On the importance of service performance and customer satisfaction in third-party logistics selection

An application of Kano model

Sobhan Asian

La Trobe Business School, La Trobe University, Melbourne, Australia

Javad Khazaei Pool

*Department of Management, University of Isfahan,
Isfahan, Iran*

Ali Nazarpour

School of Business, Maynooth University, Maynooth, Ireland, and

Reihaneh Alsadat Tabaeeian

*Department of Management, University of Isfahan,
Isfahan, Iran*

Abstract

Purpose – Developing strategic relationships with third-party logistics (3PL) providers has long been one of the key challenges in automotive supply chains. The purpose of this paper is to propose a new approach for evaluation and indexing 3PL providers using the Kano model.

Design/methodology/approach – The statistical population used in this research comprises managers from the Iranian automotive industry. The Kano evaluation approach is used to analyze the data collected and to classify the criteria used in selection of the preferred 3PL providers.

Findings – The results suggest that the proposed framework, based on the Kano classification, can be a powerful tool for the automotive industry in evaluating 3PL providers. Moreover, the analyses indicate that 3PL providers need to improve their service offering in aspects that are to be found in the Kano model's requirements, namely, must-be, one-dimensional and attractive.

Originality/value – This study contributes to the supply chain management literature by being the first to classify selection indices of 3PL providers in the automotive industry using the Kano model.

Keywords Customer satisfaction, Supply chain management, Kano model, Service performance, Third-party logistics (3PL)

Paper type Research paper

1. Introduction

Trends toward integrated logistics and globalization have changed the global business model (Kumar, 2007). As a central element, logistics have a large impact on the efficiency and overall cost of a supply chain (Shen and Chou, 2010; Chiang *et al.*, 2011; Xu, 2011; Kumar *et al.*, 2011). Aiming to be more competitive and deliver a higher value to customers, it is inevitable for manufacturers to mainly focus on their core competencies and outsource services that can be provided more efficiently or cost-effectively (Hwang *et al.*, 2016; Rezaei Somarin *et al.*, 2018). In other words, given the ever-increasing competition, heightened customer expectations, and supply chain network complexity, logistics outsourcing plays a vital role in the global distribution of products and services (Akbari, 2018; Kumar, 2007). Companies to which logistics activities can be outsourced are referred to as third-party logistics (3PL) providers (Tezuka, 2011).

3PL is generally defined as the use of external companies to perform single or multiple logistics services that traditionally would have been managed by the manufacturing firms (Hwang *et al.*, 2016; Qureshi *et al.*, 2008). Manufacturers are becoming increasingly aware that, to gain a competitive advantage in the current economic conditions and retain a place in the globalizing market, they need to focus on their core activities and outsource their logistics (Asian and Nie, 2014; Perçin, 2009). 3PL providers, as a fast-growing business, can lead to several positive results, such as reduced costs, improved performance and increased flexibility through their lean operations, and delivering agile and accurate services (Kumar, 2008, Aguezzoul, 2014, Li *et al.*, 2017, 2018; Lu, Asian, Erteke and Sevinç, 2018). 3PL helps organizations focus on their core activities, create competitive advantages and supports other interdependent operations (Li *et al.*, 2012).

This research uses a Japanese quality engineering tool – the Kano model of customer value – from the supply chain management field to address improving business excellence in the 3PL arena. The Kano model is a theory developed by Kano (1984) that reflects the non-linear relationship between satisfaction and performance. In the Kano model, elements in the various quality categories – attractive, one-dimensional, must-be and indifferent – have different impacts on customer satisfaction (Yu and Ko, 2012). The Kano model can be used to assess various aspects such as product development, supplier selection, logistics service attributes and supplier performance evaluation (Ghorbani *et al.*, 2013; Shahin and Mohammadi Shahiverdi, 2015; Fırat *et al.*, 2017).

The focus of this study is the automotive industry. Wilman and Bax (2015) rated the Iranian automotive industry as first in the Middle-East region and eighteenth worldwide. Market growth rates in the Iranian automotive industry compare favorably with those in China, Taiwan, Romania and India, with annual production expected to grow from about 1.2m units in 2014 to approximately 1.7m in 2018 (Ghauri, 2015, p. 63). Iran's automotive industry, now more than 50 years old, has the potential to grow and enter the global market. Globalization, market pressures to reduce the high price of automobiles in Iran and the improvements in ways of providing services to customers are among the factors that have led local automotive companies to pay greater attention to 3PL services. In Iran, manufacturers are facing the challenge of selecting 3PL providers, and how to identify variables that would be particularly useful in assessing and selecting appropriate 3PL providers.

Recent studies regarding evaluation criteria for 3PL providers in the automotive industry are heavily focused on developed countries (Thamsatitdej *et al.*, 2016; Wen *et al.*, 2013) and there has been little research in developing countries (Guarnieri *et al.*, 2015). While Middle-East countries, particularly Iran, play an important role in the global automotive industry, there is little or no study that tests the importance of service performance and customer satisfaction (related to 3PL selection) in this important market. Furthermore, while the research on 3PL adopts several perspectives, including value-creation models, fuzzy analytical hierarchy process (fuzzy AHP), fuzzy-based appraisement module and structural equation modeling (Datta *et al.*, 2013; Sahu *et al.*, 2015; Kumar and Singh, 2012; Sharif *et al.*, 2012; Yeung *et al.*, 2012), none of the 3PL-related research in developing countries has investigated the validity of the Kano model in the automotive industry. In other words, despite the potential benefits of the Kano model in supply chain and logistics services (Sohn *et al.*, 2017), this model has not been used to classify the criteria for selecting 3PL providers.

To address the above-mentioned research gaps, this study aims to identify the key factors that determine the selection of 3PL providers in the automobile industry.

To fulfill the research aim, the study introduces the variables that affect the selection of 3PL providers, classifies them based on the Kano Model by consulting experts from the automotive industry and, subsequently, identifies those variables that can particularly assist automotive industry manufacturers in selecting appropriate suppliers that can meet their needs.

