



## New Service Development Process in Intermodal Transport: The Case of Turkey\*

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### Abstract

*Increasing interest on intermodal transport both by the shippers and carriers has led logistics service providers and transport operators to develop new intermodal transport services. When the service literature is analyzed, it is found that there are a few studies on the New Service Development (NSD) of specific service industries. However, it is observed that there is a gap in new intermodal service development. That's why this study aims to explore the stages and determine the common stages in NSD process of intermodal transport. In order to reach this aim, intermodal transport operators and service providers offering intermodal transport services in Turkey are investigated by case study method. This study is the preliminary step for NSD processes in intermodal transport for the current literature. According to the findings, the issues of the human resources have not been paid enough attention during the NSD process. It is concluded that intermodal transport requires more detailed and industry-specific NSD models compared with the other service industries.*

**Keywords:** Intermodal Transport, New Service Development, Service Industry, Turkey.

\*This paper presented at the XIII. International Logistics and Supply Chain Congress held in Izmir on 22.10.2015

### Modlararası Taşımacılıkta Yeni Hizmet Geliştirme Süreci: Türkiye Örneği\*

#### Öz

*Modlararası taşımacılığa yönelik olarak taşıtan ve taşıyanların artan ilgisi, lojistik hizmet sağlayıcıları ve taşıma operatörlerini yeni hizmet geliştirmeye yöneltmektedir. Hizmet sektörüne yönelik literatür incelendiğinde, yeni hizmet geliştirme konusunda az sayıda ve belirli sektörlere yönelik çalışmaların olduğu saptanmıştır. Fakat, yeni modlararası taşımacılık hizmeti geliştirme üzerine ise bir boşluk olduğu görülmüştür. Dolayısıyla, bu*

*çalışmada modlararası taşımacılıkta yeni hizmet geliştirme aşamalarının araştırılması ve bu kapsamda uygulanan ortak aşamaların belirlenmesi amaçlanmıştır. Çalışma kapsamında belirlenen amaca ulaşmak için, Türkiye’de modlararası taşımacılık hizmeti sunan modlararası ulaştırma operatörleri ve hizmet sağlayıcıları, vaka analizi yaklaşımı ile incelenmiştir. Mevcut literatür dikkate alındığında bu çalışma, modlararası taşımacılıkta yeni hizmet geliştirilmesine yönelik ön çalışma niteliğindedir. Elde edilen bulgular dikkate alındığında, insan kaynakları konusunun yeni hizmet geliştirme aşamalarında yeterince dikkate alınmadığı saptanmıştır. Modlararası taşımacılıkta, diğer sektörler ile kıyaslandığında daha ayrıntılı ve sektöre özel yeni hizmet geliştirme modellerinin geliştirilmesi gerekmektedir.*

**Anahtar Kelimeler:** Modlararası Taşımacılık, Yeni Hizmet Geliştirme, Hizmet Sektörü, Türkiye.

\*Bu çalışma, “XIII. International Logistics and Supply Chain Congress” adlı kongrede bildiri olarak sunulmuştur.

## 1. Introduction

Businesses have shifted the paradigm from production orientation to service orientation starting from 1980s [1] as a reflection of rapidly increasing contribution to economy [2] and in such a competitive environment creating new services is a vital factor for service industry [3] in order to create and increase value for existing customers and attracting new customers [4]. In other words, superior performance and competitive advantage are suggested by new services [5]. These factors with the continuous innovation force decision makers in service firms to develop new services [6]. Although developing new services is essential for success of the service, it has not received due attention in the literature [4]. Much of the research on NSD is about the process of NSD [7, 8, 9, 10]. However, there are no researches specifically on intermodal transport. NSD process has the industry specific nature [11] which also needs to be considered by the intermodal transport industry.

The transportation industry and international trade have undergone great changes since 1950s. Three major factors are responsible for and characterize the changes: demand for transportation, transport technology and organization of the transportation system [12]. Intermodal transport has grown considerably with the developments taking place in the shipping and transport industry triggered

by containerization and increasing global trade such as the improvements in the infrastructure, vehicles and specific equipments.

