

## The Measurement of the Perception of the Relationship between Selection Criteria and Critical Success Factors of Enterprise Resource Planning

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### **Abstract**

*The purpose of this study is to measure the perception of the relationship between most cited selection criteria and critical success factors of Enterprise Resource Planning. After the literature review has been done, most cited selection criteria and critical success factors have been grouped with the Balanced Scorecard methodology in order to obtain more scientific match of the selection criteria and critical success factors. Following the Balanced Scorecard methodology, the most cited selection criteria and critical success factors have been matched and totally 16 hypotheses have been formed. The statistical analyses such as descriptive analyses and correlation analyses have been applied. Positive relationship has been found between the selected most cited selection criteria and critical success factors of Enterprise Resource Planning.*

**Keywords:** Enterprise Resource Planning, ERP Selection Criteria, Critical Success Factors of ERP, Balanced Scorecard

### **Introduction**

With the remarkable increase in the pace of technology and globalization, the need for computer software began to increase to keep business operations under control. That is also one of the reasons of the widespread use of Enterprise Resource Planning (ERP) systems.

This research mainly investigates the two important components of ERP; selection criteria and critical success factors. These two topics have been investigated in the literature separately. However, no studies have been known to us, which investigates the selection criteria and critical success factors together. Therefore, the purpose of this study is to measure the perception of the relationship between the most cited selection criteria and critical success factors of ERP. The study is organized as follows. The first section discusses the meaning of ERP, the selection criteria and critical success factors of ERP. The second section is about Balance Scorecard methodology. The third session includes the empirical analysis, the hypotheses, and the results of the study. Lastly, the results of this study have been discussed in the conclusion part.

### **1. The Definition of ERP, ERP Selection Criteria, and Critical Success Factors of ERP**

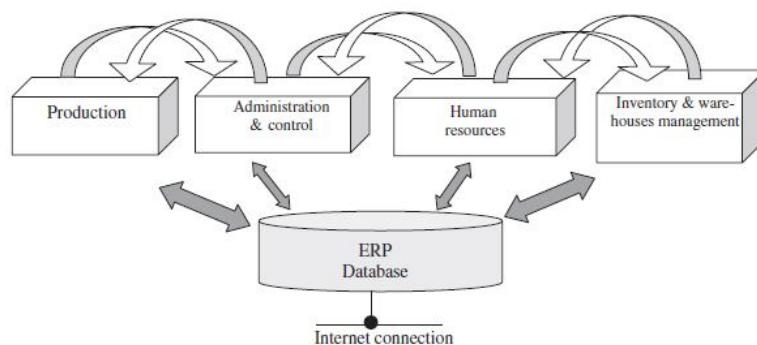
This section discusses the definition and scope of ERP with respect to selection criteria and the critical success factors (CSF) of ERP.

### 1.1. The definition and scope of ERP

ERP has been defined in various ways in the relevant literature. Aladwani (2001) has made the definition of ERP as an integrated set of programs that provide support for core organizational activities and listed the activities such as manufacturing and logistics, finance and accounting, sales and marketing and human resources. According to Jacobs and Weston (2007); ERP is to provide external advantages to plan and control the organization effectively by using the internal information to define business processes, organize and standardize the format. ERP is a set of internal enterprise-wide tools which facilitate better management and integration of production and other back office operations within the enterprise. (Koh et al., 2008).

The Eleventh Edition of the APICS Dictionary (Blackstone and Cox, 2005) defines ERP as a framework for organizing, defining, and standardizing the business processes which is necessary to effectively plan and control an organization so the organization can use its internal knowledge to seek external advantage (Jacobs and Weston, 2007). According to Wight, ERP, at the operational level, is a game plan for planning and monitoring the resources of a manufacturing enterprise, including the functions of manufacturing, marketing, finance and engineering which can be seen in the Figure 1 (as cited in Loh and Koh, 2004).

**Figure 1: ERP- Integrated Architecture**



**Source:** Loh and Koh 2004

### 1.2. ERP Selection Criteria

In today's rapidly changing competitive atmosphere, choosing the right ERP solution has become much more important, which matches the organizational needs with its processes (Baki and Çakar, 2005). In order to identify the most cited selection criteria, the relevant literature has been investigated and first 10 criteria have been listed in Figure 2.

