2017: 183). On the other hand, GP is about controlling EP of the suppliers due to its nature (Eltayeb et al., 2011: 492); it involves indicators related to green material purchasing, cooperation with

environment certified suppliers and selecting and evaluating of suppliers based on certain environmental criteria in order to meet environmental objectives (Abdallah and Al-Ghwayeen, 2020: 492).

*Cooperation with customers:* It refers to businesses' cooperating with customers to design cleaner production processes that produce environment friendly products through green practices (Green et al., 2012: 293). Additionally, CWC provide businesses with information about customer preferences and needs, which enables them to respond to these needs in a shorter time and to obtain competitive advantage (Vickery et al., 2003: 526).

*Internal environment management:* An environment management system is made of a series of internal policies, evaluation, planning and implementation acts that effect the whole organization and its relations with the natural environment (Darnall et al., 2008: 31). IEM is the practice of developing a GSCM as an organizational necessity with the commitment and support of senior and mid-level managers (Green et al., 2012: 293).

## **2.2. Green Supply Chain Management, Environmental Performance and Business Performance**

Businesses need to monitor, evaluate and manage their performances for a sustainable competitive advantage (Taticchi et al., 2010: 4). BP, which is a complex concept that involves efficiency, productivity and adaptability (Abdallah and Al-Ghwayeen, 2020: 494), is defined as a series of managerial and critical procedures that provides the realization of one or more pre-defined objectives of a business management (Alkunsol et al., 2019: 28).

Another important element of performance is the EP. EP is defined by Younis et al. (2016) as a business's ability to minimize air emissions and all kinds of waste, decrease the consumption of toxic and hazardous materials and reduce environmental accidents (Abdallah and Al-Ghwayeen, 2020: 493). Today, businesses consider EP as a social objective rather than an issue of cost, risk or image (Dheeraj and Vishal, 2012: 77). Additionally, EP is measured in different ways in various studies (Al-Tuwaijri et al., 2004: 453).

GSCM focusses on reducing waste and increasing the efficiency of supply chain through product and service innovation, which requires the common supply chain efforts of suppliers, distributors and customers (Kim et al., 2011: 284). In addition, GSCM is a proactive approach to increasing EP (Lin, 2013: 32), which refers to the interaction and synergy between shareholders to improve EP, reduce waste and minimize cost (De Giovanni and Vinzi, 2012: 907). Indeed, with green supply chain management practices, businesses can reduce the ecological effects of industrial activities without compromising on cost, quality, performance, safety or energy use efficiency. Moreover, controlling product line to meet environmental regulations not only minimizes the ecological damage, but also provides economic profit (Srivastava, 2007: 68). Accordingly, the relationships between GSCM practices, BP and EP have been investigated in various studies.

According to the literature related to the relationship between GSCM practices and BP, there is a positive relationship between GSCM practices and BP, and GSCM practices have a positive effect on BP (Zhu and Sarkis, 2004; Zhu and Sarkis, 2007; Testa and Iroldo, 2010; Golicic and Smith, 2013; Abdallah and Al-Ghwayeen, 2020). Additionally, the related literature on the relationship between GSCM practices and EP presents positive relationships between variables (Geffen and Rothenberg, 2000; Zhu and Sarkis, 2004; Zhu and Sarkis, 2007; Abdallah and Al-Ghwayeen, 2020). Moreover, a positive relationship between EP and BP has been reported (Klassen and McLaughlin, 1996; Abdallah and Al-Ghwayeen, 2020). Based on the information provided above, the relationships between these variables form the basis of the present research, and the relationships between the variables and the hypotheses formed within this framework are investigated in the methodology of the present research.

## **3. Research Methodology**

This part presents information on the method and sample of the present research. Additionally, hypotheses formed based on the research question are tested.

