

Dr Karahan Kara, Asst. Prof.

Artvin Coruh University (Turkey)

ORCID: 0000-0002-1359-0244

e-mail: karahan.kara@artvin.edu.tr

Dr Sercan Edinsel

Turkish Armed Forces

ORCID: 0000-0003-2831-7504

e-mail: sedinsel@gmail.com

Dr Esra Gökçen Kaygısız, Asst. Prof.

Giresun University (Turkey)

ORCID: 0000-0002-4950-9508

e-mail: esra.kaygisiz@giresun.edu.tr

Dr Zbigniew Bentyn

Poznan University of Economics and Business (Poland)

ORCID: 0000-0002-2061-2616

e-mail: zbigniew.bentyn@ue.poznan.pl

Supply chain process innovation between HRM capabilities and SC performance. An empirical analysis from the textile industry

Innowacyjność procesów łańcucha dostaw pomiędzy możliwościami HRM a wydajnością SC. Analiza empiryczna przemysłu tekstylnego

Abstract

This study is aimed to explain the relationship between Human Resource Management (HRM) capabilities and Supply Chain Performance in the textile and apparel industry and to determine the mediating role of Process Innovation (PI), which improves supply chain processes in this relationship. Two research models were introduced in the study. Hypotheses belonging to research models have been developed. Structural equation modelling was applied to test the hypotheses. The sample area of the research consists of textile and apparel companies operating in Turkey. The research level is at the executive level. HRM capabilities significantly affect SC performance in the textile and apparel industry. In addition, it was concluded that PI has a full mediating effect on the HRM-SC performance relationship. It has been determined that PI applications contribute to increasing efficiency in supply chain management processes and performance and support the development of HRM capabilities.

Keywords:

supply chain process innovation, supply chain performance, human resources management, mediating effect

Streszczenie

Niniejsze badanie ma na celu wyjaśnienie związku między zdolnościami zarządzania zasobami ludzkimi (HRM) a wydajnością łańcucha dostaw w przemyśle tekstylnym i odzieżowym oraz określenie pośredniczącej roli innowacji procesowych (PI), które usprawniają procesy łańcucha dostaw w tej relacji. W badaniu wykorzystano dwa modele badawcze. Opracowano także hipotezy należące do modeli badawczych. W celu przetestowania hipotez zastosowano modelowanie równań strukturalnych. Przykładowy obszar badań stanowią firmy tekstylno-odzieżowe działające w Turcji. Badania przeprowadzono na poziomie zarządu. Wykazano, że możliwości zarządzania zasobami ludzkimi istotnie wpływają na wydajność SC w przemyśle tekstylnym i odzieżowym. Ponadto stwierdzono, że innowacje procesowe (PI) mają pełny wpływ mediacyjny na relację wydajności HRM-SC, a aplikacje PI przyczyniają się do zwiększenia efektywności procesów i wydajności zarządzania łańcuchem dostaw oraz wspierają rozwój możliwości HRM.

Słowa kluczowe:

innowacje procesów łańcucha dostaw, wydajność łańcucha dostaw, zarządzanie zasobami ludzkimi, efekt mediacyjny

JEL: M10, M12, M15

Introduction

Today's understanding of competition is changing from companies to supply chains (SC) (Gunasekaran *et al.*, 2005). At the level of competition between firms, firms make efforts to minimize production and operation costs. These efforts have created the desire to reach lower cost of raw materials and labor force. The desire mentioned, on the other hand, increased the distances between consumption points and production points, and between final production points and raw material production points. This has increased material mobility, allowing materials to remain in SC for a longer period. At that point, the competition among companies has turned into a competition among supply chains. This transformation has also led to the development of effective SC management strategies (Chithambaranathan *et al.*, 2015). One of the main objectives of effective SC management strategies is to keep supplier performance at a high level. From a part-to-whole perspective, the combination of supplier performances constitutes SC performance. There are different metric approaches in the literature for determining SC performance (Arzu Akyuz & Erman Erkan, 2010). The main goal of all approaches is to determine the correct SC performance.

There are many variables that directly and indirectly affect SC performance. Human Resource Management (HRM), which plays a role in the SC, and innovation activities that contribute to the development of the SC are among the main variables that contribute to the SC performance. S. K. Jena and A. Ghadge (2021) argue that combining HRM with supply chain management (SCM) will increase the efficiency of SC performance. Recruitment, training, and performance management of HRM activities contribute to the HRM-SCM combination. W. Swart *et al.* (2012) emphasize that the performance of the SC can be increased by increasing the performance of HR based on resource-based view. S. Mandal (2018), on the other hand, supports the relationship between human capital and SC performance with an empirical study by accepting the human factor in the capital owned by companies.

Innovation is the processes carried out in products and processes to make the outputs of company activities more productive (Kahn, 2018). Process innovations (PI) are innovations applied in production and delivery methods (OECD, 2005). It is expected that companies' innovative attitudes towards improving SC activities in delivery and other logistics processes positively affect SC performance. Y. J. Seo *et al.* (2014) supported by

an empirical study claim that innovation has a significant effect on both SC performance and SC integration.

The manufacturing processes of companies producing textile goods consist of structures that follow each other and act interdependently. These structures also include supply and distribution activities. Strong SC structures are needed for these cyclical processes to take place successfully. There are many variables that have an impact on the performance of textile SC. HRM capabilities and PI activities that affect the overall SC performance are also among the variables that affect the textile SC performance. In this study, SC performance is examined in depth by considering HRM capabilities and PI activities. In this context, two research questions belonging to the study were formed. These research questions are as follows:

Research Question 1: Is there a significant relationship between the HRM capabilities of textile and apparel companies and their supply chain performance?