**Figure 2: The Selection Criteria**

Selection Criterias	Baki, Çakar, 2005	Ayağ, Özdemir, 2007	Perera, Costa, 2008	Tsai et al., 2009	Kahraman et al., 2010	Onut, Efendigil, 2010	Wieszala et al., 2010	Wachnik, 2012	Gürbüz et al., 2012	Mahara, 2013	Schrödl, Simkin, 2014	
Price - Service Cost	x		x		x		x		x		x	6
Functional Requirements - Functionality	x	x				x	x		x		x	6
Vendor Reliability		x				x	x		x	x		5
System Reliability	x				x	x	x		x			5
Service and Support	x	x	x				x		x			5
User friendly				x	x		x			x		4
Supplier's references	x			x	x			x				4
Reduced IT Infrastructure Cost - Set up Cost		x	x		x					x		4
Implementation time	x		x				x		x			4

### 1.3. The Critical Success Factors of ERP

In order to identify the most cited critical success factors of ERP, the relevant literature has been investigated and first 10 of the success factors have been listed in Figure 3.

**Figure 3:** The Critical Success Factors

CSFs	Somers, Nelson, Koh 2001	Loh, Koh 2004	Zhang et al. 2005	Beheshti, Chien, Tsaur 2006	Woo, Perez, 2007	Garcia-Sanchez, Perçin 2007	Ustasüleyman, Perçin 2010	Tsai et al., 2011	Upadhyay et al., 2011	Akça, Özer 2012	Norton et al., 2012	Shaul, Tauber, 2012	Akça, Özer 2013	Bayraktaroğlu, Uluköy 2013	Tekbaş, Ömürören 2013	Ahmad, Cuenca, 2013
Top Management Support	x	x	x	x		x			x	x	x	x		x	x	x
Project Management	x	x	x	x		x	x		x	x	x	x		x	x	
Business Plan and Vision		x	x			x			x		x				x	
Effective Communication		x	x			x	x			x				x		
Change Management	x					x	x			x	x	x				
ERP Teamwork - Project Team		x				x	x				x					x
Selection of ERP - ERP System Selection	x					x			x	x	x	x				
User training on software	x					x			x	x	x	x			x	
User Satisfaction			x		x				x				x			

## 2. The Implementation of Balanced Scorecard into ERP

Balanced Scorecard Methodology has been selected as a scientific approach in order to group the selection criteria and success factors in a logical and relational way. This method also provides a chance of adding new perspectives. The definition and implementation of Balanced Scorecard methodology has been given in this section.

### 2.1. The definition of Balanced Scorecard

The concept of a Balanced Scorecard (BSCARD) was developed by Kaplan and Norton to develop performance objectives and measures linked to strategy (Kaplan and Norton, 2001). According to Chang et al. (2011), BSCARD is a concept to measure whether the micro operational activities of a company are aligned with its macro objectives in terms of vision and strategy.

According to Martinsons et al., the BSCARD groups the wider range of effects of ERP (as cited in Rosemann and Wiese, 1999), as it originally consists of four perspectives named as financial, internal processes, customer, and innovation and learning. The financial perspective measures the ultimate results that the business provides to its shareholders. Customer perspective focuses on customer needs and satisfaction as well as market share. Internal perspective focuses on the performance of the key internal processes which drives the business. Innovation and learning direct attention to the basis of all future success – the organization's people and infrastructure (Edwards, 2001). Mansor and Bahari (2010) also used BSCARD methodology to evaluate the benefits of ERP with its 4 dimensions. When the implementation of BSCARD methodology into ERP has been analyzed, it has been found out that the fifth perspective has been added. Rosemann and Wiese's study (1999) was one of them, which added 'project perspective' into the BSCARD implementation, when measuring the performance of ERP software. Hence, "technology perspective" has been added as a new perspective into BSCARD methodology in this study, which is further explained in the implementation part.

### 2.2. Balanced Scorecard Methodology Implementation

The purpose of this study is to measure the perception of the relationship between the selection criteria and success factors of ERP. Hence, the selection criteria and success factors have been chosen according to the frequency that they have been mentioned in literature. A total of 67 selection criteria and 69 success factors have been listed in this study. As the number of selection criteria and success factors were too many and hard to evaluate, Balanced Scorecard (BSCARD) methodology has been used in order to make a logical grouping of the mentioned criteria and factors.