### **3.1. Research Method and Sample**

Within the scope of the qualitative research method, structures questionnaire forms were implemented on automotive businesses operating within the body of Konya Chamber of Industry. Simple random sampling (SRS) method was adopted for the present research. The basic principle of the SRS is that the possibility of selection is equal for any sample within the research universe (Meng, 2013). This method is commonly adopted when the features of the units forming the universe does not matter much for the research and the features of the units are homogenous (Gürbüz and Şahin, 2018: 135). Accordingly, the present research adopted SRS method.

The questionnaire form created for the present research consists of four parts. The first part consists of demographic questions. The other parts consist of questions on GSCM practices, EP and BP respectively.

Within the scope of the present research, questions measuring GSCM practices (20 items), EP (6 items) and BP (5 items) were obtained making use of the scale developed by Abdallah and Al-Ghwayeen (2020). All items in the questionnaire were scored on 5-point Likert scale. It was found that there were 300 businesses<sup>†</sup> operating in automotive industry in the province of Konya, and the analyses conducted for the present research were done with data collected from 130 of these businesses. In accordance with these data, it can be claimed that the sample can represent the universe (Coşkun et al., 2015: 137).

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<sup>†</sup> There are 300 businesses operating in automotive industry in Konya. This data is obtained from Konya Chamber of Industry on 22.11.2019. At the same time, the surveys were conducted in December 2019.

The reliability of the scales adopted was tested before testing the hypotheses. Information of the reliability of the scales is presented in Table 1 below.

*Table 1. Cronbach Alpha ( $\alpha$ ) Values for the Adopted Scales*

Scale	N of Items	( $\alpha$ ) Value
GSCM Practices	20	0.867
EP	6	0.727
BP	5	0.701

As presented in Table 1, Cronbach alpha ( $\alpha$ ) value is 0.867 for GSCM practices scale, 0.727 for EP scale and 0.701 for BP scale. At this point,  $\alpha$  values of tested scales is above 0.70, which is acknowledged as acceptable lower bound by various studies (Sekaran, 2003: 311; Gürbüz and Şahin, 2018: 333). Therefore, it can be claimed that the adopted scales are reliable.

### 3.2. Research Hypotheses

Quantitative methodology was adopted in the present research to answer the question “Does EP have a mediation role in the effect of GSCM practices on BP?”. Hypotheses formed in accordance with this purpose are listed below.

H<sub>1</sub>: GSCM practices have a positive and significant effect on BP.

H<sub>2</sub>: GSCM practices have a positive and significant effect on EP.

H<sub>3</sub>: EP has a positive and significant effect on BP.

H<sub>4</sub>: EP has a mediation role in the effect of GSCM practices on BP.

### 3.3. Testing the Research Hypotheses

Before testing the hypotheses, GSCM practices of businesses were evaluated. Findings on the GSCM are presented in Table 2.

*Table 2. Findings on the Green Supply Chain Practices of Businesses*

GSCM Practices	$\bar{X}$	S.D.
Our firm emphasizes cross-functional cooperation for environmental improvements.	4.35	0.96
Our firm emphasizes environmental compliance and auditing programs.	4.28	1.06
Senior managers in our firm are committed to GSCM.	4.12	0.95
Our firm has a system to track environmental laws and regulations.	3.28	1.07
Our firm has pollution prevention plans.	3.21	1.14
<b>IEM</b>	<b>3.85</b>	<b>0.77</b>
Our firm cooperates with customers to produce eco-designs.	4.28	1.14
Our firm cooperates with customers to design cleaner production processes.	4.22	0.99
Our firm has information sharing structure with customers.	3.82	0.99
Our firm cooperates with customers for green packaging.	3.62	1.11
Our firm cooperates with customers for using less energy during products transportation.	3.15	1.16
<b>CWC</b>	<b>3.82</b>	<b>0.65</b>
Our firm emphasizes optimization of design process to reduce solid and liquid waste.	4.08	1.14
Our firm emphasizes design of products that can be reused, recycled, and recovery of component parts.	3.66	1.20
Our firm emphasizes optimization of design process to reduce air emission and noise.	3.56	1.18
Our firm emphasizes design of products to reduce use of harmful/toxic material.	3.54	1.21
Our firm emphasizes design of products for reduced consumption of material /energy.	3.52	1.14
<b>ED</b>	<b>3.67</b>	<b>0.83</b>
Our firm has partnerships with suppliers that aim to environmental solutions and/or development environmentally friendly products.	3.88	0.95
Our firm evaluates suppliers based on specific environmental criteria.	3.87	1.07
Our firm cooperates with suppliers to meet environmental objectives.	3.72	1.30
Our firm emphasizes purchasing eco-friendly materials.	3.68	1.11
Our firm cooperates with suppliers who have environmental certifications such as ISO 14001.	3.08	1.29
<b>GP</b>	<b>3.65</b>	<b>0.80</b>
<b>General</b>	<b>3.75</b>	<b>0.59</b>

