CURRENT ENTERPRISE RESOURCE PLANNING SNAPSHOT IN BOSNIAN SMALL AND MEDIUM ENTERPRISES

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Abstract: *For the companies relying on hundreds of internal and external suppliers for the millions of components required to produce goods and services, it is quite important to integrate all these functions and departments in order to prevent information inconsistencies, to leverage multiple sources of information within the enterprise and to gain dominance among competitors, and to perform much higher efficiency levels and sustainable performance standards. Therefore, the importance of Enterprise Resource Planning emerges as a major area of interest for many enterprises in order to facilitate the flow and share of information among the different functions within and outside a company.*

However, especially in low income countries, there may be various barriers such as bureaucracy, poor technology infrastructure, and lack of consultancy firms in order to plan, develop and implement an Enterprise Resource Planning project.

This study becomes important that it presents the Enterprise Resource Planning implementation through the leading small and medium-sized enterprises (SMEs) in Bosnia and Herzegovina. A survey-based study is applied to empirically test the Enterprise Resource Planning implementation in Bosnia and Herzegovina and the short interviews with relevant respondents are considered to observe the current Enterprise Resource Planning scenarios of their organizations. Furthermore, some of the surveys can also be considered as interviews.

In the conclusion and discussion parts the survey and interview results are discussed and future research areas are addressed.

Key-words: *Enterprise Resource Planning, survey, interview, small and medium-sized enterprises*

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1. Introduction

Organizational information is generally spread through many in house developed information systems in different functions or organizational units which are called information silos. However, they cannot provide integrated information to increase enterprise-wide performance. Moreover, the maintenance of these systems can cause considerable costs.

For the companies relying on hundreds of internal and external suppliers for the millions of components required to produce goods and services, it is quite important to integrate all these functions and departments in order to prevent information inconsistencies and to leverage multiple sources of information within the enterprise. Therefore, ERP software has emerged as a major area of interest for many businesses in order to facilitate the flow and share of information among the different functions within and outside an enterprise. Enterprise Resource Planning (ERP) has been used in order to effectively plan and manage organisational resources (Koh et al., 2009; Ketikidis et al., 2008; Jacobs and Weston, 2007; Loh and Koh, 2004) and to enhace internal efficiency by integrating different organisational business functions (Tarn et al., 2002). Furthermore, ERP vendors have developed additional modules such as Supply Chain Management (SCM), Supplier Relationship Management (SRM) and Customer Relationship Management (CRM) systems as a result of the demand for integrated information systems and increased competitiveness in supply chains (Hendricks et al., 2007; Møller, 2005). ERP with these systems and internet based systems (e-Business) (Weston, 2003) improved organizational internal and external integration. Therefore, the vendors have developed new generation ERP with the name ERPII (Møller, 2005).

Enterprise resource planning (ERP) market has grown significantly in the last two decades (Mabert, Soni, & Venkataramanan, 2000; Reilly, 2005; D'Aquila, Shepherd, & Friscia, 2009).

IS literature is full of studies related to ERP implementation in almost all aspects including benefits, success rates, success indicators, and success factors. Because of the specific issues of ERP, its implementation has become very important. ERP implementation may have quite serious outcomes on the performance of the overall organisation due to high costs and its integrative character.

Bosnia and Herzegovina is located in the Balkan region and still struggling with the legacy of the Yugoslav wars in the 1990s. Bosnia and Herzegovina can be described as a federal democratic republic that is transforming its economy into a market-oriented system, and is a potential candidate for the European Union and NATO membership (Imamović, 2008) .

Consequently from the literature, the research becomes important that it aims to examine the implementation of ERP Systems through 37 Bosnian high technology enterprises by employing an extensive survey. The study was not employed to one specific sector. Instead, it aimed to reach all sectors in order to have more representative picture. Furthermore, 28 of the surveys can also be considered as interviews.

The study includes six sections starting with this introduction. The second section provides a literature review. The next section is about the research methodology. Then the results are presented. In the fifth section, the findings are discussed and finally the paper is concluded by implications for research and practice.

2. Literature Review

Hasan et al. (2011) aimed to investigate the reasons of ERP implementation in Australia and the implementation issues by the help of a survey study. It was observed that the planned and actual ERP usage is pervasive in the Australian manufacturing sector.