2. Literature review

2.1 Third-party logistics

A supply chain can be described as a chain that aims to establish effective communication between customers and suppliers through effectively managing the flows of materials, information and money (Agrawal *et al.*, 2006; Faghih-Roohi *et al.*, 2016; Lu, Ding, Asian and Paul, 2018). Hugos (2002) defines supply chain management as coordinating, in terms of management, inventory, location and transportation, the participants in a supply chain to achieve the best combination of responsiveness and efficiency in order to achieve success in the market.

The main role of logistics is to strategically manage the flow of goods in all the companies within a supply chain (Paul *et al.*, 2017; Tezuka, 2011). When logistics services are outsourced, the service provider becomes a major player in the supply chain process and brings the final products and services to the customers. It should thus integrate the shared values and strategic goals of the companies involved for their mutual benefit (Wallenburg *et al.*, 2011). In other words, this practice provides opportunities for the industry to improve efficiency of their processes (MacKerron *et al.*, 2015). Therefore, it is logical to assume that service outsourcing appears to gain popularity among different industries because of its critical role in supply chains (Cai *et al.*, 2013; Liu *et al.*, 2018).

Given its growing importance, logistics outsourcing has received considerable attention from both researchers and practitioners (Wu *et al.*, 2013; Raut *et al.*, 2018). For instance, Selviaridis (2016) investigates logistics outsourcing in terms of service exchanges through a case study and revealed the important role of contracts in service exchange governance. Ameknassi *et al.* (2016) developed a programming model that combines logistics outsourcing decisions with certain strategic supply chain planning issues, such as the security of supplies, customer segmentation and extended producer responsibility. Yang and Zhao (2016) studied how integration, an emerging and innovative approach to inter-firm relationship management between the vendor and the client, in logistics outsourcing relationships is influenced by uncertainties in the environment.

3PL, a relevant aspect of logistics outsourcing, includes a variety of related services, such as transportation, warehousing, cargo distribution and freight consolidation (Patterson *et al.*, 2010). 3PL services often involve sea and air transport companies, and railway companies with specialized railway wagons that can provide the required services (Xu *et al.*, 2015). Waters (2003) argued that 3PL providers have a good opportunity to provide consultancy services regarding logistics knowledge and other services. A company through 3PL providers can use external companies to manage all or some of the logistical operations that used to be carried out by the company itself (Perçin, 2009). Among the characteristics of 3PL providers are that they are contract-based, can offer advice concerning services and can provide integrated services (Tezuka, 2011). What is clear from market trends and research is that 3PL companies are steadily increasing the scope of their activities and taking on additional roles in a range of supply chains (Huo *et al.*, 2016; Shi *et al.*, 2016; Zhang *et al.*, 2015).

2.2 Criteria for selecting 3PL providers

Several studies have considered evaluating and selecting 3PL providers, and many researchers have introduced various criteria and sub-criteria in different areas. Gol and Çatay (2007) use the AHP technique as a way to select logistics providers in the automotive industry. Here they introduced criteria for the evaluation and selection of logistics services including general aspects a company should consider such as price, location, property and financial issues, as well as other variables such as skills and capabilities in areas such as customer services, accountability and information technology systems.

Qureshi *et al.* (2008) identified service quality, fixed asset quality, management quality, information technology capabilities, distribution performance, financial stability, history,

cost, flexibility in operation and distribution, information sharing, and trust as variables that influence the selection of 3PL providers. Liu and Wang (2009), using the Delphi method in a fuzzy environment, considered 26 criteria for logistics provider selection. These criteria included price, financial considerations, experience in the same industry, customer service, equipment, continuous improvement, reputation, cultural fit and market share. Soh (2010) similarly used financial criteria, service levels, relationships, management and infrastructure factors to evaluate logistics service providers. Meixell and Norbis (2011) used a multi-objective optimization model with the aim of enhancing 3PL selection by integrating transportation selection with supplier selection. Kannan *et al.* (2011) classified those criteria that they found relevant in selecting transportation companies by placing them in various categories: timing (commitment to the program, proper planning, transportation time); infrastructure (special equipment, coverage and geographical access); reputation (financial stability, quality, certification and qualifications of staff); operations (security, distribution management and customs clearance); customer services (hospitality, courtesy and responsiveness); price (flexibility in pricing, previous payable tolls and credit facilities); and others (business news, documentation and online reservations). Ho *et al.* (2012) proposed five criteria for 3PL selection in China: risk, flexibility, quality, delivery and costs, and classified them using fuzzy AHP and quality function deployment. Yayla *et al.* (2015) proposed effective methodology to select 3PL transportation providers based on criteria, such as optimization capabilities, delivery and transportation costs.

Previous studies call for further research on the impact of contingency factors and the need to test theories and previous findings (Hallavo *et al.*, 2016; Salimian *et al.*, 2017; Taylor and Taylor, 2014). Kembro *et al.* (2014) suggested future scholars should adopt the contingency theory in the supply chain context that would present more empirical findings regarding contingency variables. Based on the contingency theory, to make a rational decision about their logistics strategies, companies need to consider a range of relevant criteria, the situation and the context through a comprehensive analysis (Hansen *et al.*, 2018). In line with this theoretical perspective and the need for empirical validation, this research investigates the relevant requirements that originated from Kano model for 3PL providers selection.

2.3 Overview of the Kano model

The existing 3PL literature appears to be less connected with the role of customer satisfaction and product/service performance, and has mainly focused on operations research techniques and linear impacts (Sahu *et al.*, 2015). Kano model, on the other hand, is the approach that consists of key non-linear requirements that are related to a range of service attributes (Wu *et al.*, 2018). Kano (1984) introduced a customer satisfaction model that can differentiate between three types of needs that a product can satisfy and influence customer satisfaction in different ways. In other words, the Kano model categorizes the qualitative characteristics of a product or service into three main categories of requirements: the must-be, one-dimensional and attractive (Ghorbani *et al.*, 2013).