Research Question 2: Does process innovation have an impact on the relationship between HRM capabilities and supply chain performances of textile companies in the textile and apparel industry?

Research based on relationship analysis was conducted to find answers to the research questions created above. It is aimed to share the findings obtained as a result of this research with the literature. In this context, an introduction to the study has been made in this section. In the first part, the theoretical background of the variables and the concept of the study are presented. The second part covers the literature review, presentation of research models and formulation of hypotheses. The findings of the research are given in the third part. In the fourth part, the results obtained from the research are presented. In the last part, the conclusions are explained.

Theoretical background and conceptual framework

Human resource management capabilities

HRs are deemed to be the best capable of integrating all activities to create positive outcomes (Guest, 2011). As global uncertainty grows and business activity is more and more competitive, industries try to gain a competitive advantage at any cost, turning to increasingly innovative components such as HRM methods (Sparrow *et al.*,

1994). HRM is defined as the development of work procedures that offer a set of rules targeted at increasing employee commitment and efficiency to meet the organization's goals (Yu *et al.*, 2019). In other words, HRM is a collection of activities, roles, and procedures that are distinct but interconnected and aimed at attracting, developing, retaining, and even terminating employees (Florén *et al.*, 2016). HRM is described as a strategic approach for managing a company's most important asset, its employees, who contribute to the accomplishment of organizational goals both collectively and individually (Puhovichova & Jankelova, 2020). HRM techniques consist of a framework that recruits, trains, encourages, and retains employees to ensure the organization's and its members' successful implementation and survival (Jackson & Schuler, 1995). HRM is also a system of operational duties that includes staffing, selection, job design, training and development, performance assessment, and payment (Pfeffer & Jeffrey, 1998). Besides HRM practices can include virtually everything in conjunction with the management of employee relations within a company (Jackson & Schuler, 1995).

HRM capabilities are the primary strategies used by companies to influence and mold employees' attitudes, behavior, and abilities for them to perform at work and therefore accomplish the organization's goals (Chen & Huang, 2009). HRM capabilities also have an impact on a firm's innovativeness and may be a helpful for businesses resources (Beugelsdijk, 2008). Several studies have found that organizations need to create a framework of logically coherent HRM capabilities (Jiménez-Jiménez & Sanz-Valle, 2005). I. G. Riana *et al.* (2020) discovered that HRM capabilities have a substantial impact on organizational performance and innovation, and that innovation can enhance organizational performance. HRM capabilities also may make employees feel more at ease in the workplace and enhance the ability to innovate, causing businesses to become more inventive. HRM capabilities also may play a beneficial role in assisting businesses to innovate (Lu *et al.*, 2015). I. M. Prieto and M. P. Pérez-Santana (2014) underlined the importance of HRM in encouraging innovative behavior since it ensures that all operations in the organization work well.

Process innovation

Innovation may be defined as a process of learning and knowledge creation in which new issues are recognized and new information is

generated to solve them (Grant, 1996). F. Damanpour (1996) defined innovation as "new goods or services, new process technologies, new organizational structures or administrative systems, or new goals or programs relating to organizational members". Review of the literature shows that innovation may be classified into two types: technological innovation and administrative innovation (Damanpour *et al.*, 1989). L. M. Chuang (2005), on the other hand, divides technical or technological innovation into two secondary dimensions: product innovation and PI. It contributes to the organization's long-term growth and success (Lin & Chen, 2007). The goal of PI is to increase the flexibility of production processes, reduce production costs, and enhance product quality (Psomas *et al.*, 2018). PI is also described broadly as new modifications in throughput technology for an organization or operational unit, such as a factory (Bigoness & Perreault, 1981). It includes components of the organization that increase the performance of existing operations through technology advancements or re-engineering of the manufacturing process. (Damanpour & Gopalakrishnan, 2001). PI entails the application of better processes for production or service delivery as well (Tan and Nasurdin, 2011). PI efforts may enhance the flexibility and efficiency of manufacturing or delivery processes, resulting in cost savings, and therefore supporting product development efficiency and product commercialization (Damanpour & Gopalakrishnan, 2001).

Different methods have been developed to improve processes in SC activities. These developed methods are accepted as outputs of PI. An "automatic replenishment" application was developed to improve order processes. This application simultaneously provides up-to-date information about the stocks of the companies to the entire SC (Kiil *et al.*, 2018). Instant tracking of changes in stocks and automatic placing of orders provide companies with advantages in responding to customer requests. Collaborative Planning, Forecasting, and Replenishment (CPFR) application was developed to ensure SC integration. With this method, all SC members participate in process of planning, estimating, and deciding on supply activities (Hill *et al.*, 2018). The Cross Docking Logistics application developed to reduce storage times provides advantages in increasing the efficiency of distribution and logistics activities of companies (Apte & Viswanathan, 2000). The Efficient Consumer Response (ECR) application, which deals with shortening the response time to customer demands, contributes to making the logistics activities of manufacturers, distributors,

wholesalers, retailers and all other actors involved in the SC lean (Corsten & Kumar, 2005). It also enables activities to be performed faster, better and at lower cost. The Enterprise Resource Planning application, which enables companies to effectively plan their resources, provides benefits in establishing the information system structure needed by companies and in using resources correctly (Shehab *et al.*, 2004). Just-in-Time Manufacturing practices, which are based on the effective use of products and processes, provide an advantage in low stocking and waste consumption, based on order-based production instead of traditional stocking understanding (McLachlin, 1997). Quick Response, which enables manufacturers and sellers to respond immediately to customer expectations, provides advantages to companies in rapidly adapting to changing customer demands to increase SC efficiency (Choi & Sethi, 2010). Vendor Managed Inventory (VMI), an inventory management application, strengthens the supplier–vendor relationship and allows the information of the inventory to be tracked simultaneously by both the supplier and the seller (Claassen *et al.*, 2008). These PI applications, which deals with the improvement of the SC, were handled within the scope of our research, and were used in our empirical study to determine the PI status of textile companies.