Chang and Chou (2011) studied the impacts of post-implementation learning on ERP usage and ERP effect and identified the influencing factors of post-implementation learning, such as social capital and post-training self efficacy by employing a survey to examine the perceptions of ERP users. It was found out that post-implementation learning has a significant positive influence on ERP usage and ERP impact. Moreover, social capital and post-training self-efficacy are observed to be important antecedent factors of post-implementation learning. Finally, post-training self-efficacy also found to be significantly influential on ERP usage and ERP impact.

Livermore and Rippa (2011) collected the most influential factors in ERP implementation into two categories: Internal and External. Internal variables included (1) Organizational culture, (2) Leadership, (3) Communication, (4) Company size, and (5) Company history while external variables consists of (1) National culture, (2) Industry, (3) Economic conditions, and (4) Political conditions.

Dezdar and Ainin (2011a) examined the effects of organizational factors (i.e. top management support, training and education, enterprise-wide communication) on successful ERP implementation in Iran by employing a survey. According to the results, top management must fully support the project and ensure the plans are communicated and understood through the company, adequate training and education related to the systems must be provided to all users to ensure their ability to use the system effectively and efficiently and therefore contributing to their satisfaction which will in turn affect the implementation success.

Lee et al. (2010) proposed a model to examine the impact of organizational support on behavioral intention (BI) for ERP implementation by considering the technology acceptance model (TAM) through a survey study. It was observed that the organizational support is influential on perceived usefulness (PU) and perceived ease of use (PEOU). Additionally, PU and PEOU highly affected interest in the ERP system and BI to use the system.

Reamers (2002) studied the necessary implementation process and contextual variables such as local or foreign ownerships in China by focusing mainly on SAP R/3 users. The findings suggested that the local Chinese organisations are as successful as the foreign organisations. Hawking (2007) found language, culture and currency as the major issues for ERP implementation in the Asian region. Abdul-Gader (1997) studied the implications of the pertinent economic, sociopolitical, legal and cultural variables for multinational corporation (MNC) IS global policy formulation.

Livermore and Rippa (2011) noticed relatively little research on the relationship between national culture and the ERP projects and aimed to explore this issue by using two case studies from the US and Italy. They observed that national culture is influential on ERP systems implementation manner.

Kumar and Thapliyal (2010) ordered the fundamental activities before implementing an ERP system as: (1) conducting a feasibility study of organizational needs by analyzing the availability of hardware, software, databases, and in house computer expertise, and decide whether ERP is necessary, (2) educating and recruiting end users to be involved, (3) developing a project team consisting of experts, (4) hiring a team of system consultants, (5) training employee and managers, (6) handling the system installation process, and (7) converting data and information in the databases for the new ERP system. Kumar and Thapliyal (2010) suggested management and auditor role, organizational change process, people, and implementation cost and time and employee morale as the fundamental issues to be considered for successful implementation of an ERP solution.

The literature suggests that ERP system implementations have positive influence on operational performance (Mabert et al., 2001; McAfee, 2002). Madapusia and D'Souza (2012) studied the influence of ERP implementation on organisational performance by developing a literature-based and theory-driven model and tested the model through a field study. It is identified that the implementation of each ERP system module has different influences on operational performance measures differently.

Fub et al. (2007) by employing a survey study studied the probable advantages and disadvantages of ERP in the banking sector. The study identified better information transparency, improved inerrability, improved quality of business process and faster

compliance with legal requirements as benefits and loss of flexibility and vendor dependence as the main disadvantages.

Pan et al. (2011) aimed to identify, assess and explore potential risks of ERP in long-term in the post-implementation and exploitation phase by employing a case study. They identified 37 risk events for ERP exploitation.

ERP implementation research is mainly focused on exploratory case studies' results (Motwani et al., 2002; Subramanian and Hoffen, 2005) by considering some critical success factors (CSFs). Livermore and Rippa (2011) reported the most cited CSFs for ERP implementation as: (1) Inadequate requirements definition, (2) Legacy status and ERP customization, (3) Absence of strong commitment on the part of top management, (4) Lack of clear strategy relating to redesign of processes, (5) Resistance to change and lack of involvement on the part of end-users, and (6) Inadequate qualification of end-users.

Dagher and Kuzic (2011), by employing interviews and questionnaires, searched ERP implementation influencing issues, their level of importance and the influences of implementation activities on success and failures of five Australian companies. Their results suggested that Top Management Support, Project Management and Project Champion, and Vendor Tools or methodologies used in ERP implementation as the most important critical success factors.