The first category, the must-be requirements, are associated with features that must be present in the product and will prevent dissatisfaction (Nilsson-Witell and Fundin, 2005): that is, their absence would lead to customer dissatisfaction (Ghorbani *et al.*, 2013). In other words, fully satisfying the must-be requirements is regarded as the cost of entry to the market and will help managers achieve victory over their competitors or control them (Yu and Ko, 2012).

The second category, one-dimensional requirements, are usually explicitly requested by customers, and their full and proper fulfillment will lead to customer satisfaction, with customer satisfaction being a linear function of how these requirements are fulfilled (Tan and Pawitra, 2001). Satisfying one-dimensional requirements will contribute to the

survival of the providing company in the market, and not meeting them will result in customer dissatisfaction. The importance of these functional requirements is that their identification and incorporation in the product or service can be seen as the minimum effort required to safeguard the supplying organization's position in the competitive environment.

The third category, attractive requirements, contains requirements that are not considered by customers during their use of the products or services. As such, failing to fulfill them will not lead to customer dissatisfaction. However, their presence will boost the level of customer satisfaction and excitement because customers will have received some features that they had not expected. Although such requirements are not usually specified by customers, their provision will enable an organization to replace competitors' similar products or services and to achieve a very good position in the market if they are identified and included when designing a service or product. Fulfilling this type of requirement will help the company become a market leader (Yu and Ko, 2012).

The Kano model has been applied in various situations and is not limited to customer satisfaction evaluations. Implementing this model has been shown to offer various benefits in that it can result in the creation of new services (Yu and Ko, 2012; Nilsson-Witell and Fundin, 2005), enhance service quality in the tourism industry (Lin, Yeh and Wang, 2015), ease managers' decision making, identify priorities for the product and service development, respect the views of customers and create loyalty, and enable optimal planning for the development of a product's or a service's qualitative characteristics. In this study, the Kano model has been used to classify the 3PL selection criteria identified earlier.

3. Methodology
3.1 Research process
The research process is illustrated in Figure 1.

As shown in the figure, criteria were first identified and then a range of questions designed, based on the Kano model, to assess their usage. Following this, the 3PL selection criteria were classified based on frequency rates.

3.2 Kano method
In the Kano method (see Figure 2), responses are classified into four categories. In the method, (M) represents the must-be requirements, (O) represents the one-dimensional characteristics and (A) refers to attractive specifications. The fourth category (I) "indifferent" is used when the customer feels indifferent about the presence of a feature of a product.
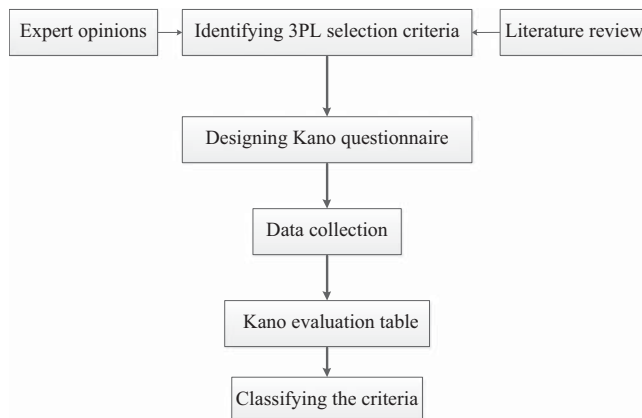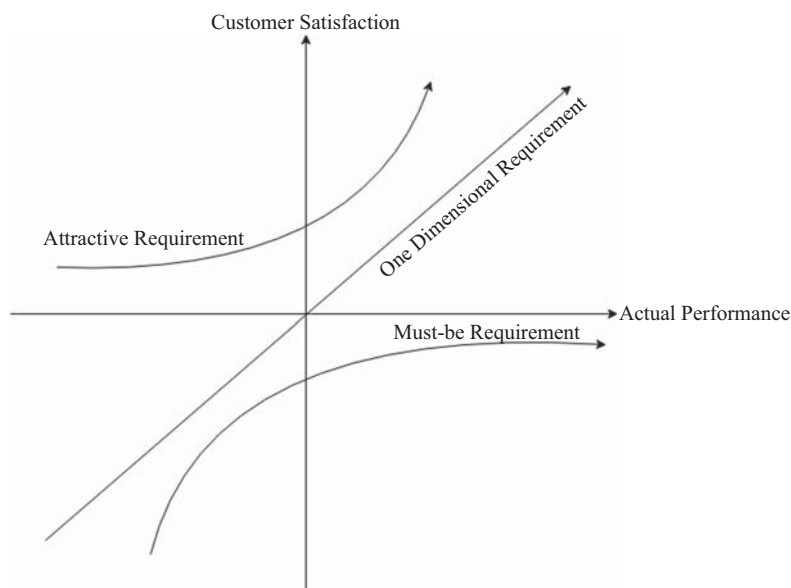

Figure 1.
Research framework

Source: Adopted from Li *et al.* (2009)

Figure 2.
Kano model

Responses to the Kano questionnaire are analyzed in terms of the highest frequencies related to the four categories (M, O, A and I) in the importance determination questionnaire.

3.3 Sample
The statistical population for this research includes general managers plus several managers representing the marketing, financial, production, human resources and information technology functions within the automotive industry in Tehran, Alborz and Markazi provinces where major automotive automotive related industries are located. In total, 120 questionnaires were distributed, of which 86 completed questionnaires were returned and used in the data analysis. The overall response rate was therefore 71 percent.

4. Results
The various studies published in this field show that 3PL selection is a complex and sophisticated process during which variables, based on which the decision will be made, must be selected, and that this choice will depend on the industry involved. In the first step, based on the views of experts plus findings from previous studies (Senthil *et al.*, 2014; Li *et al.*, 2012; Gol and Çatay, 2007; Perçin, 2009; Kannan, 2009), we produced a list of 24 possible criteria for 3PL selection in the automotive industry (see Table I).