Supply chain performance

As known, the SC is a complex system with various activities and interactions. SC performance refers to the complete fulfillment of all SC processes up to customer activities in this system. In other words, SCP is the ability to deliver quality products to end consumers in sufficient quantities and in the right stage to ensure their satisfaction (Darmawan *et al.*, 2021). It also facilitates mutual understanding and integration between SC partners and provides insight to reveal the effectiveness of the strategy (Chan & Qi, 2003). However, SCP is a difficult, complex, and very dynamic concept depends on factors such as cost, activity time, customer satisfaction, HR performance, flexibility, inventory management, information technology, demand forecasting, quality management, procrastination (Yavuz & Ersoy, 2013). The performances of all these elements build the SCP. These elements that create SCP can be measured by quantitative and qualitative methods.

Inventory costs and logistics costs, customer responsiveness, stock out probability and fill rate are the types of performance measures of SC models (Beamon, 1999). When the SC

performance is considered in terms of system design, cost, speed, customer service level and agility are among the SC performance indicators (Holmberg, 2000). F. T. Chan and H. J. Qi (2003) defined five performance criteria as resource utilization, flexibility, visibility, trust, and innovativeness. According do H. L. Lee (2004) agility, adaptability, and alignment are the significant elements in increasing SC performance. Z. Li *et al.* (2005) state that there are six criteria such as: strategic supplier partnership, customer relationship, information sharing, information quality, internal lean practices, and postponement. A. Gunasekaran *et al.* (2005) describe a framework for measuring costs and performance that emphasizes measurement of costs and performance along the SC to enhance competitiveness in global markets. Additionally, supplier reliability, innovation, responsiveness, order delivery lead time, final product delivery reliability, product variety, and asset management are the possible indicators that could be used to enhance the SC performance (Ambe, 2014). But a suitable systematic classification has not yet been developed for all these variables (Wong & Wong, 2008). In this study, it is aimed to determine the performance of the SC through the perception-based scale, since it is handled from the point of view of the managers. For this reason, SC performance evaluation based on perception was made.

Literature review and conceptual model

There are studies in the literature that indicate that SC performance can be increased through management capabilities (Gunasekaran *et al.*, 2017). At the same time, studies explain that changing the management perspective also contributes to increasing SC performance (Atilgan & McCullen, 2011). It is generally considered that integrating management capabilities rather than increasing their relations with each other will give more meaningful results on performance. K. S. Jena and A. Ghadge (2021) demonstrated in their empirical study that more effective SC performance can be achieved by integrating HRM and SCM activities. S. L. Fisher *et al.* (2010) explain the HRM–SCM relationship on two grounds. The first fundamental is the necessity of giving importance to HR within the organization to operate the SC effectively. The second is the provision of inter-organizational HRM within the SC. HR based on inter-organizational relations are taken as a basis in determining HRM practices and

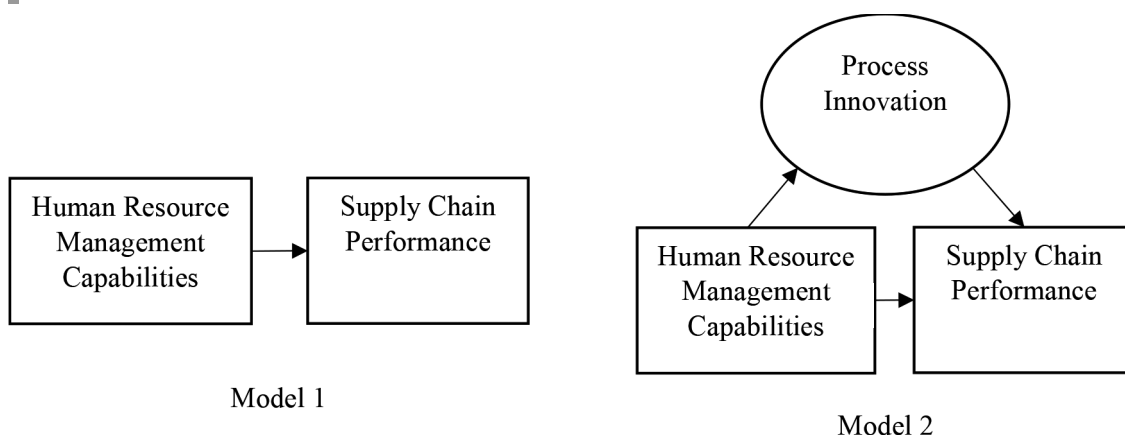
strategies. The determination and management of HRM capabilities are based on human relations within the organization. Since this study deals with the relationship between HRM capabilities and SCM performance, it targets people at the organizational level and as a unit.

SC performance is considered in three categories: economic, environmental, and social. General HR in the economic category, local HR in the social category and accepted HR as a factor affecting the SC performance are evaluated. Emphasizing the importance of HR in SC processes, D. Bogataj *et al.* (2019) stated that the decreasing HR, especially in Europe, will affect the successful realization of SC processes and that precautions should be taken in this regard. At this point, it is understood that highlighting the need for qualified HR can affect the SC performance, as well as the quantitative status of HR. J. R. Mendoza-Fong *et al.* (2019) concluded that the variables of "role of managers, learning environment, employee competencies" within the scope of HRM applications and capabilities in different sectors significantly affect SC performance. S. Rungtissawat and K. Jermstittiparsert (2019) explained the importance of human capital in improving health care SC performance and found that human capital has a significant impact on SC performance. In the same vein, S. Mandal (2018) concluded that human capital positively affects SC performance. S. Hattab *et al.* (2021) determined that the existing training and skills of HR of smallholders in the SC activities of cocoa beans play an active role in increasing the flexible, agile, and economic performance of the SC. K. J. Ding *et al.* (2015) concluded that the relationship between HRM practices in the Chinese logistics industry and logistics and SC competition, especially "recruitment and training" HRM practices, affects logistics and SC. M. S. Sangari

and J. Razmi (2015) concluded that business intelligence capabilities, including management capabilities in the automotive industry, significantly affect agile SC performance. In addition, S. Mondal and K. Samaddar (2021) explain that HR will affect the working culture, thus affecting the SC performance.