Al-Turki (2011) investigated existing trends and success factors for ERP implementation in Saudi Arabia. He identified the best implementation practices, encountered difficulties, critical success factors and benefits. According to the results, time and/or cost overruns in ERP implementation, management commitment and the existence of a clear strategic objective were critical for the success of the ERP implementation, and Change management programs and extensive training were essential for smooth implementation process.

Dezdar and Ainin (2011b) aimed to identify critical success factors for the successful implementation of ERP systems especially related to the ERP project environment including project management, team composition and competence, and business process reengineering. They conducted a survey questionnaire through ERP users in Iranian organizations. They observed a significant influence of project management and team composition on ERP implementation success.

Maditinos et al. (2011) produced a conceptual framework in order to investigate the influence of human inputs (top management, users, external consultants) on communication effectiveness, conflict resolution and knowledge transfer in the ERP consulting process and on effective ERP system implementation through a survey study. It was observed that consultancy service during the ERP implementation process is essential; knowledge transfer significantly influence ERP system success;

knowledge transfer is more important than effective communication, and resolution among organizational members; top management support is found to be less important users support.

Consequently from the literature, this study is trying to identify: (1) the strength of external and internal (organizational motivation) forces, (2) the need for consultancy, (3) advantages (organizational and information related) and disadvantages, (4) difficulties, (5) success factors, and (6) outsourcing/insourcing issues in ERP implementation through Bosnian SMEs.

3. Research Methodology

It is difficult to have and therefore give information about the situation of SMEs in Bosnia and Herzegovina. Dimitrijevic and Rodic (2011) signified the problem of unarranged statistics on SME sector in Bosnia and Herzegovina. They also reported that data about SME sector cannot be achieved on EUROSTAT, OECD databases, European Innovation Scoreboard or other statistical databases. Furthermore, they stressed on the importance of Adjustment of statistical system for monitoring of SME sector and its performances for Bosnia and Herzegovina in order to define a better policy making for SMEs in general. MAPEER SME reports that there is also no specific data available for defined sectors of ICT and Environmental technologies (Dimitrijevic & Rodic, 2011).

The survey was conducted personally, by visiting 62 public and private organizations which are identified through a detailed search through internet (Table 1). Mainly, program development and consulting companies were targeted. The targeted companies have less than hundred employees. Almost all international Enterprise Resource Planning tools and their providers exist in Bosnia and Herzegovina. The companies were selected by considering their possible interest on ERP. Since there are not so many registered companies, the survey has only been conducted in one program developing company and a few other companies dealing with Information Technology software and hardware. It was the similar for consulting companies. Additionally, the survey was distributed to the manufacturing companies varying from food production, over construction and pharmacy, up to textile and maintenance tools. Furthermore, the study also included service providing companies which are accounting, marketing, and transportation.

The survey responses were obtained by personal visits (28 were interviews) and via e-mail. The research is strengthened by the interviews during the completion of the surveys. And 28 of the surveys are completed with the respondents together. The respondents made their comments during the completion of the survey. So 28 of the responses can also be considered as interviews.

Table 1
Survey Responses

Targeted firms	Walk-in		Online	
	No response	Hand-Filled forms	Mail sent	Mail received
62	10	28	15	9

4. Results

According to Table 1, the respondents are mainly from IT selling and consulting companies, Textile, Accounting, Food, Furniture, Production Companies are followed them, Commercial, Marketing, Pharmacy Companies came in the third and there are few representatives from Architecture, Management, Metal, Petrol Station, Transportation, and Wood processes Companies.

Table 1
Classification of the Respondents by Company Type

Company Type	Frequency	Percent
Missing	1	2.7
Accounting	3	8.1
Architecture	1	2.7
Commercial	2	5.4
Food	3	8.1
Furniture	3	8.1
IT	8	21.6
Manageme	1	2.7
Marketing	2	5.4
Metal	1	2.7
Petrol Station	1	2.7
Pharmacy	2	5.4
Production	3	8.1
Textile	4	10.8
Transportation	1	2.7
Wood Process	1	2.7
Total	37	100.0

The respondents (Table 2) are generally managers and professionals within the surveyed organizations.

Table 2
Respondents by Position

Positions	Frequency	Percent
Missing	1	2.7
Associate Professionel	1	2.7
Manager	20	54.1
Professionel	15	40.5
Total	37	100.0

The respondents are in general from Zepche, Sarajevo and Visoko (Figure 3). Actually, the survey was targeted to be conducted where the organizations have facilities.