Second, we classified these 3PL selection criteria based on an analysis using a questionnaire, addressing the Kano scale, distributed among the research sample. The data collected from the questionnaires distributed among the managers were analyzed in terms of the frequency and each feature was identified by the respondents. In classifying the 3PL selection features, the criterion with the highest frequency among the four categories was viewed as an indicator. The results of this analysis can be seen in Table II.

Based on the findings from the survey shown in Table II, seven features have been classified as must-be, nine as one-dimensional and eight as attractive as shown in Figure 3.

No.	3PL selection criteria	References
1	Price	Gol and Çatay (2007)
2	Financial considerations	
3	Experience in the same industry	
4	Location	
5	Asset ownership	
6	International scope	
7	Annual efficiency	
8	Optimization capabilities	
9	Customer service	
10	3PL's supply chain vision	
11	Creative management	
12	Continuous improvement	
13	Availability of top management	
14	Cultural fit	
15	General reputation	
16	Labor relations	
17	Human resource policies	
18	Technological innovation	Li *et al.* (2012)
19	Service quality	
20	Communication systems	Senthil *et al.* (2014)
21	Flexibility	
22	Market knowledge	Perçin (2009)
23	Inventory management	Kannan (2009)
24	Shipment and tracking	

Table I.
Evaluation criteria
for 3PL selection

| No. | Attribute | Kano's categories distribution | | | | Category allocation |
		M	O	A	I	
1	Price	*58*	22	6	0	M
2	Financial considerations	*44*	30	12	0	M
3	Experience in the same industry	26	*41*	19	0	O
4	Location	21	29	*35*	1	A
5	Asset ownership	*45*	39	2	0	M
6	International scope	13	28	*39*	6	A
7	Annual efficiency	34	*41*	11	0	O
8	Optimization capabilities	*49*	35	2	0	M
9	Customer service	32	*41*	12	1	O
10	3PL's supply chain vision	15	21	*42*	8	A
11	Creative management	35	*40*	8	3	O
12	Continuous improvement	*45*	31	10	0	M
13	Availability of top management	28	*42*	14	2	O
14	Cultural fit	14	25	*39*	8	A
15	General reputation	11	21	*41*	13	A
16	Labor relations	9	19	*31*	27	A
17	Human resource policies	17	22	*33*	14	A
18	Technological innovation	*36*	31	19	0	M
19	Service quality	27	*37*	21	1	O
20	Communication systems	19	31	*33*	3	A
21	Flexibility	26	*40*	16	4	O
22	Market knowledge	31	*36*	13	6	O
23	Inventory management	*47*	31	8	0	M
24	Shipment and tracking	25	*42*	12	7	O

Notes: M, Must-be; O, One-dimensional; A, Attractive; I, Indifferent

Table II.
Kano's category for
each attribute
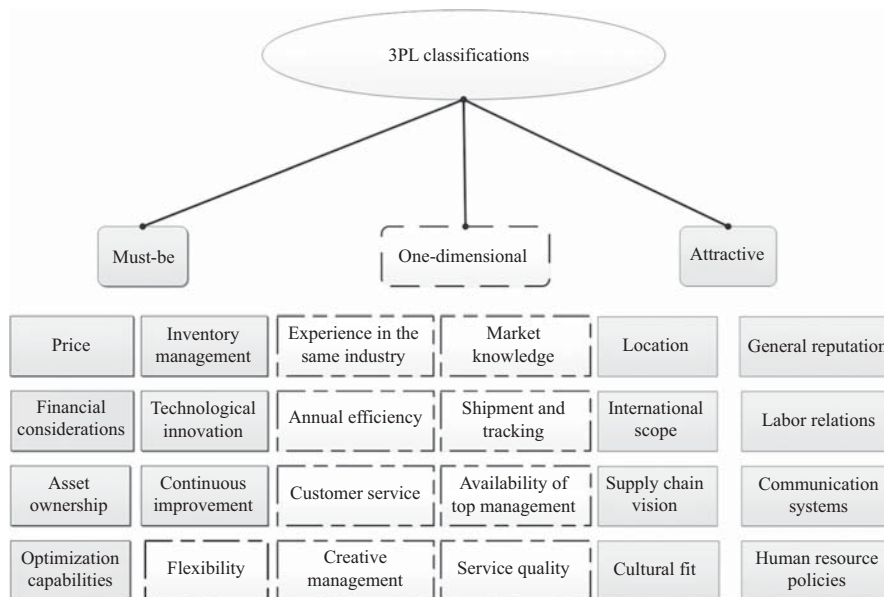
Figure 3.
Kano results

5. Discussion

The classification of those factors that the experts consider to influence the selection of 3PL companies in the automotive industry shows that they identify factors related to price, financial considerations, asset ownership, optimization capabilities, continuous improvement, technological innovation, investment management and inventory management as core (must-be) features. Of these factors, price (identified by 58 of the 86 respondents), optimization capabilities (49) and inventory management (47) were most frequently identified as important. In other words, these factors are generally seen as critical and needing to be evaluated when selecting 3PL companies. That is, 3PL providers will struggle to find clients if they do not perform well on these criteria.

In addition, as Table II shows, factors such as experience in the same industry, annual performance, customer service, creative management, availability of top management, service quality, flexibility, market knowledge plus shipment and tracking are frequently categorized as one-dimensional features, i.e., aspects that many clients expect or seek. Of these factors, the availability of top management plus shipment and tracking were most highly ranked, both with a response frequency of 42, with annual efficiency, experience in the same industry and service quality just behind with response frequencies of 41.

The experts categorized location, territory, international scope, the 3PL's supply chain vision, cultural fit, general reputation, labor relations, human resources policies and communication systems as attractive factors, meaning that they believe an improvement in these factors would boost the probability of a 3PL providers being selected and increase current customer satisfaction and their absence would lead to customer dissatisfaction. Among these factors, supply chain vision of the 3PL (42), general reputation (41) and cultural fit and international scope (39 each) were the most commonly identified.

The results also reveal that, in general, the factors classified as must-be requirements were more frequently identified than those in the other two categories (i.e. one-dimensional and attractive).