Innovation activities implemented in companies directly and indirectly affect the supply chains of the companies as well as the HRM activities. In the HRM and SCM literature, there are studies on the effect of innovation. R. Raj and K. B. Srivastava (2013) found that the relationship between HRM practices and innovativeness is significant and that organizational learning has a mediating effect on this relationship. M. J. Donate *et al.* (2016) determined that technology companies have a human capital mediating effect in the relationship between high-profile personal HRM and firm's innovation capabilities, and that social capital has a mediating effect in the relationship between collaborative HRM practices and firm's innovation capabilities. D. G. Schniederjans (2018) in the study where they discussed the role of PI in the relationship between social quality management and SC, concluded that incremental innovation has a positive effect, but radical innovation has a negative effect. N. Juhdi and J. Hashim (2018) determined that innovation has a mediating effect on the relationship between HRM and performance in the sample area of SME companies. H. H. Chang *et al.* (2019) explained that PI has a moderating effect on the relationship between business systems that strengthen knowledge sharing and SC performance. M. Z. U. Haq *et al.* (2020) have found that training and empowerment from HRM capabilities significantly affected learning in the SC, and innovation performance in internal learning. H. M. Shahid *et al.* (2020) have

Figure 1
Research models



Source: own study.

found that PI has a regulatory effect on the relationship between sustainable SC and sustainable performance in their empirical study in manufacturing companies. Although there are studies that deal with different types of innovation with different approaches in the literature, no study examining the mediating role between HRM capabilities and SC performance has been found. At this point, this study aimed to determine the mediating role of PI in the relationship between HRM capabilities and SC performance. For this reason, our hypotheses and research model (Figure 1) created within the scope of the research are as follows:

- H1: HRM capabilities have a significant positive effect on SC performance.
- H2: PI has a mediating effect in the relationship between HRM capabilities and SC performance.

Methodology

Questionnaire design

To test the hypotheses created within the scope of the research, the scales with proven reliability and validity in the literature were used. The reliability and validity of the scale of HRM abilities were tested by J. C. Anderson and D. W. Gerbing (1988). It is also taken from the HRM capabilities scale used by L. Turulja and N. Bajgoric (2018) to detect HRM capabilities. The scale of HRM capabilities consists of a total of 4 dimensions and 12 items. The dimensions of the HRM capabilities scale are explained as "selective hiring (SH), strategic training (ST), participation of the employees in the decision making (PD) and compensation system (CS)". In the study conducted by L. Turulja and N. Bajgoric (2018), it was explained that the discriminant and convergent validities values of the HRM capabilities scale were greater than 0.7. In addition, it was explained that the fit values of the HRM capabilities scale were at the good fit level ($\chi^2/df = 2.74$ ($df = 48$); CFI = 0.982; SRMR = 0.0355; RMSEA = 0.0664).

The PI scale is taken from H. H. Chang *et al.* (2019). The PI scale consists of a one dimension and a total of 8 items. H. H. Chang *et al.* (2019) stated in their study that the reliability and validity values of the scale were at the acceptable level (AVE: 0.792, CR: 0.958, Alpha: 0.947).

The SC performance scale is taken from the scale used by B. Huo *et al.* (2014) and developed by using the SC scales used in the literature. The SC

performance scale consists of one dimension and 7 items. The SC performance scale used is based on customer needs, delivery performance and SC process speed (Huo *et al.*, 2014). The reliability and validity values of the SC performance scale used are at the acceptable level (Alpha: 0.870; $\chi^2 = 1570.53$, $df = 384$, CFI = 0.95; SRMR = 0.053; RMSEA = 0.074).

Sampling

In 2020, China is the leader in textile and apparel exports with 141 billion EUR, while Turkey ranks fourth with 14 billion EUR (EURATEX, 2021). While Turkey's textile and apparel exports constituted 16% of the total country's exports with 28 billion USD in 2019, exports in the same group decreased by 1 billion USD in 2020 and constituted 18% of the total country's exports with 27 billion USD. There are a total of 17,560 companies that manufacture textile products in Turkey. Considering the role of the export of textile products in Turkey, it is understood that the sector occupies an important position. Considering that textile manufacturing is a labor-intensive field, it stands out that company managers should consider HRM capabilities. At the same time, the importance of the performances of suppliers and supply chains emerges for the successful realization of the raw material supply required for the realization of textile manufacturing. At this point, the textile products manufacturing sector constitutes the sample area of our research. Within the scope of the research, it is aimed to determine the SC performances, HRM capabilities and the opinions of the companies' PI performance of CEO, SC executives and HR executives serving the textile industry. In this context, a questionnaire was applied to the manufacturing companies of textile products operating in Turkey. With the simple random sampling method, a total of 517 companies were contacted and asked to participate in the survey application. A survey was conducted to obtain data from the CEO, SC executives and HR executives of these companies. The surveys were collected between March 2021 and July 2021. As a result of the questionnaire application a total of 403 questionnaires were collected. When the collected data were examined, it was determined that in 18 cases data were evaluated by the participants as "based on subjective estimates" (Armstrong & Overton, 1977), one of the non-response estimation methods. The research was conducted with the remaining 385 questionnaires. The characteristics and frequency analysis of the respondents are presented in Table 1.