Notes: (i)  $n=130$ , (ii) In the scale 1=I definitely disagree with and 5=I definitely agree with mean. (iii) According to Friedman two ways ANOVA test ( $\chi^2= 390.111$ ;  $p<.001$ ) the results are statistically significant.

According to the data related to the GSCM practices of businesses, the mean value is above average (3.75). This value indicates that businesses conduct GSCM practices above average. In terms of the dimensions of GSCM practices, IEM dimension is also above average (3.85), and “businesses emphasize cross-functional cooperation for environmental improvements” (4.35). The mean value for CWC is also above average (3.82). The highest scored item in this dimension is “cooperates with customers to produce eco-designs” (4.28). Mean score for ED also is above average (3.67). In this dimension, the highest scored item is about “emphasizing design of products that can be reused, recycled, and recovery of component parts” (3.66). Another dimension of GSCM practices, GP is also scored above average (3.65). Within this dimension, “having partnerships with suppliers that aim to environmental solutions and/or development environmentally friendly products” item has received the highest score (3.87). With a general review of Table 2, it can be claimed that businesses emphasize the use of GSCM practices and have placed them within their business systems.

Evaluation of the EP of the businesses is presented in Table 3.

Table 3. Findings on the Environmental Performance of Businesses

EP	$\bar{X}$	S.D.
Our firm has reduced energy consumption during the last three years compared to competitors.	4.08	1.10
Our firm has reduced air emissions during the last three years compared to competitors.	3.96	1.00
Our firm has reduced effluent wastes during the last three years compared to competitors.	3.92	0.98
Our firm has sought to improve its environmental image /position during the last three years compared to competitors.	3.81	1.02
Our firm has reduced consumption of hazardous/toxic material during the last three years compared to competitors.	3.21	1.03
Our firm has reduced solid wastes during the last three years compared to competitors.	2.95	0.89
<b>General</b>	<b>3.65</b>	<b>0.65</b>

Notes: (i)  $n=130$ , (ii) In scale 1=I definitely disagree with and 5=I definitely agree with mean. (iii) According to Friedman two ways ANOVA test ( $\chi^2= 152.550$ ;  $p<.001$ ) the results are statistically significant.

The evaluation of Table 3 shows that EP of the businesses is scored above average (3.65). In terms of performance criteria, it can be seen that businesses have reduced energy consumption during the last three years compared to competitors (4.08); they have reduced air emissions during the last three years compared to competitors (3.96); they have reduced effluent wastes during the last three years compared to competitors (3.92); they have sought to improve its environmental image /position during the last three years compared to competitors (3.81); they have reduced consumption of hazardous/toxic material during the last three years compared to competitors (3.21); and they have reduced solid wastes during the last three years compared to competitors (2.95). A general evaluation of Table 3 shows that businesses have experienced problems in reducing solid wastes compared to competitors. It can be suggested that businesses need to take measures in order to solve this problem.

Findings on the general BP of businesses are presented in Table 4.