As such, our findings are broadly in line with those of other studies conducted in this field (Falsini *et al.*, 2012; Perçin and Min, 2013; Senthil *et al.*, 2014; Wei *et al.*, 2018) that mostly used a fuzzy approach to classify factors influencing 3PL selection. For example, our research showed that price has the greatest impact on the selection of 3PL companies, a result that is consistent with other studies such as that by Gol and Çatay (2007). Kumar (2008) similarly found that price has the highest priority in 3PL selection in many regions including Asia, North America and Latin America. Aguezzoul (2014) conducted a review of earlier studies and found that cost, relationship, quality, flexibility and services professionalism are the factors that are extensively studied, and identified them as "important" 3PL selection criteria.

5.1 Theoretical contributions
Despite the importance of adopting multidimensional tools, such as Kano model, for evaluating logistic management, prior studies provide limited theoretical implication into 3PL providers selection. In this study, we responded to the recent calls for further research on the contingency theory and the need to provide additional insights to the existing theories and previous findings.

The study extends scarce research on theories related to Kano model in supply chains and logistics by focusing on a comprehensive set of factors in relation to 3PL providers selection. Most prior studies have either considered a very limited number of factors for 3PL selection or solely investigated the consequent impacts of 3PL selection. Following a different approach, we comprehensively considered and classified a wide range of factors, and identified the ones with relatively high importance in selection of 3PL providers.

Given the limited number of studies in the region where the present study was conducted, our research provides a coherent framework for 3PL companies to better understand the needs of their customers in terms of their supply chain management. Our results help 3PL companies to effectively integrate the service aspects that are identified as important in their activities, and to focus on lowering their service price, which is another key determinant in companies' 3PL selection.

5.2 Managerial implications
Many managers in the automotive industry already accept that using 3PL providers enable them to focus on their key activities and increase their competitive advantage. However, choice of the right service providers has become one of the automotive manufacturers' key challenges. To choose appropriately, manufacturers must be able to first identify their needs accurately and outsource their activities based on these needs.

Although the presence of criteria identified in the category of must-be requirements will not create satisfaction in decision makers, their absence will create inefficiencies in the automotive industry. Here, selection criteria for 3PL providers such as "price," "optimization capabilities" and "asset management," which were identified as key attributes of this dimension, are must-be indices for managers.

In terms of the most frequently cited one-dimensional requirements, we can say that improving top managers' interactions with 3PL managers can be very effective in improving mutual communication. In addition, car manufacturer should allocate sufficient funds to research and development to enable them to better identify and enhance key factors related to 3PL providers that affect their customers' satisfaction. Managers in the automobile industry should encourage 3PL managers to use the latest transportation and distribution systems, and regularly survey the field to ensure they are aware of the services currently being offered.

In terms of the attractive requirements, it is important that managers of manufacturing companies engage with those 3PL companies that are familiar with their production

operations and the culture of their company, and who try to provide additional services by gaining a better understanding of their needs. Managers of 3PL companies should aim to implement those aspects that are considered important by the relevant professionals in the manufacturing industries, and create a competitive advantage by differentiating and diversifying their services. Furthermore, when evaluating 3PL providers, managers of manufacturing companies should periodically assess any changes in their identified requirements, and select 3PL providers that offer a high level of flexibility and adaptability and are therefore able to respond to changing needs.

6. Conclusions

The aim of this study was to contribute to a better understanding of the importance of service performance and customer satisfaction in the selection of 3PL companies. Providing an empirical validation of contingency theory, we categorized these factors across three dimensions of the Kano model. To this end, 24 factors were extracted from various articles, and experts were asked their opinions as to which of these factors fell within each category.

Among the studied criteria, our results revealed that price is the main must-be requirement for 3PL providers evaluation. Market environment generally puts continuous pressure to reduce the price of products, and that customers are nowadays more price-sensitive than ever before. Therefore, manufacturing industries need to foster strong link with the 3PL companies that offer lower prices, particularly in the Middle-East region where the service cost is intuitively known as the most important partner selection priority.

7. Limitations and future research directions

This study, as with any research, has its limitations. We undertook a cross-sectional study related to a particular time and place. Moreover, only experts in the automotive industry were surveyed, so caution should be applied when considering generalizing the results to other industries or countries. To widen the applicability, a similar study could be carried out in a broader population. Further, the research population could be expanded and generalized by including customers, employees, transport agents and 3PL companies.

Since the factors included in this research were identified specifically for the automotive industry, the list could not be definitive but open to revision for studies conducted in other industries and in other sectors. We would also encourage researchers to focus on additional factors, such as the impact of quality certificates, compliance with qualitative new technologies and technological capabilities, such as business intelligence technologies, as well as environmental factors such as the political rules and dynamics of the surrounding environment.

Furthermore, this paper was based on categorizing the criteria of 3PL selection using only the Kano model. To operationalize and validate our model in terms of the efficiency of 3PL provider selection for the automotive industry, future research could investigate combining it with operation research methods, such as multi-criteria decision making and data envelopment analysis.

References

Agrawal, A., Shankar, R. and Tiwari, M.K. (2006), "Modeling the metrics of lean, agile and leagile supply chain: an ANP-based approach", *European Journal of Operational Research*, Vol. 173 No. 1, pp. 211-225.

Aguezzoul, A. (2014), "Third-party logistics selection problem: a literature review on criteria and methods", *Omega*, Vol. 49, pp. 69-78.

Akbari, M. (2018), "Logistics outsourcing: a structured literature review", *Benchmarking: An International Journal*, Vol. 25 No. 5, pp. 1548-1580.

Ameknassi, L., Aït-Kadi, D. and Rezg, N. (2016), "Integration of logistics outsourcing decisions in a green supply chain design: a stochastic multi-objective multi-period multi-product programming model", *International Journal of Production Economics*, Vol. 182, pp. 165-184.

Asian, S. and Nie, X. (2014), "Coordination in supply chains with uncertain demand and disruption risks: existence, analysis, and insights", *IEEE Transactions on Systems, Man, and Cybernetics: Systems*, Vol. 44 No. 9, pp. 1139-1154.