Table 3
Respondents by City

City	Frequency	Percent
Breza	1	2.7
Jelah	1	2.7
Mostar	1	2.7
no comment	1	2.7
Sarajevo	11	29.7
Teshani	1	2.7
Visoko	6	16.2
Zenica	2	5.4
Zepche	13	35.1
Total	37	100.0

The majority of Bosnian SMEs accept ERP as a helpful tool for their organizations. However, few of them considered ERP as an additional tool (Figure 4). On the other hand, six companies could not make any comment about ERP.

Table 4
ERP Consideration

ERP Consideration	Frequency	Percent
Additional tool	2	5.4
ERPisHelpful	29	78.4
I dont know	6	16.2
Total	37	100.0

The surveyed companies have generally somewhat in an ERP development phase (Figure 5). Only a few doesn't have ERP in any phase and some are not aware of what ERP was.

"…I am not aware of ERP and its benefits" (Anonymus, Company Director).

Malik Koljenovic, Vice director of Mekom, stated that there is no sufficient information about ERP and its benefits in BiH business environment. Additionally, BiH companies need help in order to implement and maintain ERP systems. Edina Halilic, General Director of Pharmacon, suggested that there should be more educated people in this field in order to provide help and services when certain problems occur. Furthermore, he concluded that there is "…a shortage of capable programmers and service staff".

Table 5
Classification of the Respondents by ERP implementation phases

ERP Implementation Phase	Frequency	Percent
Development phase	6	16.2
draft ERP strategy	6	16.2
has an ERP strategy	15	40.5
No ERP	4	10.8
No strategy but some application	1	2.7
not aware of ERP	3	8.1
no comment	2	5.4
Total	37	100.0

The respondents feel uncomfortable about federal and local laws. On the other hand, there is a great influence of external competitors. Therefore they don't want to lose their competitive force and they believe that their organizations need to implement ERP projects (Figure 1).

"…In my opinion, ERP is very important for enterprises especially recent surroundings or environment. Therefore, investing on ERP is the best investment a company can do." (Smajic E., Consultant).

Figure 1
External Forces
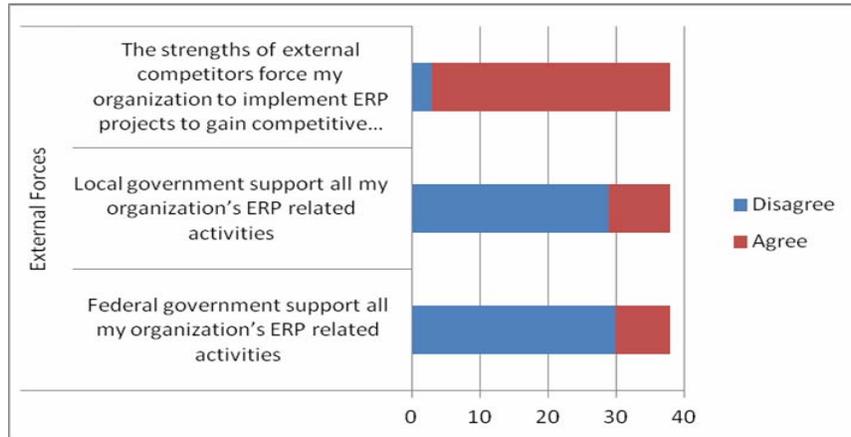
It has been understood that the organizations can afford ERP projects and they have available installed technologies to implement ERP projects. They believe that ERP implementation is necessary for their organisations and strongly want to implement ERP strategies (Figure 2).
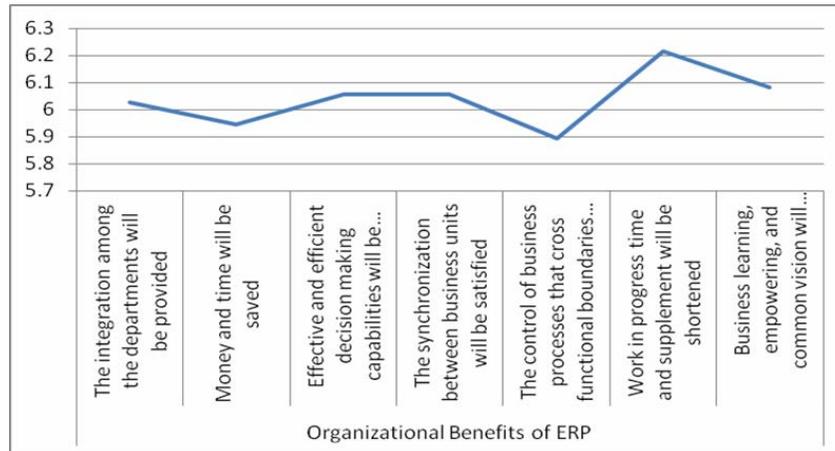
Figure 2
Organizational Motivation
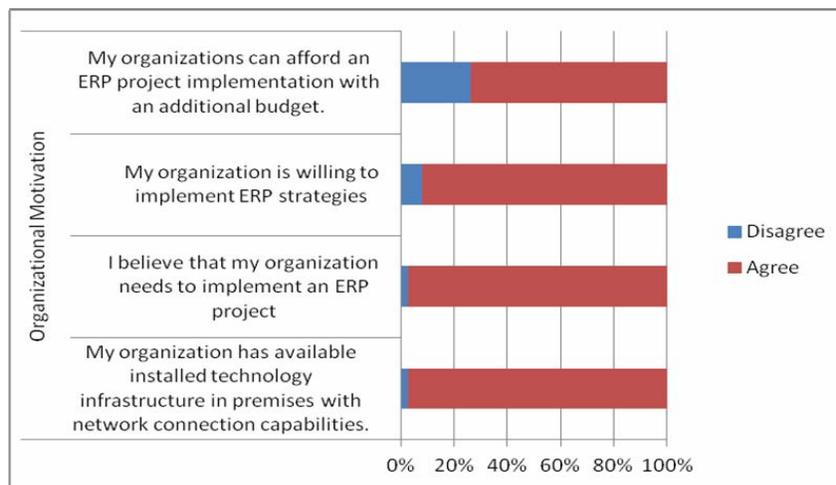
Contrarily, the organizations claim that there are not many available consulting companies in order to develop and implement ERP solutions in BiH (Figure 3). Furthermore, during the interviews one of the company directors stated that the lack of ERP consulting organizations had an influence on their organization in the way that the company had no clear plan about implementation costs so they had to pay extra money and rearrange their budget.