Table 4. Findings on the General Business Performance of Businesses

General BP	$\bar{X}$	S.D.
Our sales have increased during the last three years compared to competitors.	3.88	1.06
Our customer satisfaction level has increased during the last three years compared to competitors.	3.73	0.97
Our market share has increased during the last three years compared to competitors.	3.69	0.96
Our firm has achieved a high percentage of profits during the last three years compared to competitors.	3.47	1.21
Our general competition position has improved during the last three years compared to competitors.	3.44	1.09
<b>General</b>	<b>3.64</b>	<b>0.72</b>

Notes: (i)  $n=130$ , In scale 1=I definitely disagree with and 5=I definitely agree with mean. (iii) According to Friedman two ways ANOVA test ( $\chi^2= 23.054$ ;  $p<.001$ ) the results are statistically significant.

As presented in Table 4, general BP of businesses is above average (3.64). In terms of performance criteria, it can be seen that businesses have increased their sales during the last three years compared to competitors (3.88). Their customer satisfaction levels have also increased during the last three years compared to competitors (3.73). Similarly, market shares of businesses have increased during the last three years above average (3.69). During the last three years, there have been improvement in the profits (3.47) and their general competition positions (3.44) compared to competitors.

In order to test research hypotheses, Pearson Correlation analysis was conducted first. Correlation values obtained from the analysis are presented in Table 5.



Variables	$\bar{X}$	S.D.	(1)	(2)	(3)
GSCM Practices (1)	3.75	0.59	1		
EP (2)	3.65	0.65	.669**	1	
BP (3)	3.64	0.72	.652**	.619**	1

Notes: (i) n=130, (ii) \*\*p<.001

The correlations between GSCM practices, EP and BP show positive and significant relationships between variables ( $p<0.001$ ). As for the relationships between variables separately in this context, there are mid-level relationships between GSCM practices and EP (0.669); GSCM Practices and BP (0.652); and EP and BP (0.619). Hierarchical regression analysis was conducted to test the research hypotheses and the results are presented in Table 6 below.

Table 6. Hierarchical Regression Analysis Results for Variables

	Dependent Variable	Independent Variable	Beta Unstn.	Sta. Error	$\beta$	p	R <sup>2</sup>	F
1 <sup>st</sup> Step	BP	GSCM Practices						
		Constant	.690	.308	-	.000	.424	94.398
		GSCM Practices	.788	.081	.652	.000		
2 <sup>nd</sup> Step	EP	GSCM Practices						
		Constant	.887	.275	-	.000	.447	103.636
		GSCM Practices	.738	.073	.669	.000		
3 <sup>rd</sup> Step	BP	EP						
		Constant	1.597	.235	-	.000	.383	79.377
		EP	.565	.063	.619	.000		
4 <sup>th</sup> Step	BP	GSCM Practices and EP						
		Constant	.368	.304		.228	.485	59.799
		GSCM Practices	.520	.104	.430	.000		
		EP	.363	.094	.331	.000		

Multiple regression analysis was conducted in order to define the mediation role of EP in the relationship between GSCM practices and BP. According to the multiple regression analysis results presented in Table 6, regression model is statistically significant ( $p<0.001$ ). In the scope of mediation effect model suggested by Baron and Kenny (1986), the effects of GSCM practices on BP was studied in order to define the mediation effect. Accordingly, explanatory variable, supply chain practices explains the 42.4% of the variance in the dependent variable, BP ( $R^2=0.424$ ;  $F= 94.398$ ). In the second step, the effect of GSCM practices on EP was examined, and accordingly GSCM practices can explain the 44.7% of the variance in EP ( $R^2=0.447$ ;  $F= 103.636$ ). In the third step, the effect of EP on BP was studied and it was found that EP can explain the 38.3% of the variance in BP ( $R^2=0.383$ ;  $F= 79.377$ ). In the last step, GSCM practices and EP variables were added in the model together, and the effect of these two variables on BP was examined, and according to the results GSCM practices and EP can explain the 48.5% of the variance in BP ( $R^2=0.485$ ;  $F= 59.799$ ). When EP variable was added to the model at the end of the regression analysis, the effect of SCM practices on BP decreased from  $\beta= 0.652$  to  $\beta= 0.430$ . Additionally, when EP variable was added to the model, there was an increase from  $R^2=0.424$  to  $R^2=0.485$ , and therefore explaining power of the regression model increased. After EP was added to the model, the effects of GSCM practices decreased, yet this effect was still significant ( $p<0.001$ ). This result shows that EP is a variable with partial mediation role in the effect of GSCM practices on BP. Sobel test was made to define the significance of this mediation role. According to the Sobel analysis results,  $z$  value was calculated as 6.70, which was statistically significant ( $p<0.001$ ).