The growth of intermodal freight transportation will be driven and challenged by four main factors [13]: (i) understanding the changing customer requirements and hyper-competition of supply chains in a global marketplace; (ii) responding to changing customer requirements with seamless and integrated coordination of freight through various modes; (iii) knowledge of current and future intermodal operational options and alternatives, as well as the potential for improved ICT and (iv) constraints on and coordination of infrastructure capacity as well as better management of existing infrastructure and broader considerations on future investment in new infrastructure.

Intermodalism is the idea of process pointed out by Muller (1999) [14] and the process consists of technical, legal, commercial and management framework indicated by D’Este (1996) [15]. These views confirm that the intermodal transport is a “service” rather than a technology. Therefore, the concept of intermodalism emphasizes “soft” features of service delivery that facilitate the technology of multi-modal transport [15].

Intermodal transport is an efficient and sustainable solution to deal with increasing transport volumes. With

intermodal transport, different modes of transport such as trucks, trains and ships are optimally combined to handle transport as environmentally-friendly and cost-efficiently as possible [16]. Appearance of the door-to-door transport [17] rising tax levels and fuel prices, increasing problems with congestion and increasing environmental consciousness among shippers has drawn attention to intermodal transport [18]. Hence new intermodal transport services have been promoting for several years (e.g. PROMIT, Twinning Project, Marco Polo Programme, and The Cream Project ect.) [54]. Intermodal transportation provides many remarkable opportunities to the related parties for saving money [19], saving of time, simplification of trade documentation, reliability, safety needs [17], expanding markets, increasing value added services related to distribution [20] and increase efficiency and also provides competitive advantage [21]. These benefits of intermodal transport suggest that more attention for NSD in intermodal transport is required [22].

When the service literature is analyzed, it is found that there are a few studies on the NSD of specific service industries. However, it is observed that there is a gap in new intermodal service development. Increasing interest on intermodal transport, and accordingly new intermodal projects reveal the need on determining the nature of NSD processes in intermodal transport from both academic and industrial perspectives. Besides successful new projects, existence of plenty of unsuccessful projects has raised awareness on how to establish NSD processes. Accordingly, the stages and activities of NSD processes followed by intermodal service providers in Turkey as a first step in this study.

According to Menor et al. (2002), NSD process, which is considered as one of the main determinants of service competitiveness, has not been paid enough attention by scholars. It was determined that the design of the services is ineffective

and inadequate compared with the physical products. In this respect, the objective of the paper is twofold. First objective is to explore the stages in the NSD process of intermodal transport. Menor et al. (2002) structured their paper based on two main pillars, which are “exploitation” and “exploration”. From this point of view, the notion of “exploitation” is regarded in this study. Specifically, in order to analyze NSD process of intermodal service providers, it is intended to generate knowledge by using existing models commonly accepted in the literature. Second objective is to determine the common stages of NSD and explore whether these stages are always necessary or not as addressed in Menor et al., (2002) [23]. According to this study, the recent tendency has evolved as new services suddenly reveal rather than following formal development process.

To reach these objectives, first an interview questionnaire form derived from the literature was applied to decision makers from intermodal service providers in Turkey. Turkey as a developing economy has great potential on intermodal transportation due to its geographical position. The opportunities have been recognized by many major transportation companies, which have located in the region or abroad due to increasing need for the intermodal transport services. This situation provides an opportunity to observe the NSD process in intermodal transport industry.

This paper has been structured in five sections. The next section reviews the literature on the NSD process and intermodal transport. Section three describes the methodological context, including data collection and sampling, and the results of the empirical analysis are given thereafter. The conclusions and discussion are provided in the last section.

## 2. Literature Review

Developing new services is important, complex and risky for service firms

[24]. Because of the high competition in the industry, the shift toward the innovativeness has been recognized for the survival of the companies [25]. In order to bypass the failure of the new service in such environment, strategic focus on NSD and development competencies is applied. Although there have been several studies referring that there has been limited use of formal NSD process [8], it is increasingly important to explore and understand the NSD and its processes [26]. There has been considerable amount of research carried on the NSD that provides a structure to the activities and concepts related to NSD process [27].

