

## IMPACT OF TRAINING QUALITY & TEAM COMPETENCE ON ERP IMPLEMENTATION SUCCESS: EVIDENCE FROM BOSNIA & HERZEGOVINA

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### Abstract

*This study is focused on empirical factors that are influencing perceived success of ERP implementation by users in companies in Bosnia and Herzegovina. The study investigates effects of training quality and team competence on ERP implementation success in Bosnia and Herzegovina companies. A structured survey, based on previously validated scales, was used to collect the data, and once collected, was processed in SPSS and Microsoft Excel. Descriptive statistics and regression methodology were applied in SPSS. Results revealed statistically significant effects of Training Quality on ERP Implementation Success while the hypothesized effects of Team Competence on ERP Implementation Success were not confirmed. Rejection of direct effects of Team Competence emphasize some specifics of the market and the economy of Bosnia and Herzegovina. It may be that an under-developed economy and the ERP culture caused some factors to be less important in the success of the ERP implementation. Results of this study may help companies, managers and project managers in need of ERP implementation to identify important factors of perceived success by users. The population of the study is from one corporation located in Bosnia and Herzegovina with approximately 400 ERP users that developed and internally implemented their own ERP system.*

**Key words:** *Enterprise Resource Planning; ERP systems implementation; Team Competence; Training Quality*

### I. INTRODUCTION

ERP (Enterprise Resource Planning) is a computer software that allows companies to plan and manage their resources is called. It is comprised of modules which digitally track actual processes and usually covers complete process flow of the company (e.g. from customer order to delivery). ERP has an “all business under one roof” concept that allows for a flow of information within one platform and consistent reporting from the bottom up. It also allows companies to transform digitally and to manage all processes through ERP software without significantly using other tools or software systems. Considering all this, ERP is a main tool or a platform to manage today’s business, either the process being production, services, sales, or any other. Since it is not exclusively about software, there are many challenges in the implementation itself. ERP implementation is an extensive and complex process, and there have been many cases of unsuccessful implementations (PARR, 2000).

With ERP implementation comes the necessity for a cultural change in the company as well. Employees need to adapt to various changes and process optimizations which presents multiple implementation challenges. ERP systems are built on the best practices in an industry. However, inevitably, the software itself may not fit the working processes of the adopting company. In such cases, the ERP software is either customized to better fit an organization’s needs or the organization itself must change its business processes to match the system (Bradford, 2003).

Our goal is to investigate user perception of implementation success through measures: Training quality and team competence.

### II. LITERATURE REVIEW

#### Evolution of ERP

In the 1990’s Grant Thornton coined the acronym ERP. During the mid-1990’s the ERP concept took off and replaced many legacy mainframe applications. Due to the Year 2000 phenomenon companies were given

another reason to replace their old systems. This new concept became the de facto business management tool for all types of businesses. It expanded from back office use (accounting and other transactional functions) to front office, including Customer Relationship Management (CRM) and pipeline management. Today ERP systems are widely used in businesses of all sizes and all industries. New technology continues to expand the ease of use of the application making it an even more important and valuable tool for organizations (Kim, Rich, Chris, & Fran, 2019).

**Training Quality**

In reviewed literature training quality is recognized as a critical factor for success of ERP project implementation. One of the critical success factors (CSF) of an ERP implementation project is user training (DOROBĂȚ & NĂSTASE, 2012).

There are many methods of training that can be used in project implementation and it is important to select right ones which are acceptable to the end users. It is usually best to combine several methods such as classroom training with video presentations and live demonstrations where users can attempt to apply knowledge on a test environment. Clear management commitment, testing user’s knowledge and constant support upon starting use of ERP systems should follow to ensure that training subjects are followed through in practice. Training on its own does not mean much if it is not part of well-coordinated process in the project of ERP implementation.

Some studies measured training related variables and concluded that it has a significant influence on quality benefits. The multiple regression results revealed positive effects of Training, Hardware and software, project management, and Top Management Support on Quality benefits of ERP (D.Deshmukh, Thampi, & Kalamkar, 2015).

The literature reviewed above helped establish hypothesis 1 of this study.