According to the multiple regression analysis results, the lowest of VIF values was 1.810, which was lower than the upper bound 10. It was also found that the lowest tolerance value in the model was 0.553, which was higher than the lower bound 0.10. The highest CI value in the model was calculated as 18.527, which was significantly lower than the upper bound 30. Therefore, there is no multiple correlation problem in the model. Additionally, the highest Durbin-Watson coefficient in the model was 2.317, which showed that there was no auto-correlation problem. Based on the results of the multiple regression analysis, hypotheses  $H_1$  "GSCM practices have a positive and significant effect on BP.",  $H_2$  "GSCM practices have a positive and significant effect on EP.",  $H_3$  "EP has a positive and significant effect on BP." and  $H_4$  "EP has a mediation role in the effect of GSCM practices on BP." were accepted.

## 4. Conclusion

Within the scope of the main objective of the present research, first the relationships between GSCM practices, EP and BP were examined. Four hypotheses formed on the basis of these relationships were tested. According to the obtained findings, GSCM practices have a positive and significant effect on BP and EP; and EP has a positive and significant effect on BP. Additionally, EP has a partial mediation role in the effect of GSCM practices on BP. These findings are in agreement with the findings of similar studies in the related literature (Klassen and McLaughlin, 1996; Geffen and Rothenberg, 2000; Zhu and Sarkis, 2004; Zhu and Sarkis, 2007; Testa and Iroldo, 2010; Golicic and Smith, 2013; Abdallah and Al-Ghwayeen, 2020).

According to the results of the analyses conducted for the present research, the level of realizing GSCM practices in above average for businesses (3.75). EP (3.65) and BP (3.64) levels of businesses are also above average. The most critical element in BP of businesses was that the item “businesses have reduced solid wastes during the last three years compared to competitors” within the EP criteria was below average (2.95). According to this finding, it is suggested that businesses act more consciously in terms of reducing solid wastes and adapt this to their business cultures.

The present research is limited to businesses operating in automotive industry in Konya province. Further studies can be conducted in different cities/samples or on other industries in Konya. Additionally, since the present research was conducted within certain time limitations, taken the nature of research questions and hypotheses, further studies can be conducted in longer time periods in terms of data collection.