Table 1

Frequency of the sample

Gender	Number	%	Marital Status	Number	%
Woman	121	31.4	Married	244	63.3
Man	264	68.6	Single	141	36.7
Total	385	100.0	Total	385	100.0
Tenure	Number	%	Department	Number	%
0–5	23	5.9	CEO	75	19.4
5–10	104	27.0	SC executives	132	34.2
10–20	145	37.6	HR executives	178	46.4
20 +	113	29.5			
Total	385	100.0	Total	385	100.0

Source: own study.

Findings

Reliability and validity of the scales

Primarily, it was determined whether the data set had a normal distribution to reveal the sampling area of the collected data. Kolmogorov–Smirnov normality test was applied via the SPSS package program to determine whether the data set has a normal distribution. The results obtained are presented in Table 2. When Table 2 is examined, it is seen that the Asymp. Sig. (2-tailed) values are less than 0.05. This explains that the data set does not show a normal distribution. However, although the data set does not show a normal distribution, this situation doesn't affect the research negatively since structural equation modeling is applied in this research. In structural equation model applications, there is no requirement for the data set to show a normal distribution (Hayes, 2017).

Kaiser–Meyer–Olkin (KMO) and Bartlett tests were conducted to determine the validity of analyses of HRM capabilities, PI and SC

performance scales. The SPSS package program was used in the implementation of the tests. KMO and Bartlett test results are shown in Table 3. B. Tabachnick and L. Fidell (2013) explain that for scale validity values to be at an acceptable level, the KMO test result should be greater than 0.60 and the p -value of the Bartlett test should be less than 0.01. When Table 3 is examined, it is seen that the KMO and Bartlett test values are at an acceptable level. According to these values, it can be said that all scales used in the research were valid.

Since HRM capabilities, PI and SCP scale applications are made in the Republic of Turkey, primarily the items of the scales were translated into Turkish and applied. For this reason, exploratory factor analyses of the scales were needed. At this point, EFA analysis was performed with the data set obtained through the SPSS package program. EFA analysis results are given in Table 4. Ş. Büyüköztürk *et al.* (2017) explained that factor loads of scale expressions should be greater than 0.32 in social science. As seen in Table 4, the factor loads of the items belonging to all scales are higher than 0.32. In addition, it is seen that the eigenvalues and total variance percentage values of

Table 2

Kolmogorov–Smirnov normality test results

Scales	<i>N</i>	Mean	SD	Kolmogorov–Smirnov <i>Z</i>	Asymp. Sig. (2-tailed)
HRM Capabilities	385	4.15	0.54	1.416	0.019
Process Innovation	385	4.18	0.61	3.562	0.002
Supply Chain Performance	385	4.16	0.40	2.817	0.000

Source: own study.

Table 3

Kaiser–Meyer–Olkin (KMO) and Bartlett tests results of the scales

Test		HRM Capabilities	Process Innovation	Supply Chain Performance
Kaiser–Meyer–Olkin measure of sampling adequacy		0.923	0.916	0.896
Bartlett's test of sphericity	Approx. Chi-Square	3533.103	2403.302	1219.513
	df	66	28	21
	Sig.	0.000	0.000	0.000

Source: own study.

Table 4

EFA results of HRM capabilities, PI and SCP scales

Items	Factor Loads	AVE/ /CR	Eigenvalues/ /Total Variance Percentage	
ST2 "Training programs are mainly based on firm-specific knowledge."	0.869	0.60/ /0.94	2.832/ /23.59%	82.16%
ST1 "Employee training and development policies cover all the employees in the firm."	0.846			
ST3 "Employees receive training during their professional life."	0.826			
CS3 "Our firm incentives to its employees related to their hard work and dedication."	0.839		2.633/ /21.94%	
CS1 "Our firm has a mixed system of rewarding fix and variable."	0.762			
CS2 "Our firm incentives to its employees related to their performance."	0.719			
SH1 "The members of the department or team, which the new worker will be part, participate in the selection of candidates."	0.801		2.534/ /21.12%	
SH3 "In the selective process, the capacity to work in synergy and continuous learning are considered."	0.772			
SH2 "In the selective process, knowledge and experience are considered."	0.768			
PD1 "Employees" participation in the decision-making process."	0.864		1.861/ /15.510%	
PD2 "Inform to the employees about economic and strategic information."	0.667			
PD3 "Level of personnel empowerment in the firm."	0.468			
PI3 "Our company uses Cross Docking Logistics."	0.887	0.69/ /0.95	5.518/ /68.97%	
PI1 "Our company has Automatic Replenishment."	0.875			
PI2 "Our company has Collaborative Planning, Forecasting, and Replenishment."	0.870			
PI4 "Our company has Efficient Consumer Response."	0.842			
PI5 "Our company applies imported Enterprise Resource Planning."	0.841			
PI6 "Our company uses Just-in-Time Manufacturing."	0.822			
PI7 "Our company applies Quick Response."	0.800			
PI8 "Our company uses Vendor Managed Inventory (VMI) to manage inventory."	0.691			
SCP6 "Our supply chain has an outstanding on-time delivery record."	0.798	0.59/ /0.91	4.118/ /58.83%	
SCP4 "We are satisfied with the speediness of the supply chain process."	0.798			
SCP2 "Our supply chain allows us to quickly introduce new products into our markets."	0.795			
SCP3 "The length of the supply chain process is getting shorter."	0.777			
SCP1 "Our supply chain has the ability to quickly modify products to meet customers' requirements."	0.764			
SCP5 "Based on our knowledge of the supply chain process, we think that it is efficient."	0.733			
SCP7 "Our supply chain provides high-level customer services."	0.698			

Note(s): selective hiring (SH), strategic training (ST), participation of the employees in the decision making (PD), compensation system (CS), process innovation (PI) and supply chain performance (SCP).