Cai, X., Chen, J., Xiao, Y., Xu, X. and Yu, G. (2013), "Fresh-product supply chain management with logistics outsourcing", *Omega*, Vol. 41, pp. 752-765.

Chiang, D., Lin, C. and Chen, M. (2011), "The adaptive approach for storage assignment by mining data of warehouse management system for distribution centres", *Enterprise Information Systems*, Vol. 5 No. 2, pp. 219-234.

Datta, S., Samantra, C., Mahapatra, S.S., Mandal, G. and Majumdar, G. (2013), "Appraisement and selection of third party logistics service providers in fuzzy environment", *Benchmarking: An International Journal*, Vol. 20 No. 4, pp. 537-548.

Faghih-Roohi, S., Ong, Y.S., Asian, S. and Zhang, A.N. (2016), "Dynamic conditional value-at-risk model for routing and scheduling of hazardous material transportation networks", *Annals of Operations Research*, Vol. 247 No. 2, pp. 715-734.

Falsini, D., Fondi, F. and Schiraldi, M.M. (2012), "A logistics provider evaluation and selection methodology based on AHP, DEA and linear programing integration", *International Journal of Production Research*, Vol. 50 No. 17, pp. 4822-4829.

Fırat, S.Ü.O., Akan, M.Ö.A., Ersoy, E., Gök, S. and Ünal, U. (2017), "A six sigma DMAIC process for supplier performance evaluation using AHP and Kano's model", *International Journal of Business Analytics*, Vol. 4 No. 2, pp. 37-61.

Ghauri, P.N. (2015), *Reintegrating Iran with the West: Challenges and Opportunities* (trans by M. Elahee, F. Sadrieh and M. Wilman), Emerald, Bingley.

Ghorbani, M., Mohammad Arabzad, S. and Shahin, A. (2013), "A novel approach for supplier selection based on the Kano model and fuzzy MCDM", *International Journal of Production Research*, Vol. 51 No. 18, pp. 5469-5484.

Gol, H. and Çatay, B. (2007), "Third-party logistics provider selection: insights from a Turkish automotive company", *Supply Chain Management: An International Journal*, Vol. 12 No. 6, pp. 379-384.

Guarnieri, P., Sobreiro, V.A., Nagano, M.S. and Serrano, A.L.M. (2015), "The challenge of selecting and evaluating third-party reverse logistics providers in a multicriteria perspective: a Brazilian case", *Journal of Cleaner Production*, Vol. 96, pp. 209-219.

Hallavo, V., Toivanen, J., Kuula, M. and Putkiranta, A. (2016), "Impact of ownership change on plant practice-performance dynamics: a longitudinal multiple case study", *Benchmarking: An International Journal*, Vol. 23 No. 5, pp. 1363-1380.

Hansen, Z.N.L., Larsen, S.B., Nielsen, A.P., Groth, A., Gregersen, N.G. and Ghosh, A. (2018), "Combining or separating forward and reverse logistics", *The International Journal of Logistics Management*, Vol. 29 No. 1, pp. 216-236.

Ho, W., He, T. and Lee, C.K.M. (2012), "Strategic logistics outsourcing: an integrated QFD and fuzzy AHP approach", *Expert Systems with Applications*, Vol. 39 No. 12, pp. 10841-10850.

Hugos, M.H. (2002), *Essentials of Supply Chain Management*, Wiley, London.

Huo, B., Fu, D., Zhao, X. and Zhu, J. (2016), "Curbing opportunism in logistics outsourcing relationships: the role of relational norms and contract", *International Journal of Production Economics*, Vol. 182, pp. 293-303.

Hwang, B.N., Chen, T.T. and Lin, J.T. (2016), "3PL selection criteria in integrated circuit manufacturing industry in Taiwan", *Supply Chain Management: An International Journal*, Vol. 21 No. 1, pp. 103-124.

Kannan, G. (2009), "Fuzzy approach for the selection of third party reverse logistics provider", *Asia Pacific Journal of Marketing and Logistics*, Vol. 21 No. 3, pp. 397-416.

Kannan, V., Bose, S.K. and Kannan, N.G. (2011), "An evaluation of ocean container carrier selection criteria: an Indian shipper's perspective", *Management Research Review*, Vol. 34 No. 7, pp. 754-777.

Kano, N. (1984), "Attractive quality and must-be quality", *Journal of Japanese Society for Quality Control*, Vol. 14 No. 2, pp. 38-48.

Kembro, J., Selviaridis, K. and Näslund, D. (2014), "Theoretical perspectives on information sharing in supply chains: a systematic literature review and conceptual framework", *Supply Chain Management: An International Journal*, Vol. 19 Nos 5/6, pp. 609-625.

Kumar, P. (2007), "Global logistics outsourcing: latest trends in selecting 3PL", *Asia-Pacific Business Review*, Vol. 3 No. 2, pp. 84-91.

Kumar, P. (2008), "An integrated model of AHP and TOPSIS for 3PL evaluation", *Asia Pacific Business Review*, Vol. 4 No. 3, pp. 14-21.

Kumar, P. and Singh, R.K. (2012), "A fuzzy AHP and TOPSIS methodology to evaluate 3PL in a supply chain", *Journal of Modelling in Management*, Vol. 7 No. 3, pp. 287-303.

Kumar, S., Kadow, B. and Lamkin, M. (2011), "Challenges with the introduction of radio- frequency identification systems into a manufacturer's supply chain-a pilot study", *Enterprise Information Systems*, Vol. 5 No. 2, pp. 235-253.

Li, F., Li, L., Jin, C., Wang, R., Wange, H. and Yang, L. (2012), "A 3PL supplier selection model based on fuzzy sets", *Computers & Operations Research*, Vol. 39, pp. 1879-1884.

Li, S., Kang, M. and Haney, M.H. (2017), "The effect of supplier development on outsourcing performance: the mediating roles of opportunism and flexibility", *Production Planning & Control*, Vol. 28 No. 6, pp. 599-609.