The literature proves that the services and products have different features because of the intangibility, inseparability, perishability and heterogeneous characteristics of the services [28]. Although the applicability of processes of new product development into the service industry is under discussion [9], literature related NSD process is based on the NPD process of Booz et al. (1982) [29] as indicated by Stevens and Dimitriadis (2005) [3]. Obviously, there are various ways to describe the NSD process [30] as shown in Table 1. Most NSD processes are the waterfall models [31] that have adopted sequential structure [27]. First, Bowers (1987) [32] suggested a normative market driven process of NSD for hospitals. This research revealed that developing new services differs from the BAH model. Likewise, Bitran and Petrosa (1998) [33] specified the differences between product and service development by reviewing the related literature and developed generic model.

Some other NSD process researches have employed nonlinear structure. Edvarson and Olsson (1996) [30] created a nonlinear model within the focus of customer and quality. The research also indicates the variability of the process due to time and dependency relations. An exploratory comparative longitudinal research on two

individual industry projects was conducted by Steven and Dimitriadis (2005) [3] in order to present a NSD model that consists organizational learning component. Gottfridson (2011) [34] investigated NSD process with 11 small Swedish companies and concluded that there was no clear formal NSD process in studied companies. Digitalization of business environment created the need for shorter NSD process, and Alam (2014) [35] proposed phase wise, informal and shorter NSD process model based on the 158 new service projects that located USA, Australia and India.

Alam and Perry (2002) [8] proposed a simplified model based on the case studies of Australian financial service firms. This study stressed both sequential and parallel processes in NSD and indicated the need for the new ways of conceptualizing NSD process. The research of Frohle and Roth (2007) [27] presented both resource and process centric perspectives within a single framework. Burger et al., (2011) [36] investigated the level of maturity of NSD process by revealing a proposal model. This model helps assessing the NSD practices of the companies. Cocca and Ganz (2015) [37] introduced the developing green services with the literature and tried to find out its influence on the NSD process. All these models have their own merits, and offer theoretical background and managerial thinking [27] and answer the question of how the NSD process can best be organized for an innovation [38].

In line with the below models and approaches, the structure of NSD process is substantially affected by the industry that the company operates in. In addition to these models, various models are suggested by various researchers [27]. However, as indicated by Fitzsimmons and Fitzsimmons (2000) [11] there are still not enough studies on NSD process to meet the industry specific needs. Thus, lack of empirical evidence on new intermodal transport service development in the literature creates research opportunity for

the authors and leads this study to focus on the process of new intermodal transport service development.

Intermodal transport has expanding its market share through markets for flows over short distances, for perishable and high-value commodities, for small consignments, and for flows that demand speed, reliability and flexibility. In that case the industry achieves significant

breakthrough innovations [40]. In Turkey currently changing trend occurs through the shifting intermodal services. Turkey is involved in different transport networks and corridors related with intermodal transport. In the context of connections between Pan-European Transport Corridors and Central Asia, Turkey has an important role as one of the most important countries in the Black Sea and Mediterranean basin

Table 1. Summary of the Key NSD Models

<b>Bowers (1987) [32]</b>	<b>Linear</b>	Develop a business strategy	Develop a new services strategy	Idea Generation	Concept Development and Evaluation	Business Analysis	Service Development and Evaluation	Market Testing	Commercialization
<b>Edvardsson and Olsson (1996) [30]</b>	<b>Non Linear</b>	Service Concept Development	Service System Development	Service Process Development	Component Design	Implementation	Feedback and Learning		
<b>Bitran and Petrosa (1998) [33]</b>	<b>Linear</b>	Strategic Assessment	Concept Development	System Design	Implementation	Feedback and Learning			
<b>Alam and Perry (2002) [8]</b>	<b>Linear/Non Linear</b>	Strategic Planning	Idea Generation	Idea Screening	Business Analysis	Form a cross functional team	Service design and Process system design	Personnel training	Service testing and pilot run
<b>Tatikonda and Zeithaml (2002) [39]</b>	<b>Linear</b>	Strategic Positioning	Idea Generation	Concept Development	Concept Implementation	Full Prototype Tests	Market Rollout	Performance Evaluation	Commercialization
<b>Stevens and Dimitriadis (2005) [3]</b>	<b>Non Linear</b>	Interpretation Stage	Development Stage	Implementation Stage					
<b>Alam (2014) [35]</b>	<b>Non Linear</b>	Initiation Phase	Comprehension Phase	Corroboration Phase	Execution Phase				

in terms of both east-west and North-south connections [41].