According to the BSCARD methodology, the titles of the group of the factors have been listed as Financial, Customer, Internal Processes, Innovation and Learning, and Technology. With the same methodology, the titles of the groups for success factors have been listed as; Cost, Vendor, Internal Processes, Innovation and Learning, and Technology. "Technology" title has been added additionally to the BSCARD groups for this study. The relation between the selection criteria and success factors has been built according to their meanings, coverage, and the citation numbers in the literature. The criteria and factors with the highest citation numbers were matched with each other. On the other hand, there were factors which have same number of citation and similar name, but different coverage such as; system quality and information quality. To match the quality in selection criteria, system quality has been chosen instead of information quality as success factor.

“Vision” in selection criteria was matched with “Business plan and vision” in success factors in order to see the relation of the same ideas in different perspective, as “Business plan and vision” was cited often in the literature. On the other hand, top management support was not taken into the hypotheses as a result of not being able to make any connection between the listed selection criteria in internal process.

The grouped selection criteria and success factors by the BSCARD methodology with the number used in the literature have been listed in the Tables 1, 2, 3, 4 and 5. The mentioned selection criteria and success factors have been related to each other and chosen for the further investigation. In addition, the hypotheses of this research which have been explained in the following section have been built on them.

**Table 1:** BSCARD Implementation Group Financial/Cost

Selection Criteria	Success Factors		
<b>Financial / Cost</b>			
Price - Service Cost	6	Project Cost	1

**Table 2:** BSCARD Implementation Group Customer/Vendor

Selection Criteria	Success Factors	
<b>Customer / Vendor</b>		
Service and Support	5	Vendor support
Domain knowledge of the vendor	3	Use of consultants
Consultancy	3	Vendor's staff knowledge

**Table 3:** BSCARD Implementation Group Internal Processes

Selection Criteria	Success Factors	
<b>Internal Processes</b>		
User friendly	4	Business Plan and Vision
Vision	2	Effective Communication
Flexibility in adjusting demands according to business requirements	2	Change Management
Strategic Alignment	1	User Satisfaction
Resistance to change	1	Business Process Reengineering

**Table 4:** BSCARD Implementation Group Innovation & Learning

Selection Criteria	Success Factors	
<b>Innovation &amp; Learning</b>		
Training Performance	3	User training on software
Innovative Business Processing	2	Training and job redesign

**Table 5:** BSCARD Implementation Group Technology

Selection Criteria	Success Factors	
<b>Technology</b>		
Functional Requirements – Functionality	6	Software Development, Testing and Repair
System Reliability	5	Implementation strategy and timeframe
Implementation time	4	System Quality
Customization	3	Software and Hardware Compliance with ERP
Quality	2	Software customization

After the grouping and matching the related selection criteria and success factors, empirical analysis has been done by using survey methodology.

### 3. The Empirical Analysis

In the third and last section, the preparation of the questionnaire, the pilot study, the data collection, and analysis processes have been explained.

### **3.1. The preparation of questionnaire**

In this study, the survey method has been used in order to collect the research data as a quantitative analysis method. The questionnaire has been specially designed for this study for ERP users and ERP project team members. The survey has four parts. The first part is to collect basic information about the participants and the company. The second part is to evaluate the importance of the decided selection criteria for choosing ERP, whereas the third part is to evaluate the importance of decided success factors for the success of ERP. Lastly, the forth part has been designed for the cross-check questions, which are for the first seven success factors and selection criteria that have been cited most in the literature.

### **3.2. The Pilot Study**

As an original questionnaire has been prepared in this study, the pilot study has been done in order to evaluate the reliability of this study. The pilot study has been done with 25 people from different sectors; 19 from Turkey, 6 from other countries via e-mail. In the pilot study, the reliability analysis has been done separately via SPSS 16 for totally 39 questions; 16 from selection criteria, 16 from success factors, 7 from cross check questions. The results gave Cronbach's Alpha coefficients, as 0,925 for selection criteria, 0,959 for success factors and 0,879 for cross check questions, which shows that the questionnaire is reliable. In addition, the reliability has been analyzed per question with Corrected Item-Total Correlation multiple values. Any value that has been found less than 0,30 shows the question that needs to be removed from the questionnaire. In parallel with this result, Cronbach's Alpha coefficients for if Item Deleted values have been found between 0,80 and 1, which shows that it is not necessary to extract any question from the survey.