## References

- Abdallah, A. B., & Al-Ghwayeen, W. S. (2020). Green supply chain management and business performance. *Business Process Management Journal*, 26(2), 489-512.
- Ageron, B., Gunasekaran, A., & Spalanzani, A. (2012). Sustainable supply management: an empirical study. *International Journal of Production Economics*, 140(1), 168-182.
- Alkunsol, W. H., Sharabati, A. A. A., AlSalhi, N. A., & El-Tamimi, H. S. (2019). Lean six sigma effect on jordanian pharmaceutical industry's performance. *International Journal of Lean Six Sigma*, 10(1), 23-43.
- Al-Tuwaijri, S. A., Christensen, T. E., & Hughes Li, K. E. (2004). The relations among environmental disclosure, environmental performance, and economic performance: a simultaneous equations approach. *Accounting, Organizations and Society*, 29(5-6), 447-471.
- Baron, R. M., & Kenny, D. A. (1986). The moderator–mediator variable distinction in social psychological research: conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology*, 51(6), 1173-1182.
- Bowen, F.E., Cousins, P.D., Lamming, R.C., & Farukt, A.C. (2001). The role of supply management capabilities in green supply. *Production and Operations Management*, 10(2), 174-189.
- Coşkun, R., Bayraktaroğlu, S., Yıldırım, E., & Altunışık, R. (2015). *Sosyal bilimlerde araştırma yöntemleri: SPSS uygulamalı*. Sakarya Yayıncılık.
- Darnall, N., Jolley, G. J., & Handfield, R. (2008). Environmental management systems and green supply chain management: complements for sustainability?. *Business Strategy and the Environment*, 17(1), 30-45.
- De Giovanni, P., & Vinzi, V. E. (2012). Covariance Versus Component-Based Estimations of Performance in Green Supply Chain Management. *International Journal of Production Economics*, 135(2), 907-916.
- De Sousa Jabbour, A. B. L., De Oliveira Frascareli, F. C., & Jabbour, C. J. C. (2015). Green supply chain management and firms' performance: Understanding potential relationships and the role of green sourcing and some other green practices. *Resources, Conservation and Recycling*, 104, 366-374.
- Dheeraj, N., & Vishal, N. (2012). An overview of green supply chain management in India. *Research Journal of Recent Sciences*, 1(6), 77-82.
- Eltayeb, T.K., & Zailani, S. (2009). Going green through green supply chain initiatives toward environmental sustainability. *Operations and Supply Chain Management: An International Journal*, 2(2), 93-110.
- Eltayeb, T.K., Zailani, S., & Ramayah, T. (2011). Green supply chain initiatives among certified companies in Malaysia and environmental sustainability: investigating the outcomes. *Resources, Conservation and Recycling*, 55(5), 495-506.
- Geffen, C.A., & Rothenberg, S. (2000). Suppliers and environmental innovation: the automotive paint process, *International Journal of Operations & Production Management*, 20(2), 166-86.
- Golicic, S. L., & Smith, C. D. (2013). A meta-analysis of environmentally sustainable supply chain management practices and firm performance, *Journal of Supply Chain Management*, 49(2), 78-95.
- Green, K. W., Inman, R. A., Sower, V. E., & Zelbst, P. J. (2019). Impact of JIT, TQM and green supply chain practices on environmental sustainability. *Journal of Manufacturing Technology Management*, 30(1), 26-47.
- Green, K. W., Zelbst, P. J., Meacham, J., & Bhaduria, V. S. (2012). Green supply chain management practices: impact on performance. *Supply Chain Management: An International Journal*, 17(3), 290–305.
- Gürbüz, S., & Şahin, F. (2018). *Sosyal bilimlerde araştırma yöntemleri*. Gözden Geçirilmiş Güncellenmiş 5. Baskı. Ankara: Seçkin Yayıncılık.
- Hervani, A. A., Helms, M. M. & Sarkis, J. (2005). Performance measurement for green supply chain management. *Benchmarking: An International Journal*, 12(4), 330-353.
- Hsu, C. C., Tan, K. C., Zailani, S. H. M., & Jayaraman, V. (2013). Supply chain drivers that foster the development of green initiatives in an emerging economy. *International Journal of Operations & Production Management*, 33(6), 656-688.