In order to overcome the vulnerability of transport industry and become more sustainable, Turkey needs to develop intermodal transport solutions that can rapidly yield results without losing the advantages of its competitive road transport system. Turkey has significant potential, and several projects are underway to develop intermodal transport [42].

Transportation industry has evolved with economic and technological developments and changes in customer requirements which lead to service providers to follow customer-oriented strategies [43]. Therefore passing through user-friendly processes in NSD has increased the importance in such an innovative and competitive environment [30].

As asserted previously, this reveals the importance of NSD process studies specific to the intermodal transport. When the NSD process literature reviewed, only a few studies have been found in terms of transport industry. Nijssen et al., (2006) [44] tried to reveal differences between NSD and NPD, and they took into account the companies operated in different industries including transport industry as a sampling. Zhou and Wang (2012) [45] also referred the logistics enterprises in NSD process. Chen et al., (2015) [46] proposed to apply Kensei engineering based approach in NSD with analyzing the home delivery service which is one of the crucial part of the logistics industry. Apart from these studies, any other studies which focused on intermodal transport with the point of NSD process literature have not been found.

### **3. Research Methodology**

Qualitative research is conducted in line with the below mentioned research questions in this study. The research gap in intermodal transport literature has been tried to be fulfilled by testing the convenience of Alam and Perry's (2002) [8]

NSD model in intermodal transport. This research used the explanatory case study as a research method. Case study research provides a close investigation of topics, issues and people and seeks to answer focused questions by producing in-depth descriptions and interpretations over a relatively short period of time [47].

In this study, the research questions are considered as follows:

(i). Which stages of NSD process in the light of Alam and Perry (2002)'s model are applied by the intermodal service providers operating in Turkey?

(ii). What are the differences between the stages and activities of NSD process practiced by the intermodal service provider companies in Turkey?

In order to answer these research questions, data were collected through structural interviews with follow ups by e-mails based on the structured questionnaire which was developed considering Alam and Perry's (2002) [8] model. Then, the responses were analyzed by using frequency analysis to determine which stages were applied by the sampling firms. Afterward, the differences between the stages and activities of the sampling firms were revealed accordingly. Data analysis, which consists of data review, categorization, tabulation, and evaluating the findings, was conducted by using pattern matching method.

To investigate the reliability of the study, a scale was generated considering the studies commonly accepted and used in the literature. Furthermore, 3 industrial professionals and 1 academic who have many studies on logistics and intermodal transport, were requested to discuss and confirm the validity of the findings.

#### **3.1. Data Collection**

Judgmental sampling, which includes experienced people with the central phenomenon, was used in the study [5]. After reviewing the relevant logistics and transportation journals and websites on



intermodal transportation, the intermodal service providers were compiled and listed. Within this list, the websites of each intermodal transport company were analyzed and the information on their intermodal services was explored. As a result of this analysis, 10 companies, which met the research questions, were selected. The structured questionnaire form was distributed to the intermodal services providers operating in Turkey by web-based interface, on July 2015, followed up by a telephone call. Respondents were asked to state the stages and the relevant activities that they took into consideration during the new intermodal service development process. Out of 10 companies, seven responses were received from the respondents. The profiles of respondents from these companies included in the case study were summarized in the Table 2.

For the anonymity reasons, the details of the respondents such as the

sea-rail and air-sea. Additionally, Ro-Ro transport providers also responded to the questionnaire. Apart from the companies using their own asset, sampling also consists of the intermodal transport operator who only operates the intermodal process.

### 3.2. Research Model

The relevant literature related on NSD models was reviewed as a first step of the research design. From this review an extensive list of NSD models was founded and a structured interview form was developed based on Alam and Perry's (2002) [8] model. The model used in this study is depicted in the Figure 1.