### **3.3. The Data Collection and Analysis**

The data of this research have been collected from all sectors that use ERP software, not only from Turkey, but also from all around the world. Therefore, the questionnaire has been prepared on free online research web platform; "Qualtrics" to reach many people all around the world with the advantage of the use of technology. The questionnaire has been spread via e-mail and private message on LinkedIn to the personal contacts, user groups such as ERP Committee (which is the biggest ERP user organization in Turkey), brand base user groups (Oracle, Microsoft, SAP, Stream soft vs.), ERP Community (which is the worldwide ERP user and sales group) via LinkedIn, via direct messages to the members of such groups related with ERP on Twitter. The data collection has been done, especially at the time which everybody had an access to internet and used the social media actively. Not every participant completed the survey. With the advantage of the online survey platform Qualtrics, the survey did not allow participants to pass the next question or table without filling the existing part totally. As a result, there were no missing data. The questionnaires, which were not completed, were not taken into consideration. The survey has been shared on 28 groups related with ERP through LinkedIn. It has also been sent as direct message to more than 1200 people on Twitter, who were members of ERP related groups and specifically showed an interest on ERP in their personal profile. 203 people started the questionnaire, but only 135 people filled all the survey. The response rate is 67%. The numbers of the participant and response rates have been given in the Table 6.

**Table 6:** The Total Number of Participants and Response Rate by Countries

Total Participant from Turkey	150	Total Participants from Other Countries	53
Total Filled From Turkey	100	Total Filled From Other Countries	35
Response Rate	67%	Response Rate	64%

The analysis of the data has been made via SPSS Version 16.0 Statistics Program. The reliability analysis has been done finally for 135 questionnaires. The Cronbach's Alpha coefficient was found 0,919 for selection criteria, 0,929 for success factors, and 0,849 for cross check questions which approves the reliability of the questions. Skewness and kurtosis values have been found between -3 and +3 which show the normal distribution of the data (Groeneveld and Meeden, 1984).

**Figure 4:** The Reliability Analysis Results, Cronbach's Alpha Coefficients of Cross Check Questions in The Study

#### Item-Total Statistics

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
Cross_Project_cost	24,36	13,589	0,45	0,3	0,851
Cross_Service_and_support	24,01	13,351	0,607	0,453	0,829
Cross_User_friendly	24,33	12,448	0,631	0,468	0,824
Cross_Business_plan	24,2	12,833	0,596	0,427	0,83
Cross_Training_performance	24,42	12,111	0,641	0,514	0,823
Cross_Functional_requirements	24,02	12,708	0,692	0,564	0,816
Cross_System_reliability	24,04	12,588	0,658	0,515	0,82

As a result of the reliability analysis, Cronbach's Alpha coefficients for If Item Deleted values have been found more than 0, 70, between 0,963 – 9, 65, which shows that the survey questions are relatively reliable.

#### 3.4. The Descriptive Statistics

The first part of the survey has been designed to describe the general profile such as; which sectors the company is in, the number of the years the company is in the sector, the number of the years the company is using ERP, which vendor and which modules of ERP the company is using. The majority of the participants, 74, 1%, was from Turkey, whereas 25, 9% of the participants was from other countries. 47, 4% of the participants was in their sector for more than 15 years, followed by 22, 2% up to 5 years; 18, 5% was in their sector between 6-10 years and lastly 11, 9% was in their sector between 11-15 years. 37, 8% of the participants was from big size companies, 30, 4% was from medium size, 20% was from small size and 11, 9% was from micro size companies, respectively.

It has been found out that 16,3% of the participants has used ERP for 10 years, 14,8% of the participants has used ERP for 5 years and 11,1 % of the participants has used ERP for 2 years. The question about ERP modules have been asked with multiple choice questions. The ERP system provides an opportunity to the users to choose the modules as they want. Hence, the majority of the participants as 27, 4%, has used all the modules of ERP.

**Figure 5:** The Information of Vendor Usage

#### Which\_vendor

	Frequency	Percent	Cumulative Percent
Valid Oracle	12	8,9	8,9
Microsoft	23	17,0	25,9
SAP	33	24,4	50,4
StreamSoft	1	0,7	51,1
Others	66	48,9	100,0
Total	135	100	

As it is listed in the Figure 5; the majority of the participants, 48, 9%, has used other vendors which are not listed in the questionnaire. On the other hand, only 24, 4% of the participants have used SAP, which is the one of the biggest ERP vendor in the world.