Source: own study.

Table 5
CFA results of HRM capabilities, PI, and SCP scales

Parameter Estimates	Estimate	S.E.	Fit Values	Cronbach's Alpha (α)
Measuring Model				
SH \leftarrow HRM	0.846*	0.029	$X^2 [155.6, N = 385] = 49$, CMIN/df (3.176)****, CFI (0.970)***, RFI (0.941)***, IFI (0.970)***, TLI (0.959), NFI (0.957)***, RMSA (0.075)****	0.934
ST \leftarrow HRM	0.609*	0.030		
PD \leftarrow HRM	0.967*	0.028		
CS \leftarrow HRM	0.965*	0.031		
SH1 \leftarrow SH	0.830*	0.048		
SH2 \leftarrow SH	0.879*	0.040		
SH3 \leftarrow SH	0.898*	0.000		
ST1 \leftarrow ST	0.888*	0.075		
ST2 \leftarrow ST	0.918*	0.076		
ST3 \leftarrow ST	0.758*	0.000		
PD1 \leftarrow PD	0.685*	0.054		
PD2 \leftarrow PD	0.804*	0.049		
PD3 \leftarrow PD	0.898*	0.000		
CS1 \leftarrow CS	0.804*	0.055		
CS2 \leftarrow CS	0.865*	0.050		
CS3 \leftarrow CS	0.819*	0.000		
PI1 \leftarrow PI	0.864*	0.000	$X^2 [54, N = 385] = 17$, CMIN/df (3.174)****, CFI (0.985)***, RFI (0.963)***, IFI (0.985)***, TLI (0.975), NFI (0.978)***, RMSA (0.075)****	0.935
PI2 \leftarrow PI	0.843*	0.039		
PI3 \leftarrow PI	0.896*	0.047		
PI4 \leftarrow PI	0.808*	0.053		
PI5 \leftarrow PI	0.786*	0.060		
PI6 \leftarrow PI	0.768*	0.049		
PI7 \leftarrow PI	0.732*	0.053		
PI8 \leftarrow PI	0.639*	0.060		
SCP1 \leftarrow SCP	0.711*	0.000	$X^2 [66.2, N = 385] = 14$, CMIN/df (2.280)***, CFI (0.987)***, RFI (0.961)***, IFI (0.987)***, TLI (0.978), NFI (0.978)***, RMSA (0.058)****	0.883
SCP2 \leftarrow SCP	0.775*	0.077		
SCP3 \leftarrow SCP	0.663*	0.099		
SCP4 \leftarrow SCP	0.748*	0.090		
SCP5 \leftarrow SCP	0.687*	0.091		
SCP6 \leftarrow SCP	0.786*	0.077		
SCP7 \leftarrow SCP	0.597*	0.078		

Note(s): * $p < 0.01$, ** CMIN/df < 3 (good fit), *** CFI, NFI, RFI, IFI, TLI > 0.90 (acceptable fit), **** $0.05 < \text{RMSA} < 0.08$ (acceptable fit), ***** $3 < \text{CMIN/df} < 5$ (acceptable fit).

Source: own study.

the scales are at an acceptable level. In addition, the average variance extracted (AVE) and construct validity (CR) test scores of the scales are shown in Table 4.

It has proven that the scales used in the research with EFA are valid in the field of application to Turkey. It was tested whether factor loads were below the expected level with the confirmative factor analysis (CFA) and whether they were compatible with the EFA results. CFA analysis was performed with the AMOS program. Factor loads and model fit values of the scales were determined. The obtained scores are shown in Table 5. In terms of factor loads, it was determined that the lowest factor load "participation of the employees in the decision making" dimension belonged to the first expression (estimate: 0.685, $p < 0.01$). In addition,

it was determined that all expressions were at the 1% significance level and their factor loads were at an acceptable level (Tabachnick Fidell *et al.*, 2013). All the fit values of the scales are at an acceptable level. These results explain that the scales used in the research have a valid level. Table 5 shows the reliability levels (Cronbach's Alpha) of the scales. Cronbach's Alpha values of HRM practices, PI and SC performance scales are 0.920, 0.925 and 0.891, respectively.

Test of the hypothesis

Two hypotheses based on three different variables were formed in the study. Since the first hypothesis examines the relationship between the

Table 6
Correlation relations of variables

Variables	HRM Capabilities	Process Innovation	Supply Chain Performance
HRM Capabilities	1		
Process Innovation	0.912*	1	
Supply Chain Performance	0.472*	0.386*	1

Note(s): * $p < 0.01$.

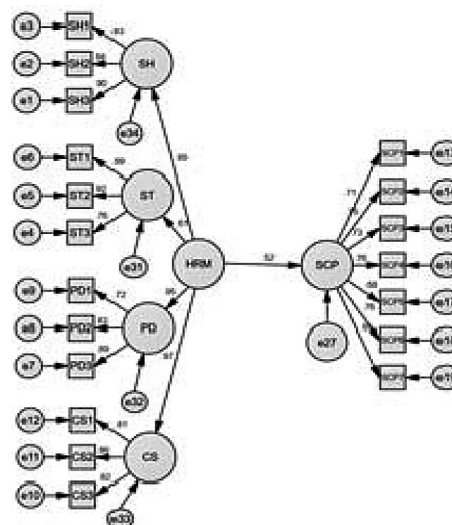
Source: own study.

two variables, a simple regression analysis was performed. Hierarchical regression analysis was performed to determine the second hypothesis three variable relationship and mediating effect. Before performing the regression analysis, correlation analysis was performed to determine whether the relationship between the variables was significant and to what extent. In Table 6, correlation relations between variables are expressed. The highest correlation between the variables was found as high correlation levels (Evans, 1996) between HRM capabilities and PI ($r(385) = 0.912, p < 0.01$). In addition, all correlation relationships were significant at the 1% significance level. The fact that the relations between the variables were at a significant level indicated that meaningful results would be obtained in the hypothesis tests.