Li, Y., Guo, H. and Zhang, Y. (2018), "An integrated location-inventory problem in a closed-loop supply chain with third-party logistics", *International Journal of Production Research*, Vol. 56 No. 10, pp. 3462-3481.

Li, Y., Tang, J., Luo, X. and Xu, J. (2009), "An integrated method of rough set, Kano's model and AHP for rating customer requirements' final importance", *Expert Systems with Applications*, Vol. 36, pp. 7045-7053.

Lin, L.Z., Yeh, H.R. and Wang, M.C. (2015), "Integration of Kano's model into FQFD for Taiwanese Ban-Doh banquet culture", *Tourism Management*, Vol. 46, pp. 245-262.

Liu, H.T. and Wang, W.K. (2009), "An integrated fuzzy approach for provider evaluation and selection in third party logistic", *Expert Systems with Applications*, Vol. 36, pp. 4387-4398.

Liu, Y., Liao, Y. and Li, Y. (2018), "Capability configuration, ambidexterity and performance: evidence from service outsourcing sector", *International Journal of Production Economics*, Vol. 200, pp. 343-352.

Lu, D., Asian, S., Erteke, G. and Sevinç, M. (2018), "Mind the perception gap: an integrative performance management framework for service supply chains", *International Journal of Physical Distribution & Logistics Management*, available at: https://doi.org/10.1108/IJPDLM-09-2017-0302

Lu, D., Ding, Y., Asian, S. and Paul, S.K. (2018), "From supply chain integration to operational performance: the moderating effect of market uncertainty", *Global Journal of Flexible Systems Management*, Vol. 19 No. 1, pp. 3-20.

MacKerron, G., Kumar, M., Benedikt, A. and Kumar, V. (2015), "Performance management of suppliers in outsourcing project: case analysis from the financial services industry", *Production Planning & Control*, Vol. 26 No. 2, pp. 150-165.

Meixell, M.J. and Norbis, M. (2011), "Integrating carrier selection with supplier selection decisions to improve supply chain security", *International Transportations in Operational Research*, Vol. 19 No. 5, pp. 711-732.

Nilsson-Witell, L. and Fundin, A. (2005), "Dynamics of service attributes: a test of Kano's theory of attractive quality", *International Journal of Service Industry Management*, Vol. 16 No. 2, pp. 152-168.

Patterson, Z., Ewing, G.O. and Haider, M. (2010), "How different is carrier choice for third party logistics companies?", *Transportation Research Part E: Logistics and Transportation Review*, Vol. 46 No. 5, pp. 764-774.

Paul, S.K., Asian, S., Goh, M. and Torabi, S.A. (2017), "Managing sudden transportation disruptions in supply chains under delivery delay and quantity loss", *Annals of Operations Research*, pp. 1-32, available at: https://doi.org/10.1007/s10479-017-2684-z

Perçin, S. (2009), "Evaluation of third-party logistics (3PL) providers by using a two-phase AHP and TOPSIS methodology", *Benchmarking: An International Journal*, Vol. 16 No. 5, pp. 588-604.

Perçin, S. and Min, H. (2013), "A hybrid quality function deployment and fuzzy decision-making methodology for the optimal selection of third-party logistics service providers", *International Journal of Logistics Research and Applications*, Vol. 16 No. 5, pp. 380-397.

Qureshi, M.N., Kumar, D. and Kumar, P. (2008), "An integrated model to identify and classify the key criteria and their role in assessment of 3PL service provider", *Asia Pacific Journal of Marketing and Logistics*, Vol. 20, pp. 227-249.

Raut, R., Kharat, M., Kamble, S. and Kumar, C.S. (2018), "Sustainable evaluation and selection of potential third-party logistics (3PL) providers: an integrated MCDM approach", *Benchmarking: An International Journal*, Vol. 25 No. 1, pp. 76-97.

Rezaei Somarin, A., Asian, S., Jolai, F. and Chen, S. (2018), "Flexibility in service parts supply chain: a study on emergency resupply in aviation MRO", *International Journal of Production Research*, Vol. 56 No. 10, pp. 3547-3562.

Sahu, N.K., Datta, S. and Mahapatra, S.S. (2015), "Fuzzy based appraisement module for 3PL evaluation and selection", *Benchmarking: An International Journal*, Vol. 22 No. 3, pp. 354-392.

Salimian, H., Rashidirad, M. and Soltani, E. (2017), "A contingency view on the impact of supplier development on design and conformance quality performance", *Production Planning & Control*, Vol. 28 No. 4, pp. 310-320.

Selviaridis, K. (2016), "Contract functions in service exchange governance: evidence from logistics outsourcing", *Production Planning & Control*, Vol. 27 No. 16, pp. 1373-1388.

Senthil, S., Srirangacharyulu, B. and Ramesh, A. (2014), "A robust hybrid multi-criteria decision making methodology for contractor evaluation and selection in third-party reverse logistics", *Expert Systems with Applications*, Vol. 41, pp. 50-58.

Shahin, A. and Mohammadi Shahiverdi, S. (2015), "Estimating customer lifetime value for new product development based on the Kano model with a case study in automobile industry", *Benchmarking: An International Journal*, Vol. 22 No. 5, pp. 857-873.

Sharif, A.M., Irani, Z., Love, P.E. and Kamal, M.M. (2012), "Evaluating reverse third-party logistics operations using a semi-fuzzy approach", *International Journal of Production Research*, Vol. 50 No. 9, pp. 2515-2532.

Shen, C. and Chou, C. (2010), "Business process re-engineering in the logistics industry: a study of implementation, success factors, and performance", *Enterprise Information Systems*, Vol. 4 No. 1, pp. 61-78.

Shi, Y., Zhang, A., Arthanari, T., Liu, Y. and Cheng, T.C.E. (2016), "Third-party purchase: an empirical study of third-party logistics providers in China", *International Journal of Production Economics*, Vol. 171, pp. 189-200.