- Hsu, C. W., & Hu, A. H. (2008). Green supply chain management in the electronic industry. *International Journal of Environmental Science & Technology*, 5(2), 205-216.
- Kim, J. H., Youn, S., & Roh, J. J. (2011). Green supply chain management orientation and firm performance: evidence from South Korea. *International Journal of Services and Operations Management*, 8(3), 283-304.
- Klassen, R. D., & McLaughlin, C. P. (1996). The impact of environmental management on firm performance. *Management Science*, 42(8), 1199-1214.
- Laosirihongthong, T., Adebajo, D., & Keah, C.T. (2013). Green supply chain management practices and performance. *Industrial Management & Data Systems*, 113(8), 1088-1109.
- Lin, R. J. (2013). Using fuzzy DEMATEL to evaluate the green supply chain management practices. *Journal of Cleaner Production*, 40, 32-39.
- Liu, Y., Zhu, Q., & Seuring, S. (2017). Linking capabilities to green operations strategies: The moderating role of corporate environmental proactivity. *International Journal of Production Economics*, 187, 182-195.
- Luthra, S., Garg, D., & Haleem, A. (2014). Green supply chain management. *Journal of Advances in Management Research*, 11(1), 20-46.
- Meng, X. (2013). Scalable simple random sampling and stratified sampling. *30th International Conference on Machine Learning*, 531-539.
- Mollenkopf, D., Stolze, H., Tate, W. L., & Ueltschy, M. (2010). Green, lean, and global supply chains. *International Journal of Physical Distribution & Logistics Management*, 40(1-2), 14-41.
- Perotti, S., Zorzini, M., Cagno, E., & Micheli, G.J. (2012). Green supply chain practices and company performance: the case of 3PLs in Italy. *International Journal of Physical Distribution & Logistics Management*, 42(7), 640-672.
- Sekaran, U. (2003). *Research Methods for Business: A Skill Building Approach*. (J. Marshall, & P. M. Fadden, Dü) New York: Fourth Edition.
- Sharma, S., & Gandhi, M. A. (2016). Exploring correlations in components of green supply chain practices and green supply chain performance. *Competitiveness Review*, 26(3), 332-368.
- Srivastava, S. K. (2007). Green supply-chain management: A state-of-the-art literature review. *International Journal of Management Reviews*, 9(1), 53-80.
- Taticchi, P., Tonelli, F., & Cagnazzo, L. (2010). Performance measurement and management: a literature review and a research agenda. *Measuring Business Excellence*, 14(1), 4-18.
- Testa, F., & Iraldo, F. (2010). Shadows and lights of GSCM (Green Supply Chain Management): Determinants and effects of these practices based on a multinational study. *Journal of Cleaner Production*, 18(10-11), 953-962.
- Vickery, S.K., Jayaram, J., Droge, C., & Calantone, R. (2003). The effects of an integrative supply chain strategy on customer service and financial performance: an analysis of direct versus indirect relationships. *Journal of Operations Management*, 21(5), 523-539.
- Walls, J. L., Phan, P. H., & Berrone, P. (2011). Measuring environmental strategy: Construct development, reliability, and validity. *Business & Society*, 50(1), 71-115.
- Zhu, Q., & Sarkis, J. (2004). Relationships Between Operational Practices and Performance among Early Adopters of Green Supply Chain Management Practices in Chinese Manufacturing Enterprises. *Journal of Operations Management*, 22(3), 265-289.
- Zhu, Q., & Sarkis, J. (2007). The moderating effects of institutional pressures on emergent green supply chain practices and performance. *International Journal of Production Research*, 45(18-19), 4333-4355.
- Zhu, Q., Geng, Y., Fujita, T., & Hashimoto, S. (2010). Green supply chain management in leading manufacturers Case studies in Japanese large companies, *Management Research Review*, 33(4), 380-392.
- Zhu, Q., Sarkis, J., & Geng, Y. (2005). Green supply chain management in China: pressures, practices and performance. *International Journal of Operations & Production Management*, 25(5), 449-468.
- Zhu, Q., Sarkis, J., & Lai, K. H. (2008). Confirmation of a measurement model for green supply chain management practices implementation. *International Journal of Production Economics*, 111(2), 261-273.
- Zsidisin, G. A., & Siferd, S. P. (2001). Environmental purchasing: a framework for theory development. *European Journal of Purchasing & Supply Management*, 7(1), 61-73.