The model structure built for our first hypothesis is shown in Figure 2. According to the model, HRM capabilities are the independent variable and SC performance is the dependent variable. According to the relationship between variables, HRM capabilities affect SC performance positively and significantly ($\beta = 0.52, p < 0.01$). The effect level is also medium. The fit values of the model are shown in Table 7. All fit values scores are acceptable. These results explain that the model structure presented in Figure 2 is at an acceptable level. Our first hypothesis aims to determine whether HRM capabilities have a significant impact on SC performance. It is supported that HRM capabilities have a significant effect on SC performance. Therefore, the first hypothesis of the study (H1) is supported.

The model structure built for second hypothesis is shown in Figure 3. According to the model, HRM capabilities is the independent variable, SC performance is the dependent variable, and PI is the mediating variable. To test whether there is a mediating effect in models with mediating variables, 4 basic conditions must be met (Baron & Kenny, 1986). In the first of these conditions, the effect of the independent variable on the

Figure 2
Path analysis model of HRM capabilities and SC performance



Source: own study.

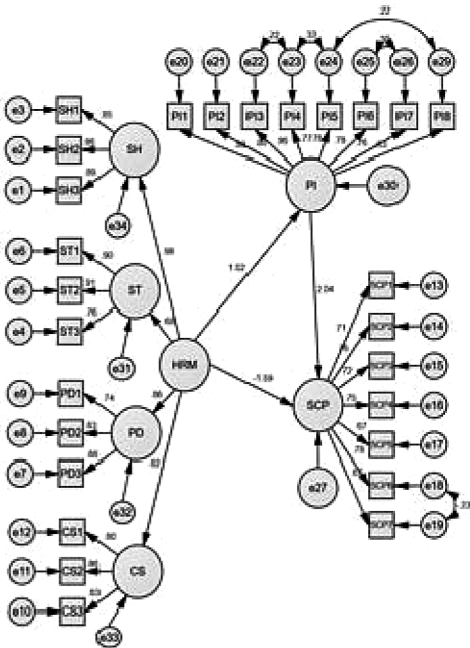
dependent variable should be significant. This condition is proved in the first hypothesis of our research. The second condition is that there is a significant relationship between the independent variable of the mediating model and the mediating variable. The third condition is that there is a significant relationship between the mediating variable of the mediating model and the dependent variable. The fourth condition is that the relationship between the independent variable and the dependent variable in the mediating model is meaningless or should decrease to the level of the relationship. If the relationship between the independent variable and the dependent variable becomes insignificant, the mediating variable is considered to have a full mediating effect. If the level of relationship between the independent variable and the dependent variable is weak, the mediator variable is considered to have a partial mediation effect.

Table 7
Results of the path analysis model of HRM capabilities and SC performance

Parameter	Estimate	S.E.	Fit Values
Structural Model SCP ← HRM	0.52*	0.21*	$X^2 [397.5, N = 385] = 147$, CMIN/df (2.704)**, CFI (0.949)***, RFI (0.909)***, IFI (0.949)***, TLI (0.940) *** NFI (0.921)***, RMSA (0.067)****

Note(s): * $p < 0.01$, ** CMIN/df < 3 (good fit), *** CFI, NFI, RFI, IFI, TLI > 0.90 (acceptable fit), ****0.05 <RMSA < 0.08 (acceptable fit).
Source: own study.

Figure 3
Path analysis model of HRM capabilities, PI, and SC performance



Source: own study.

In the mediating model (Figure 3), the relationship between the independent variable (HRM practices) and the mediating variable (PI) is significant ($\beta = 1.02, p < 0.01$). The relationship between the mediating variable (PI) and the dependent variable (SC performance) is significant ($\beta = 2.04, p < 0.01$). The relationship between the independent variable (HRM practices) and the dependent variable (SC performance) is not significant ($\beta = -1.59, p > 0.01$). According to the mediating model results, it is determined that all of the mediating model conditions are met. In addition, the fact that the relationship between the independent variable (HRM practices) and the dependent variable (SC performance) has become meaningless, proving that the mediating variable (PI) has a full mediation effect. The fit values scores of the intermediary model are shown in Table 8. The intermediary model's fit values scores are at the acceptable fit level. This proves that our intermediary model is at an acceptable level. As a result of the findings obtained, the second hypothesis of our research (H2) is supported.

Table 8
Results of the path analysis model of HRM capabilities, PI, and SC performance

Parameter	Estimate	S.E.	Fit Values
Structural Model PI ← HRM	1.02*	0.027	$X^2 [1056.5, N = 385] = 312$, CMIN/df (3.386)***, CFI (0.913)****, RFI (0.866)****, IFI (0.913)****, TLI (0.902) **** NFI (0.881)****, RMSA (0.079)*****
SCP ← PI	2.04*	0.375	
SCP ← HRM	-1.59**	0.226	

Note(s): * $p < 0.01$, ** $p > 0.01$, *** $3 < \text{CMIN/df} < 5$ (acceptable fit), **** CFI, NFI, RFI, IFI, TLI > 0.85 (acceptable fit), *****0.05 <RMSA < 0.08 (acceptable fit)
Source: own study.