*H1: Training quality affects ERP Implementation success*

**Team competence**

A team is a small group of people with complementary skills who are equally committed to a common purpose or goals, as well as working approach for which they hold themselves mutually accountable (Katzenbach, 1999).

Competence is consisted of knowledge, skills and abilities possessed by individuals (Hunt, 1997).

Team competence is a factor we will be using to measure success of ERP implementation in Bosnia and Herzegovina, as many authors concluded that it influences success of ERP implementation. For example, (Dezdar & Ainin, 2011) develop the hypothesis that ERP TCC (Team Competence and Composition) is positively related to ERP implementation success. Somers and Nelson state 22 critical factors for the success of ERP implementation and team competence takes second place among them. (Somers & Nelson, 2001).

The literature reviewed above helped to establish hypothesis 2 of this study.

*H2: Team competence affects ERP Implementation success*

**ERP Implementation success**

Dezdar & Ainin (2011) investigated if Effective PRM (project management) is positively related to ERP implementation success and if ERP TCC (team competence and composition) is positively related to ERP implementation success.

The results of this study support proposed hypothesis (H1) that there is a positive relationship between PRM and ERP implementation success. The findings of this research also support the proposed hypothesis (H2) that there is a positive relationship between ERP TC and ERP implementation success (Dezdar & Ainin, 2011).

After finding bases for other hypotheses we can conclude that it is justifiable to conduct research for companies in Bosnia and Herzegovina since no studies of such kind were found at the time of writing this paper.

Based on reviewed literature we were able to establish model shown on figure 1:

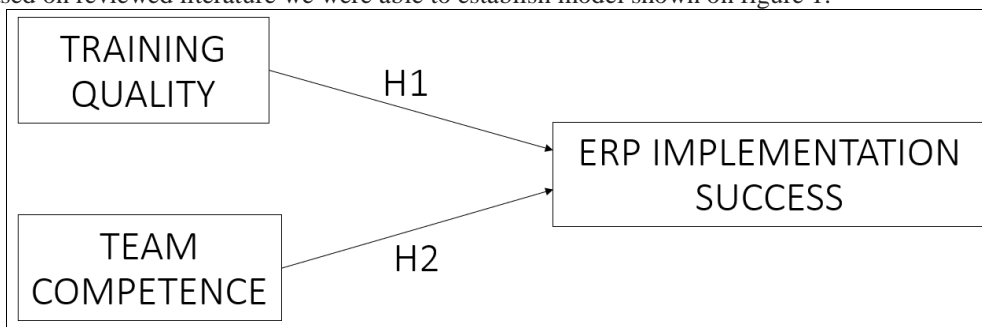


Figure 1: Research Model

### III. RESEARCH METHODOLOGY

ERP usage in companies in Bosnia and Herzegovina is underdeveloped and mostly large companies who must have this kind of the system are using it. A corporation with approximately 6000 employees was selected for this study. It is one of the largest group of companies in Bosnia and Herzegovina, and has a fully implemented ERP system. Our selected employees are production and administrative ones who use ERP in their daily tasks. Companies within this Group are manufacturing products in various industries such as: Materials, Leather, Furniture, Sewing and Metalworks. The population of our study is not encompassing of all 6000 employees, but rather it focuses on the 400 ERP users working for this corporation. Out of 400, we received 77 complete responses were received, indicating a response rate of 19.25 %. A structured survey based on previously validated scales was used to collect data. The validity and reliability of the instrument was assured through adequate statistical tests which were performed upon data collection. Data was collected using an online (digital form) structured survey. Users filled out the Google form document distributed through HR department to employees who use the ERP system. Scales that are used were previously used in research papers and are valid and reliable for measuring defined hypotheses:

- D. Deshmukh, Thampi, & Kalamkar (2015) concluded that training has positive effects on ERP quality benefits, and the scale used seems appropriate for our research;
- Dezdar & Ainin (2011) hypothesized that ERP TCC (Team Competence and Composition) is positively related to ERP implementation success. The scale they used was very useful for implementing this study.

We processed the date using SPSS and Microsoft Excel. Descriptive statistics, validity and reliability tests, and regression analysis were used to research effects of independent variables on the dependent variable.