The stages in the model are both sequential and parallel. This model was also used [48, 9, 49, 50] to reveal industry specific empirical evidences. Since this model fits to the notion of customer oriented transport perception in the

**Table 2.** Profiles of the Respondents

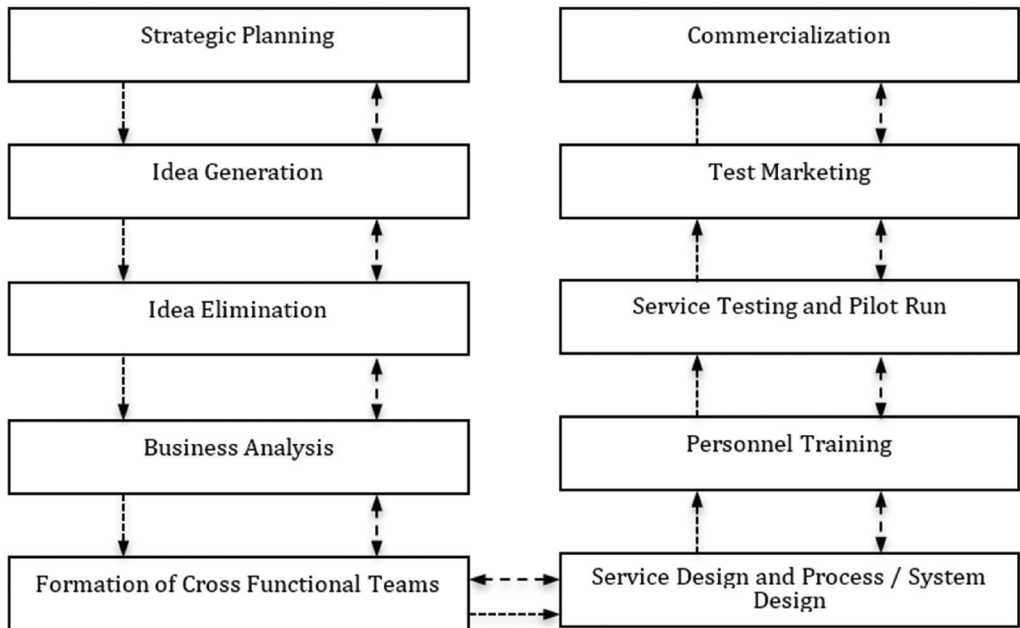
Interview	Positions	Experiences (years in the company)
A	Regional Director	1-5 years
B	General Manager	6-10 years
C	President of Strategic Investments Group	11-15 years
D	Management Executive	1-5 years
E	Intermodal Manager	1-5 years
F	Operations Manager	6-10 years
G	General Manager	1-5 years

company name they work for, and other personal details were not disclosed in the study. Yet, it is intended to explain the nature of the sampling. In this respect, the companies that the respondents work for are the leading intermodal service providers in Turkey, and they have distinguished features considering their services provided. Accordingly, the sampling includes the companies specialized on intermodal transport using only rail-road combination or using all mode combinations such as rail-road,

modern world, it leads us to apply this model in the study.

### 3.3. Results of the Case Study

The analysis was conducted with the help of a matrix, which groups the relevant data into simple categories and provides a multidimensional summary [51]. Due to the small number of responses and the open nature of questions, statistical data processing was not appropriate.



**Figure 1.** Conceptual Model of the Study

Source: Adopted from Alam and Perry, 2002 [8]

**Table 3.** Stages and the Activities Followed by the Sampling Companies

NEW SERVICE DEVELOPMENT PROCESS	A	B	C	D	E	F	G	Total
<b>Strategic planning</b>	✓	✓	✓	✓	✓	✓	✓	7
Identify strategic roles	✓	✓	-	✓	✓	✓	✓	6
Review of historical performance	✓	✓	✓	✓	✓	✓	✓	7
Agreement on a common NSD strategy	✓	✓	-	✓	✓	-	✓	5
Specification of the research categories to approach	✓	✓	✓	✓	✓	-	✓	6
Assignment of individual roles and responsibilities	-	-	-	-	-	✓	✓	2
<b>Idea generation</b>	✓	✓	✓	✓	✓	✓	✓	7
State needs, problems and their solutions	✓	✓	✓	✓	✓	-	✓	6
Critize existing service	✓	✓	-	✓	✓	✓	✓	6
Identify gaps in the market	✓	✓	✓	✓	✓	✓	✓	7
Provide a wish list	✓	✓	-	✓	✓	-	✓	5
State new service adoption criteria	-	-	-	✓	✓	✓	✓	4
<b>Idea elimination</b>	✓	✓	✓	✓	✓	✓	✓	7
Customer screen	✓	-	-	✓	✓	-	-	3
Operational screen	✓	✓	✓	✓	✓	✓	✓	7
Strategic screen	✓	✓	✓	✓	✓	✓	✓	7