Figure 3
Need for Consulting Companies
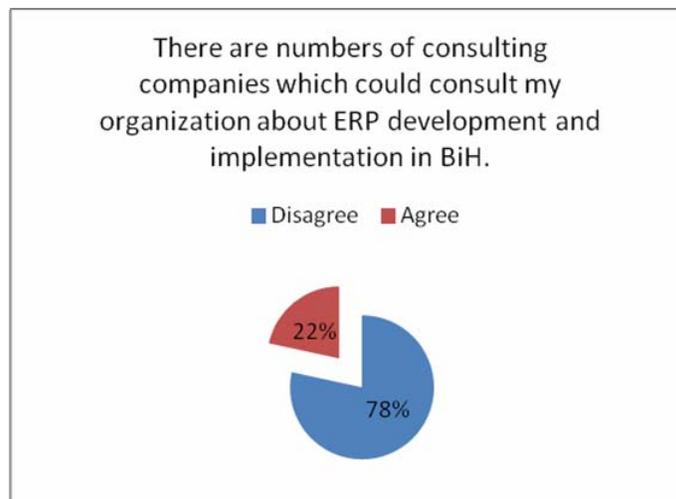
The respondents believe that ERP is a necessary tool for the organizations to achieve organizational benefits such as acquiring the integration of the departments, effective and efficient decision making capabilities, the synchronization of business units, the control of business processes, business learning, empowering, and common vision, and saving money and time (Figure 4).