**Figure 6: Mean and Standard Deviation of Selection Process****Descriptive Statistics**

	Mean	Std. Deviation
SP_Project_cost	3,85	0,981
SP_Service_and_support	4,33	0,862
SP_Domain_Knowledge	3,93	0,895
SP_Consultancy	4,16	0,871
SP_User_friendly	3,93	1,012
SP_Company_vision	4,07	0,899
SP_Flexibility	4,16	0,821
SP_Strategic_alignment	3,91	0,851
SP_Resistance_change	3,65	1,180
SP_Training_performance	3,73	0,948
SP_Innovative_business	3,93	0,927
SP_Functional_requirements	4,09	0,815
SP_System_reliability	4,05	0,867
SP_Implementation_time	3,95	0,949
SP_Customization	3,98	0,988
SP_Quality	4,06	0,896

As a descriptive statistical analysis, the mean of the factors has been listed in the Figure 6. As a result of this research, the participants generally agreed with the importance of listed selection criteria while choosing ERP. If the mean of the results were evaluated, service and support have been found as the most important criteria according to the participants' perception, followed by consultancy and flexibility.

**Figure 7: Mean and Standard Deviation of Success Factors****Descriptive Statistics**

	Mean	Std. Deviation
SF_Project_cost	3,64	1,003
SF_Vendor_support	4,07	0,869
SF_Vendor_knowledge	4,04	0,876
SF_Using_consultancy	4,07	0,825
SF_User_satisfaction	3,97	0,880
SF_Business_plan_vision	4,04	0,836
SF_Business_process_reengineering	4,01	0,885
SF_Effective_com	4,11	0,870
SF_Change_management	3,93	0,869
SF_User_training	3,99	0,910
SF_Training_and_job_redesign	3,94	0,844
SF_Software_hardware_compliance	3,84	0,883
SF_Software_development	3,96	0,832
SF_Implementation_strategy	4,05	0,813
SF_Software_customization	4,03	0,889
SF_System_quality	4,04	0,841

The same evaluation has been made for success factors which show that the participants generally agreed with the importance of listed success factors in the success of ERP Software. On the other hand, effective communication has been found as the most important success factor of ERP software.

### 3.5. The Correlation Analysis

The correlation analysis has been made in order to determine whether participants' perception indicates significant relationship between selection criteria and success factors of ERP. According to the correlation analysis; correlation coefficient is to be between -1 and +1 and shows the direction and strength of the relationship. The Pearson correlation coefficient more than 0.6 has been accepted as a strong relationship.

**H1: Participants' perception indicates a significant relationship between price-service cost in selection criteria and project cost in success factors.**

**Figure 8:** H1 Correlation Analysis

**Correlation**

		SF_Project_cost	SP_Project_cost	Cross_Project_cost
SF_Project_cost	Pearson Correlation	1	0,499**	0,512**
	Sig. (2-tailed)		0,000	0,000
	N	135	135	135
SP_Project_cost	Pearson Correlation	0,499**	1	0,505**
	Sig. (2-tailed)	0,000		0,000
	N	135	135	135
Cross_Project_cost	Pearson Correlation	0,512**	0,505**	1
	Sig. (2-tailed)	0,000	0,000	
	N	135	135	135

\*\*.Correlation is significant at the 0.01 level (2-tailed).

A significant relationship has been found with 0,499 Pearson correlation coefficient.

**H2: Participants' perception indicates a significant relationship between service – support in selection criteria and vendor's support in success factors.**

Significant and strong relationship has been found with 0,644 Pearson correlation coefficient.

**H3: Participants' perception indicates a significant relationship between domain knowledge of the vendor in selection criteria and vendor's staff knowledge in success factors.**

A significant relationship has been found with 0,356 Pearson correlation coefficient.

**H4: Participants' perception indicates a significant relationship between consultancy services in selection criteria and using consultancy services in success factors.**

A significant relationship has been found with 0,596 Pearson correlation coefficient.

**H5: Participants' perception indicates a significant relationship between being user friendly in selection criteria and user satisfaction in success factors.**

A significant relationship has been found with 0,425 Pearson correlation coefficient.

**H6: Participants' perception indicates a significant relationship between company vision in selection criteria and business plan – vision in success factors.**

A significant relationship has been found with 0,462 Pearson correlation coefficient.

**H7: Participants' perception indicates a significant relationship between flexibility in adjusting demands according to business requirements in selection criteria and business process reengineering in success factors.**

A significant relationship has been found with 0,409 Pearson correlation coefficient.