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**Table 3.** Stages and the Activities Followed by the Sampling Companies (Cont')

<b>NEW SERVICE DEVELOPMENT PROCESS</b>	<b>A</b>	<b>B</b>	<b>C</b>	<b>D</b>	<b>E</b>	<b>F</b>	<b>G</b>	<b>Total</b>
Financial screen	✓	✓	✓	✓	-	-	✓	5
Technological screen	✓	✓	✓	✓	-	✓	✓	6
<b>Business analysis</b>	✓	✓	✓	✓	✓	✓	✓	7
Limited feedback on financial data, including profitability of the concepts, competitors' data.	-	✓	-	-	✓	-	-	2
Market opportunity forecasting	✓	✓	✓	✓	✓	✓	✓	7
Sales forecasting	✓	✓	✓	✓	✓	-	✓	6
Financial forecasting	✓	✓	-	✓	✓	✓	✓	6
<b>Formation of Cross-Functional Teams</b>	✓	✓	✓	✓	✓	✓	✓	7
Search and identify appropriate personnel from various departments	✓	✓	-	-	✓	✓	✓	5
Assess their expertise and compatibility with the project	✓	✓	-	✓	-	-	✓	4
Joining the top management in selecting team members	-	-	✓	✓	-	✓	-	3
<b>Service Design and Process/System Design</b>	✓	✓	✓	✓	✓	✓	✓	7
Review and jointly develop blueprints	✓	✓	✓	✓	✓	✓	✓	7
Suggest improvements by identifying fail points	✓	✓	✓	✓	✓	-	✓	6
Observe the service delivery trial by the firm personnel	-	-	-	✓	✓	-	✓	3
<b>Personnel Training</b>	✓	✓	✓	✓	✓	✓	✓	7
Observe and participate in mock service delivery process	✓	✓	✓	-	✓	✓	-	5
Suggest improvements	✓	✓	✓	✓	-	-	✓	5
<b>Service Testing</b>	✓	✓	✓	✓	✓	✓	✓	7
Participate in a simulated service delivery processes	✓	✓	✓	✓	✓	✓	✓	7
Suggest final improvements and design change	-	✓	-	✓	✓	-	✓	4
<b>Test Marketing</b>	✓	✓	✓	✓	✓	✓	✓	7
Comments on the marketing plan	-	✓	-	✓	✓	-	✓	4
Detailed comments about their satisfaction of marketing mixes	✓	-	✓	✓	✓	✓	✓	6
Suggest desired improvements	✓	-	-	✓	✓	-	✓	4
<b>Commercialization</b>	✓	✓	✓	✓	✓	✓	✓	7
Adapt the service as a trial	-	✓	✓	✓	✓	-	✓	5
Feedback about the overall performance of the service along with the desired improvements	✓	✓	-	✓	✓	✓	✓	6
Word of mouth communications to other potential customers	✓	✓	-	✓	-	-	✓	4

Source: [8, 7, 52]

The results of the case study have substantiated the proposed model of Alam and Perry (2002) [8] and this study helped to validate the model for intermodal transport. Obviously it has been observed that all stages in the model are also conducted by the intermodal service provider companies. Table 3 illustrates the results of the study. New intermodal transport service development process follows the stages of strategic planning, idea generation, idea elimination, business analysis, formation of cross functional teams, service design and process/system design, personnel training, service testing, test marketing and commercialization.

The total numbers of stages followed by the respondents are illustrated in the last column of the Table 3. In this table, “review of historical performance” as a “strategic planning”, “identify gaps in the market” as a “idea generation”, “operational and strategic screens” as an “idea elimination”, “market opportunity forecasting” as a “business analysis”, “review and jointly develop blue prints” as a “service design and process/system design” and “participate in a simulated service delivery processes” as a “service testing activities” have been conducted by all the intermodal transport companies during their NSD process.