Soh, S. (2010), "A decision model for evaluating third party logistics providers using fuzzy analytic hierarchy process", *Africa Journal of Business Management*, Vol. 4 No. 3, pp. 339-349.

Sohn, J.I., Woo, S.H. and Kim, T.W. (2017), "Assessment of logistics service quality using the Kano model in a logistics-triadic relationship", *The International Journal of Logistics Management*, Vol. 28 No. 2, pp. 680-698.

Tan, K. and Pawitra, T. (2001), "Integrating SERVQUAL and Kano's model into QFD for service excellence development", *Managing Service Quality: An International Journal*, Vol. 11 No. 6, pp. 418-430.

Taylor, A. and Taylor, M. (2014), "Factors influencing effective implementation of performance measurement systems in small and medium-sized enterprises and large firms: a perspective from contingency theory", *International Journal of Production Research*, Vol. 52 No. 3, pp. 847-866.

Tezuka, K. (2011), "Rationale for utilizing 3PL in supply chain management: a shippers' economic perspective", *IATSS Research*, Vol. 35, pp. 24-29.

Thamsatitdej, P., Samaranayake, P., Laosirihongthong, T. and McLean, M.W. (2016), "Selection of third-party logistics service providers (3PL) under the sustainable supply chain management", *Proceedings of the 14th ANZAM Operations, Supply Chain and Services Management Symposium, Sydney, June 13-15.*

Wallenburg, C., Cahill, D., Michael Knemeyer, A. and Goldsby, T. (2011), "Commitment and trust as drivers of loyalty in logistics outsourcing relationship", *Journal of Business Logistics*, Vol. 32 No. 1, pp. 83-98.

Waters, D. (2003), *Logistics: An Introduction to Supply Chain Management*, Palgrave Macmillan, Basingstoke.

Wei, C., Asian, S., Ertek, G. and Hu, Z.-H. (2018), "Location-based pricing and channel selection in a supply chain: a case study from the food retail industry", *Annals of Operations Research*, available at: https://doi.org/10.1007/s10479-018-3040-7

Wen, C.L., Jeng, S., Kisworo, D., Wee, P.K. and Wee, H.M. (2013), "Value creation through 3PL for automotive logistical excellence", *Proceedings of the Institute of Industrial Engineers Asian Conference. Springer, Singapore*, pp. 127-132.

Wilman, M. and Bax, B. (2015), *The Automotive Industry in Iran: A Critical Analysis*, Emerald, Bingley.

Wu, F., Li, H.Z., Chu, L.K. and Sculli, D. (2013), "Supplier selection for outsourcing from the perspective of protecting crucial product knowledge", *International Journal of Production Research*, Vol. 51 No. 5, pp. 1508-1519.

Wu, X., Cao, J. and Huting, J. (2018), "Using three-factor theory to identify improvement priorities for express and local bus services: an application of regression with dummy variables in the Twin Cities", *Transportation Research Part A: Policy and Practice*, Vol. 113, pp. 184-196.

Xu, L. (2011), "Information architecture for supply chain quality management", *International Journal of Production Research*, Vol. 49 No. 1, pp. 183-198.

Xu, Su Xiu, S., X., Meng Cheng, M., George, Q. and Huang, G.Q. (2015), "Efficient intermodal transportation auctions for B2B e-commerce logistics with transaction costs", *Transportation Research Part B*, Vol. 80, pp. 322-337.

Xu, S.X., Cheng, M. and Huang, G.Q. (2015), "Efficient intermodal transportation auctions for B2B e-commerce logistics with transaction costs", *Transportation Research Part B: Methodological*, Vol. 80, pp. 322-337.

Yang, Q. and Zhao, X. (2016), "Are logistics outsourcing partners more integrated in a more volatile environment?", *International Journal of Production Economics*, Vol. 171, pp. 211-220.

Yayla, A.Y., Oztekin, A., Gumus, A.T. and Gunasekaran, A. (2015), "A hybrid data analytic methodology for 3PL transportation provider evaluation using fuzzy multi-criteria decision making", *International Journal of Production Research*, Vol. 53 No. 20, pp. 6097-6113.

Yeung, K., Zhou, H., Yeung, A.C. and Cheng, T.C. (2012), "The impact of third-party logistics providers' capabilities on exporters' performance", *International Journal of Production Economics*, Vol. 135, pp. 741-753.

Yu, H. and Ko, H.T. (2012), "Integrating Kano model with strategic experiential modules in developing ICT-enabled services: an empirical study", *Management Decision*, Vol. 50 No. 1, pp. 7-20.

Zhang, J., Nault, B.R. and Tu, Y. (2015), "A dynamic pricing strategy for a 3PL provider with heterogeneous customers", *International Journal of Production Economics*, Vol. 169, pp. 31-43.

Further reading

Ahn, W.C., Ishii, S. and Ahn, S.B. (2013), "A comparative study of Korean and Japanese logistics industries' market structures: focusing on subsidiary and third-party logistics companies", *The Asian Journal of Shipping and Logistics*, Vol. 29 No. 3, pp. 361-376.

Bhatti, R., Kumar, P. and Kumar, D. (2010), "Analytical modeling of third party service provider selection in lead logistics provider environments", *Journal of Modelling in Management*, Vol. 5 No. 3, pp. 275-286.

Hueiju, Y. and Hsien Tang, K. (2012), "Integrating Kano model with strategic experiential modules in developing ICT-enabled services an empirical study", *Management Decision Journal*, Vol. 50 No. 1, pp. 7-20.

Leuschner, R., Carter, C.R., Goldsby, T.J. and Rogers, Z.S. (2014), "Third-party logistics: a meta-analytic review and investigation of its impact on performance", *Journal of Supply Chain Management*, Vol. 50 No. 1, pp. 21-43.

Liu, C.L. and Lai, P.Y. (2016), "Impact of external integration capabilities of third-party logistics providers on their financial performance", *The International Journal of Logistics Management*, Vol. 27 No. 2, pp. 263-283.

Corresponding author
Javad Khazaei Pool can be contacted at: khazaei110@gmail.com