**H8: Participants' perception indicates a significant relationship between strategic alignment in selection criteria and effective communication in success factors.**

A significant relationship has been found with 0,478 Pearson correlation.

**H9: Participants' perception indicates a significant relationship between resistance to change in selection criteria and change management in success factors.**

A significant relationship has been found with 0,367 Pearson correlation coefficient.

**H10: Participants' perception indicates a significant relationship between training performance in selection criteria and user training in success factors.**

A significant relationship has been found with 0,473 Pearson correlation coefficient.

**H11: Participants' perception indicates a significant relationship between innovative business processing in selection criteria and training and job redesign in success factors.**

A significant relationship has been found with 0,528 Pearson correlation coefficient.

**H12: Participants' perception indicates a significant relationship between functional requirements in selection criteria and software and hardware compliance in success factors.**

A significant relationship has been found with 0,446 Pearson correlation coefficient.

**H13: Participants' perception indicates a significant relationship between system reliability in selection criteria and software development – testing – repair in success factors.**

A significant relationship has been found with 0,458 Pearson correlation coefficient.

**H14: Participants' perception indicates a significant relationship between implementation time in selection criteria and implementation strategy – timeframe in success factors.**

A significant relationship has been found with 0,497 Pearson correlation coefficient.

**H15: Participants' perception indicates a significant relationship between customization in selection criteria and software customization in success factors.**

A significant relationship has been found with 0,587 Pearson correlation coefficient .

**H16: Participants' perception indicates a significant relationship between quality in selection criteria and system quality in success factors.**

Significant and strong relationship has been found with 0,611 Pearson correlation coefficient.

### 3.6. Results and Discussion

After the data analysis, the results of the research showed that all the hypotheses have been accepted. The summary of the correlation analysis and results of the study have been listed in the Table 7.

**Table 7:** The Results of the Study

Selection Criteria	Correlation	Success Factors	Hypothesis	Results
Price - Service Cost	<b>0,499</b>	Project Cost	<b>H1</b>	<b>Accepted</b>
Service and Support	<b>0,644</b>	Vendor support	<b>H2</b>	<b>Accepted</b>
Domain knowledge of the vendor	<b>0,356</b>	Vendor's staff knowledge	<b>H3</b>	<b>Accepted</b>
Consultancy	<b>0,596</b>	Use of consultants	<b>H4</b>	<b>Accepted</b>
User friendly	<b>0,425</b>	User Satisfaction	<b>H5</b>	<b>Accepted</b>
Vision	<b>0,462</b>	Business Plan and Vision	<b>H6</b>	<b>Accepted</b>
Flexibility in adjusting demands according to business requirements	<b>0,409</b>	Business Process Reengineering	<b>H7</b>	<b>Accepted</b>
Strategic Alignment	<b>0,478</b>	Effective Communication	<b>H8</b>	<b>Accepted</b>
Resistance to change	<b>0,367</b>	Change Management	<b>H9</b>	<b>Accepted</b>
Training Performance	<b>0,473</b>	User training on software	<b>H10</b>	<b>Accepted</b>
Innovative Business Processing	<b>0,528</b>	Training and job redesing	<b>H11</b>	<b>Accepted</b>
Functional Requirements - Functionality	<b>0,446</b>	Software and Hardware Compliance with ERP	<b>H12</b>	<b>Accepted</b>
System Reliability	<b>0,458</b>	Software Development, Testing and Repair	<b>H13</b>	<b>Accepted</b>
Implementation time	<b>0,497</b>	Implementation strategy and timeframe	<b>H14</b>	<b>Accepted</b>
Customization	<b>0,587</b>	Software customisation	<b>H15</b>	<b>Accepted</b>
Quality	<b>0,611</b>	System Quality	<b>H16</b>	<b>Accepted</b>

As a result of the correlation analysis, positive relationship has been found between the perception of the critical success factors and the selection criteria. The results show that all listed selection criteria and success factors have been found between 0 and 1. On the other hand, the highest relation has been found between Service and support – Vendor support ( $p=0,644$  - H2) and the lowest relation has been found between Domain knowledge of the vendor – Vendor's staff knowledge ( $p=0,356$  – H3). On the other hand, in the correlation analysis on global data, strong relation has been observed on Service and support – Vendor support ( $p=0,644$  –H2), Quality –System quality ( $p=0,611$  – H16).