### IV. DATA ANALYSIS

As a first step in this our analysis of results we conducted reliability (Cronbach’s Alpha) and validity tests were conducted (EFA, Exploratory Factor Analysis). Rules of Cronbach (1951) are often used to determine reliability of model construct. For internal consistency purpose, this widely adopted measure of reliability was very useful for the study (Cronbach & Richard, 2004).

As shown in Figure 3 below all values are larger of than 0.7; which is considered adequate.

Reliability results for hypotheses with satisfactory values are as follows:

Table 1: Reliability analysis

Variable	Cronbach Alpha	Items
ERP implementation Success – User satisfaction	.893	7
ERP implementation Success – Organizational impact	.911	8
Training quality	.934	8
Team competence	.971	9

For validity analysis Joseph F. Hair Jr. (2014) consider values greater than .5 adequate. For ERP implementation success - User satisfaction Measure all values are above .5

Table 2: Validity of ERP implementation Success – Dimension User satisfaction

Validity	Value
ERP implementation Success – User satisfaction Item 1	,765
ERP implementation Success – User satisfaction Item 2	,825
ERP implementation Success – User satisfaction Item 3	,838
ERP implementation Success – User satisfaction Item 4	,762
ERP implementation Success – User satisfaction Item 5	,759
ERP implementation Success – User satisfaction Item 6	,761
ERP implementation Success – User satisfaction Item 7	,777

For ERP implementation Success – Organizational impact Measure all values are above .5

Table 3: Validity of ERP implementation Success – Dimension Organizational impact

Validity	Value
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ERP implementation Success – Organizational impact Item 1	,791
ERP implementation Success – Organizational impact Item 2	,760
ERP implementation Success – Organizational impact Item 3	,789
ERP implementation Success – Organizational impact Item 4	,804
ERP implementation Success – Organizational impact Item 5	,795
ERP implementation Success – Organizational impact Item 6	,754
ERP implementation Success – Organizational impact Item 7	,766
ERP implementation Success – Organizational impact Item 8	,830

For Training quality Measure all values are above .5

Table 4: Validity of Training Quality

Validity	Value
Training quality Item 1	,781
Training quality Item 2	,846
Training quality Item 3	,880
Training quality Item 4	,888
Training quality Item 5	,842
Training quality Item 6	,804
Training quality Item 7	,843
Training quality Item 8	,767

For Team competence Measure all values are above .5

Table 5: Validity of Team Competence

Validity	Value
Team competence Item 1	,908
Team competence Item 2	,890
Team competence Item 3	,925
Team competence Item 4	,936
Team competence Item 5	,919
Team competence Item 6	,908
Team competence Item 7	,893
Team competence Item 8	,894
Team competence Item 9	,867

Table 6 shows demographical characteristics indicating presence of respondents with different gender, age groups and education levels.

Table 6: Demographics

Variable	Demographics	Number	Percentage
Gender	Female	21	27%
	Male	56	73%
	Total	77	100%
Age	20-29	11	14%
	30-39	43	56%
	40-49	20	26%
	50+	3	4%
	Total	77	100%

Education	High School	33	43%
	Bachelor	38	49%
	Master	5	6%
	Doctorate	1	1%
	Total	77	100%

Descriptive statistics results in the survey have shown that 73% of the sample was male and was 27% female. This demonstrates a specific ratio in the ERP sample and does not reflect the ratio in the overall company population. This is interesting due to the fact that in population there are more female employees compared to number of male employees in the company. It is however noticeable that when it comes to ERP users, males dominated the sample.

When it comes to age, it is clear that most users come from the age group of 30-39 years with 43 users or 56%. Following this it is the 40-49 group with 20 users or 26%.

Education is mostly at the Bachelor level with 38 users or 49%, followed by High School level with 33 users or 43%. Master level has 5 users or 6% and Doctorate level has only 1 or 1%. This shows that the study includes a large number of administrative employees who are mostly Bachelor educational level and they use ERP in administrative processes like Inbound, outbound, finance, etc., while workers within the production lines mostly have High School education which corresponds with the second largest population category in Education statistics.