Apart from these findings, there are additional activities that are not listed in the model but have been contributed by the respondents and the interviews during the validation process. These include “sustainability of the project”, “environmental screen”, “political and legal screen”, “comparing with the other transport modes”, “applying intra-company and outsourced personnel training”. The model also does not specify that the NSD process requires special attention on “the destination”, “external environment”, “sustainability necessities” and “comparison with the other transport modes seems” which are industry-specific NSD activities.

#### **4. Discussion**

The models on NSD have been examined in the literature, and a model of Alam and Perry (2002) [8] has been tested by an empirical research, and the model was strongly supported by the results. Although the model is not new, previous studies generally focus on different regions and different service industries. Nevertheless, this study focused on Turkey which is a natural bridge between the East and the West, serving as a junction between the continents of Asia and Europe in terms of intermodal transport perspective. This, in itself, is a conceptual contribution to the NSD literature. This study provides specific perspectives into the stages and activities for intermodal transport providers. Similarly, this model can be seen as a reference for the NSD processes of the actors involved in this transportation service industry with some arrangements, which could also be considered as another remarkable contribution. The model should be integrated with industry specific requirements such as external environment factors, sustainability necessities, and country and destination specific factors.

While the activity of “limited feedback on financial data” in the “business analysis” stage was regarded as the most important stage in the Alam’s (2011) [10] study, only two respondents applied these activities during their NSD processes. Apart from preserving the current market share, customer orientation, which is one of the needs to enter the new markets and to hold the competitive advantage accordingly, has not been paid much attention in the NSD process of intermodal transport companies. However, this situation differs in terms of the firm specific characteristics as determined during the validity process. Accordingly, it is emphasized that, successful new intermodal service projects are substantially integrated with human resources.

The most significant implication of this

study is that the issues related to human resources have not been considered the intermodal transport companies. In this respect, it is found that the “formation of cross-functional teams” and “personnel training” stages have rarely been applied rather than the other stages. “Assignment of individual roles and responsibilities”, “joining the top management in selecting team members” and “observing the service delivery trial by the firm’s personnel” are determined as the least applied activities. However, as indicated by Cadwallader et al., (2010) [53], employee participation is vital for successful implementation of NSD.

Furthermore, Alam (2014) [35] claimed that previous models had unnecessary details to meet the needs of NSD, thus provided shorter model thanks to the digitalization, especially with the help of social media. However, this study has revealed that detailed models are much more appropriate for the intermodal transport due to its capital intensive and complex nature. From this aspect, it is realized that NSD processes have industry-specific nature and should be structured in terms of the dynamics and needs of the industry.

## 5. Conclusion

The importance of intermodal transport has increased worldwide including Turkey due to its environmentally friendly nature and contribution to the cost reduction during the logistics processes. This situation has provided much more attention to the new intermodal service projects. However, as approved by the professionals during the validity process, the service industry which the intermodal transport involves in has differences in terms of the NSD processes. In this context, intermodal transport has some specific characteristics such as being international, necessity of integration between software and hardware of different transport modes, having medium level of customer contact etc. Due to these

characteristics of intermodal transport, each stage of NSD process should be carefully conducted because of the low fault tolerance. Additionally, financial stability of the companies operating in this industry should be steady as the services are conducted without considering the demand as approved by the professionals during the validity process.

The results of the study also provide implications for the managers. The questions on NSD such as “Do the managers of intermodal service providers follow a specific NSD process?”, “Should linear or parallel process be followed?” are asked. Accordingly, managers should follow a linear and carefully designed NSD process due to the nature of industry. Furthermore, it is proposed that being market oriented needs to be prioritized by the company for successful NSD process.

This study is the first step on NSD in intermodal literature. However, as with any study, there are some limitations on this study as well. First, the sampling of the study is restricted to only one country. Secondly, a new model including different stages and activities can be measured using other research methods. Afterward, this new model can be tested within a wider geographical area, which can be regarded as a future research direction. Additionally, the studies on determining the failure and success factors for the new intermodal services can be conducted as well. Last but not least, the reason for why the topics of the human resources have not been paid enough attention during the NSD process can be investigated in the future studies.

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