### Conclusion

The main objective of the study was to determine the measurement of the perception of the relationship between most cited selection criteria and critical success factors of ERP. No studies have been known to us in the literature to evaluate the relationships between the perception of the selection criteria and success factors. The studies found in the literature mainly focused only on one of them. Hence, the measurement of the perception of the relationship between selection criteria and success factors has been chosen as a research topic.

ERP is a worldwide software program that is being used by every sector and business. Therefore, the target of the research was not limited only with manufacturing. As a result, the data have been collected from many different countries such as; Algeria, Australia, Azerbaijan, Colombia, England, Germany, India, Ireland, Israel, Italy, Kenya, Luxemburg, Mexico, Netherland, New Zealand, Poland, Romania, Russia, Spain, Turkey and United States of America. The participants were from different sectors such as; automobile, aviation, chemical industry, construction, production, electric, energy, finance, manufacturing, information technologies, consulting, media, retail, service, telecommunication, textile, and transportation. There were other participants from other countries and sectors that were not taken into consideration because they did not complete the questionnaire. The probable reasons of leaving the questionnaire can be not being related with the topic, not being able to give the right and proper answer, the lack of information about the ERP implementation process, internet connection problems or application problems. At the end of seven months of the data collection period, the response rate was 67%.

The selection criteria and critical success factors have been found from the literature and the most cited ones have been selected and grouped by using Balanced Scorecard (BSCARD) methodology. This grouping focused on ERP with different business perspectives such as cost, customer, process, innovation. "Technology perspective" has been added to the BSCARD methodology only for this study. The examples of adding a new perspective could have been found in the literature for different implementations. For the ERP implementation, there was an example of Rosemann and Wiese's study (1999), which added 'project perspective' as a new perspective.

Totally 16 selection criteria and 16 success factors have been chosen according to their BSCARD group and the number of citations in the literature. The criteria and factors in the same group have been matched according to the similarities; especially the most cited ones have been chosen and matched. After the BSCARD methodology implementation, 16 hypothesis have been created and the data collection they have been evaluated. In the end, the entire hypothesis has been accepted according to the correlation analysis.

As a result of correlation analysis on global data, perceived strong relations have been found between service and support – vendor support, quality – system quality. The terms seem to refer the same meaning. Therefore, the high correlation seems not to be surprising. On the other hand, the correlation between Domain knowledge of the vendor and Vendor's staff knowledge has been found significant but not strong, even though they have the same meaning, which shows that having the same meaning will not have same effect on selection criteria and success factors.

The weakest relations have been found between the domain knowledge of the vendor – vendor's staff knowledge and resistance to change – change management. The probable reasons for this can be the understanding of the criteria and factors separately in the selection process and the evaluation of the success. The domain knowledge of the vendor has been cited much more in the literature. The vendor's staff knowledge has been found in the literature only once which can be the reason of having less correlation between each other. The resistance to change has been found in the literature only once, but change management has been found in more than 5 studies. When we look deeper into the probable reasons, change will be hard to evaluate in the selection process. After the implementation of the ERP system, the effects of change can be seen more widely and physically.

Some similarities between literature and this study have been found such as, Chand et al. (2005) using BSCARD methodology and dividing the ERP success outcomes into 4 dimensions. Although their grouping was only on success outcomes, they put the customer satisfaction under customer dimension. In this study, user satisfaction has been evaluated under internal processes. On the other hand, Chand et al. put the training method satisfaction under learning and innovation, whereas training performance has been evaluated under innovation and learning group.

This study has some limitations. The comparison between the results of Turkey and other countries could not have done, as the limitations on the sample size of other countries made a reliable comparison difficult. In the future, more data can be collected from other countries and therefore, this study can be enlarged. Using an online survey program also caused some problems such as internet connection, some bugs on the website, not having an access via mobile devices. In any problem on the website, participants quitted the survey without filling it totally. Factor analysis could not have been done for the questions of the survey due to the limited number of participants in the study (n=135). In order to make a factor analysis, the number of participants should be more than 300 (Hatcher 1994, Tabachnik and Fidell 1996).

Future research can focus on matching different selection criteria and success factors. On the other hand, the BSCARD methodology can be used in selecting different groups, without adding the technology group or with adding a different group. The companies which would like to choose ERP software can focus on these selection criteria and success factors in order to choose and implement the best ERP software and get the most benefit from the system.

For the future research, the survey can be applied other countries, sectors and. The survey can also include questions about Cloud usage in ERP system. Hence, the results can also give a direction for the future research on ERP Cloud.

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