All scales were measured using five-point Likert scale with following interpretation:

- 1 Strongly Disagree
- 2 Disagree
- 3 Neutral
- 4 Agree
- 5 Strongly Agree

Table 7: Descriptive Statistics of ERP Implementation Success Variable

Item	Mean	St. Dev.	Min	Max
ERP implementation Success – User satisfaction item 1	3,99	0,70	1,00	5,00
ERP implementation Success – User satisfaction item 2	3,87	0,78	2,00	5,00
ERP implementation Success – User satisfaction item 3	3,73	0,91	1,00	5,00
ERP implementation Success – User satisfaction item 4	3,65	0,89	1,00	5,00
ERP implementation Success – User satisfaction item 5	3,90	0,70	2,00	5,00
ERP implementation Success – User satisfaction item 6	3,83	0,86	2,00	5,00
ERP implementation Success – User satisfaction item 7	3,44	0,97	1,00	5,00
ERP implementation Success – US_ TOTAL	3,77	0,65	1,86	5,00
ERP implementation Success – Organizational impact item 1	3,71	0,72	2,00	5,00
ERP implementation Success – Organizational impact item 2	3,88	0,71	2,00	5,00
ERP implementation Success – Organizational impact item 3	3,75	0,86	1,00	5,00
ERP implementation Success – Organizational impact item 4	3,66	0,84	1,00	5,00
ERP implementation Success – Organizational impact item 5	3,60	0,82	2,00	5,00
ERP implementation Success – Organizational impact item 6	3,64	0,76	2,00	5,00
ERP implementation Success – Organizational impact item 7	3,69	0,80	1,00	5,00
ERP implementation Success – Organizational impact item 8	3,62	0,71	2,00	5,00
ERP implementation Success – Organizational impact_ TOTAL	3,69	0,61	2,25	5,00
ERP implementation Success - TOTAL	3,73	0,60	2,20	5,00

As shown in table 7, MEAN value for item group ERP implementation Success – User satisfaction is 3,77 which indicates users are mostly neutral with tendency to agree with measures regarding ERP implementation success.

Minimum average score is 3,44 for ITEM 7 and maximum average score is 3,99 for ITEM 1 which shows consistent orientation to above mentioned scoring level.

Table 8: Descriptive Statistics of Training Quality

Item	Mean	St. Dev.	Min	Max
Training quality item 1	3,45	0,93	1,00	5,00

Training quality item 2	3,51	0,85	1,00	5,00
Training quality item 3	3,47	0,90	1,00	5,00
Training quality item 4	3,25	0,99	1,00	5,00
Training quality item 5	3,25	0,86	1,00	5,00
Training quality item 6	3,06	1,06	1,00	5,00
Training quality item 7	3,36	1,07	1,00	5,00
Training quality item 8	2,81	1,01	1,00	5,00
Training quality - TOTAL	3,27	0,80	1,38	5,00

Training quality has a variety of answers between MIN 1 and MAX 5. The average total is 3,27 with a minimal average value of 2,81 to maximal average value of 3,51. For item 8 users demonstrated some disagreement with question about revision of training (ERP system training review sessions are scheduled) with a score of 2,81. This can implicate that ERP implementation team didn't organize (enough) review sessions to get feedback from users and improve training techniques. Maximum score goes to item 2 (A formal training program has been developed to meet the requirements of ERP system users), and it suggests that users recognize some level of formal organization towards training program for ERP (with average score of 3,51).

Table 9: Descriptive Statistics of Training Quality

Item	Mean	St. Dev.	Min	Max
Team competence item 1	3,73	0,81	2,00	5,00
Team competence item 2	3,82	0,72	2,00	5,00
Team competence item 3	3,70	0,83	2,00	5,00
Team competence item 4	3,69	0,75	2,00	5,00
Team competence item 5	3,73	0,72	2,00	5,00
Team competence item 6	3,55	0,84	1,00	5,00
Team competence item 7	3,55	0,80	1,00	5,00
Team competence item 8	3,57	0,79	1,00	5,00
Team competence item 9	3,60	0,94	1,00	5,00
Team competence - TOTAL	3,66	0,72	1,78	5,00

Team competence has a total average of 3,66 which shows result between neutral and agree, or to be correct, by the classification used in this study (3,5-4,49) it suggests users agree and acknowledge ERP implementation team competence. Minimum average value is 3,55 for items 6 and 7, and maximum average value is 3,82 for item 2. Results indicate that both items ask similar questions about implementation team participation during training and discussions. Possible explanation for low score is the fact that some of the training sessions were done remotely. Perhaps people still do not recognize this kind of training as adequate for ERP systems and prefer in person, onsite training sessions.