Conclusion and discussion

PI aims to make the operations in the main fields of activity of the enterprises more effective and efficient. In addition, the simplification of processes with a lean perspective is also in the field of PI. Since textile and apparel companies are labour-intensive, they tend to use human-oriented processes. The successful execution of company activities can be achieved with an effective HRM. Textile companies are in the status of enterprises that provide production services. The supply processes of raw materials and semi-finished products needed in product transformation processes directly affect the textile company's success. At the same time, the success of textile companies is dependent on the success of the SC they are in. For this reason, SC performance also plays a vital role in production processes. At this point, the relationship between HRM capabilities and SC performance formed our first research question. The first hypothesis of the study is to test whether this relationship exists or not. The first hypothesis is supported as a result of the research conducted on HR manager, SC manager and CEO of textile and apparel companies operating in Turkey. This situation explains that the HRM capabilities of textile and apparel companies in Turkey significantly affect SC performance. This finding also explains the conclusion that textile and apparel companies should turn to HR to increase their SC performance.

This research conducted at the managerial level shows that managers are convinced that they should focus on HR and the capabilities of these resources. Especially in today's world, where the SC is gaining importance, the prominence of the talents of the supply employees involved in this process to increase the performance has been important information for the company's senior managers. In the SC in which textile and apparel manufacturers are involved, fabric, yarn, etc., suppliers are located. At the same time, some customers sell clothing products etc. So textile and apparel manufacturers are the connection point in the SC. In order for the entire SC to perform successfully, the capabilities of the personnel who affect the supply process must be developed. In this context, personnel who know the importance of procurement activities in recruitment processes and can carry out the continuity of procurement

activities should be recruited. The roles and duties of the hired personnel in the SC should be transferred to the personnel through strategic training processes. The participation of qualified and trained personnel in decision-making processes should be ensured. Successful remuneration policies should create suitable conditions for the continuous employment of qualified and trained personnel within the company.

The second research question of the research is to determine whether PI has a mediating role in the relationship between HRM capabilities and SC performance. With the second hypothesis, this relationship is tested, and it is concluded that the PI variable has a full mediating role in the relationship between HRM capabilities and SC performance. PI is a type of innovation that deals with technological developments and innovative attitudes, changing the operating units and making them more effective (Bigoness & Perreault, 1981; Ettlie & Reza, 1992). Successful operating units increase the efficiency of the business and enable the company to perform its role in the SC more successfully. This contributes to increasing the performance of the SC. The HR capabilities of the operation units are the human capital required for the realization of PI. Employees who do not resist change and adopt technological developments quickly support making the operation units more effective.

Considering the fully mediated role of PI in the textile industry in Turkey, the following conclusions are reached: (i) Care should be taken to select personnel who are aware of the importance of SC activities and who can contribute to PI while recruiting personnel to work units. (ii) Training methodologies that contribute to SC performance, consider the importance and necessity of PI, and aim to develop human capabilities should be adopted in in-firm strategic training processes. (iii) In order to increase the efficiency of the work units, it should be ensured that the opinions of the personnel are taken in the managerial decision-making processes, that the personnel adopt the decision, and that the personnel believe in the decisions taken. (iv) The necessary value should be given to the HR and talents in the work units that directly contribute to the SC performance by the managers and company owners, and remuneration policies that support this value should be implemented.

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Dr Karahan Kara

Assistant professor at the Department of Management and Organization, Logistics Program, Artvin Coruh University in Turkey. His research interests include supply chain management, logistics management and innovation management.

Dr Karahan Kara

Ukończył studia doktoranckie z zarządzania biznesem na Uniwersytecie Çanakkale Onsekiz Mart w 2019 r. Obecnie pracuje w programie logistycznym na Uniwersytecie Artvin Çoruh jako adiunkt. Jego zainteresowania naukowe to zarządzanie łańcuchem dostaw, zarządzanie logistyką oraz zarządzanie innowacjami.

Dr Esra Gökçen Kaygısız

Assistant professor at the Department of Business, Turkey, Giresun University, Faculty of Economics and Administrative Sciences. Her research interests include knowledge and wisdom management, human resource management and reputation management.

Dr Esra Gökçen Kaygısız

Ukończyła studia doktoranckie na Uniwersytecie Selçuk. Od 2014 r. jest adiunktem na Uniwersytecie Giresun na Wydziale Nauk Ekonomicznych i Administracyjnych, w Katedrze Biznesu. Jej zainteresowania badawcze to zarządzanie wiedzą i mądrością, zarządzanie zasobami ludzkimi oraz zarządzanie reputacją.

Dr Zbigniew Bentyn

PhD, assistant professor at the Department of Logistics, Institute of International Business and Economics, Poznan University of Economics and Business (Poland). His research interests include international logistics, including the problems of globalization and their impact on the functioning of global logistics systems.

Dr Zbigniew Bentyn

Adiunkt w Katedrze Logistyki w Instytucie Gospodarki Międzynarodowej Uniwersytetu Ekonomicznego w Poznaniu. Uzyskał stopień doktora nauk ekonomicznych w Akademii Ekonomicznej w Poznaniu. Jego zainteresowania naukowe obejmują logistykę międzynarodową, w tym problemy globalizacji i ich wpływ na funkcjonowanie globalnych systemów logistycznych.

Dr Sercan Edinsel

PhD, he works as a senior human resources manager in the Turkish Armed Forces. His research interests include human resource management and strategic human resource management.

Dr Sercan Edinsel

Ukończył studia doktoranckie z zakresu zarządzania zasobami ludzkimi na Uniwersytecie Süleyman Demirel w 2018 r. Pracuje jako starszy kierownik ds. zasobów ludzkich w Turckich Siłach Zbrojnych. Jego zainteresowania naukowe to zarządzanie zasobami ludzkimi oraz strategiczne zarządzanie zasobami ludzkimi.