Item 2 with highest score is: "The ERP Implementation Team knows the material he/she is presenting." This confirms that the team writing this article is competent and has knowledge about material they are presenting.

**Empirical findings**

Table 10: Coefficients

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.636	.261		2.433	.018
	TQ	.162	.083	.215	1.951	.055
	TC	.004	.090	.005	.048	.962
	a. Dependent Variable: ERPIS					

Further empirical findings with acceptance level are shown in table below:

Table 11: Hypotheses' Tests

#	Hypothesis	Beta	Sig. (p)	Status
H1	TQ (Training quality)>ERP Implementation success	.215	.055	Supported
H2	TC (Team competence)>ERP Implementation success	.005	.962	Not supported
<i>Note: Confidence interval is determined at 90%</i>				

H1: Training quality affects ERP Implementation success

Proposed Hypothesis 1 was supported and accepted because of the p value ,055 which is lower than 0,1 and acceptable by the determined confidence level of 90%. It is safe to conclude that Training quality affects ERP implementation success. According to the beta value (.215), it can be concluded that the effects of Training quality on Implementation success are positive, and that it can be predicted 21,5% of dependent variable (Implementation success) by having knowledge about independent variable (Training quality).

H2: Team competence affects ERP Implementation success

Hypothesis 2 was not supported because of p value of ,962 which is higher of 0,1 determined by the confidence level of 90%. It can be concluded that Team Competence does not affect ERP implementation success.

## V. CONCLUSION

This research is mainly done to examine already established models worldwide (proven by research explained in literature review) in environment of Bosnia and Herzegovina. The purpose of this study was to investigate which are the most important factors which influence the success of ERP implementation. In Bosnia and Herzegovina awareness for ERP necessity is very low, entrepreneurs use only what they must by the law, and it is very challenging to implement an EPR system. Literature and research confirmed that training quality is a critical success factor for ERP implementation (DOROBĂȚ & NĂSTASE, 2012).

The previously shown research on relationship between Training quality and ERP Implementation success confirms it has significant effect on success of ERP implementation in companies in Bosnia and Herzegovina. This shows compliance with other research results. Training is an opportunity for the organization to step out of the box, learn more about their processes and learn about the new activities they will work with using ERP. If training is not organized and done well, consequences can be that the company has fully functional ERP which nobody uses, and implementation fails.

The research on effects of Team competence on ERP Implementation success is not in line with the results of this study conducted in Bosnia and Herzegovina. Other researchers developed hypothesis that ERP TCC (Team Competence and Composition) is positively related to ERP implementation success (Dezdar & Ainin, 2011). Somers and Nelson are state 22 critical factors for success of ERP implementation and second one among them is team competence (Somers & Nelson, 2001).

This was a surprising result and it recommended to repeat the same study on a larger sample or to do research with multiple ERP solutions included. One of the possible explanations could be that low awareness for ERP importance in Bosnia and Herzegovina returns its population to basic needs and not those factors that could additionally contribute to successful ERP Implementation.

This Study was focused on empirical factors that are influencing perceived success of ERP implementation by users in companies in Bosnia and Herzegovina, namely training quality and team competence. A structured survey, based on previously validated scales, was used to collect the data, and once collected, it was processed by SPSS and Microsoft Excel.

Descriptive statistics and Regression methodology were applied in SPSS to investigate effects of independent variables on the dependent one. Results revealed statistically significant effects of Training Quality on ERP Implementation Success while the hypothesized effects of Team Competence on ERP Implementation Success were not confirmed.

Rejection of direct effects of Team Competence emphasizes some specifics of the market and the economy of Bosnia and Herzegovina. It may be the fact that under-developed economy, and ERP culture cause some factors to be less important in the success of ERP implementation. However, this can be subject of some further research.

Results of this study may help companies, managers and project managers in need of ERP implementation to identify important factors of perceived success by users. The population of the study is a corporation located in Bosnia and Herzegovina with approximately 400 ERP users (out of 6000 employees), a corporation that developed and internally implemented their own ERP system.

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