Figure 4
Organisational Benefits of ERP

The respondents are agreed on that ERP is beneficial on information performance by integrating the data, providing real data for decision making reducing the risk of losing sensitive data (Figure 5).
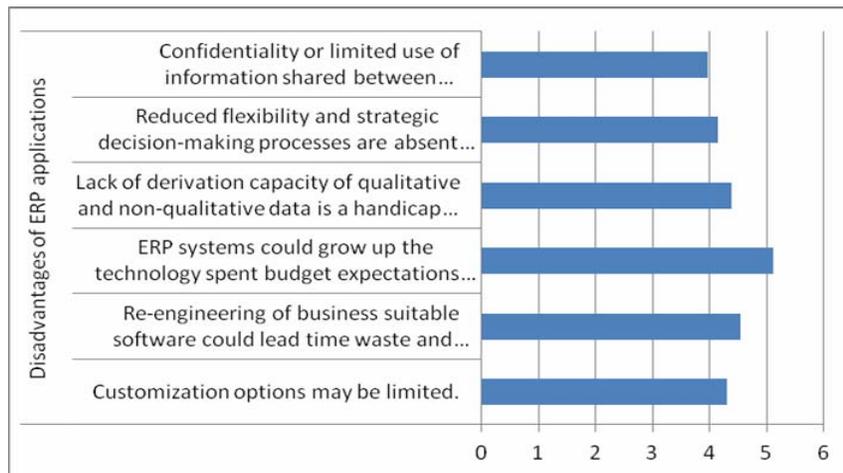
Figure 5
ERP Impact on Information Performance
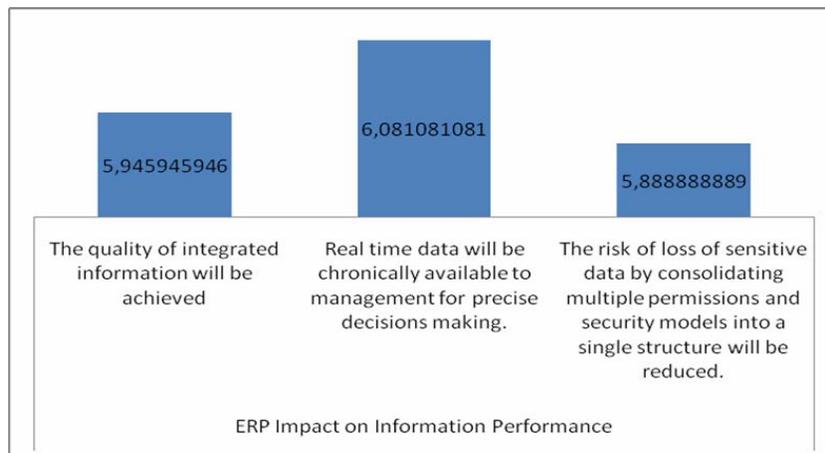
However, the respondents are observed to be neutral on the probable disadvantages of ERP systems such as limitation of customization options, losing time and therefore competitive advantage while re-engineering suitable software, lack of derivation capacity of qualitative and non-qualitative data, reduced flexibility and strategic decision-making processes, and confidentiality or limited use of information shared between departments. But they slightly agreed that the probable cost for ERP was high (Figure 6).

"…Prices for implementing ERP are very high" (Kunic, I., IT operator, Kuna Koza).

Figure 6
Disadvantages of ERP applications

As observed from Figure 7, the companies believed that software developers could not solve compatibility issues, complex policies and limited codex between their perspectives and differentiated structures of organizations. The developer and decision-making team may not work properly through the project fundamentals. Furthermore, specific needs of ERP system design for every business units may cause problems.

It has been supported in the study that ERP project objectives should be clearly defined. "… It is necessary to have a clear ERP plan, available budget, and clear expectations from ERP, correlations between sectors or departments and visions about the upcoming ERP system" (Almir Zeric, General Manager, Dell-Disti).

Figure 7
ERP Implementation Difficulties
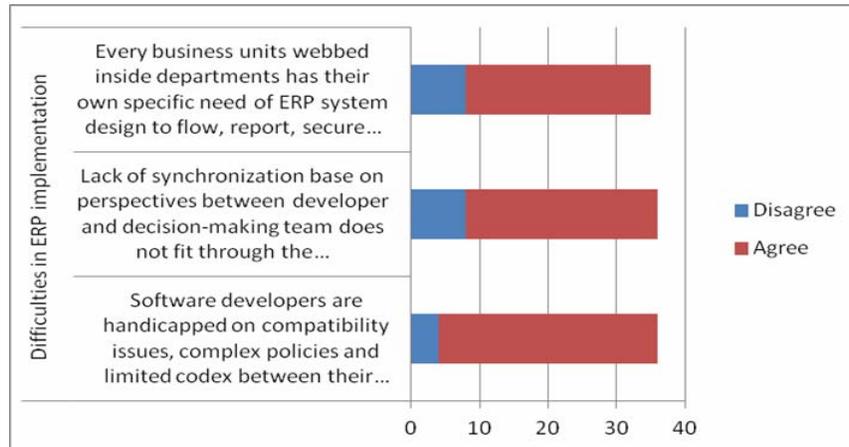
Additionally, a clear ERP plan, a training program during implementation process, calculation of the total cost and overall project completion time until the end of ERP project by Project managers and consultants are also necessary in order to be successful on ERP projects (Figure 8).

Figure 8
ERP Success Factors
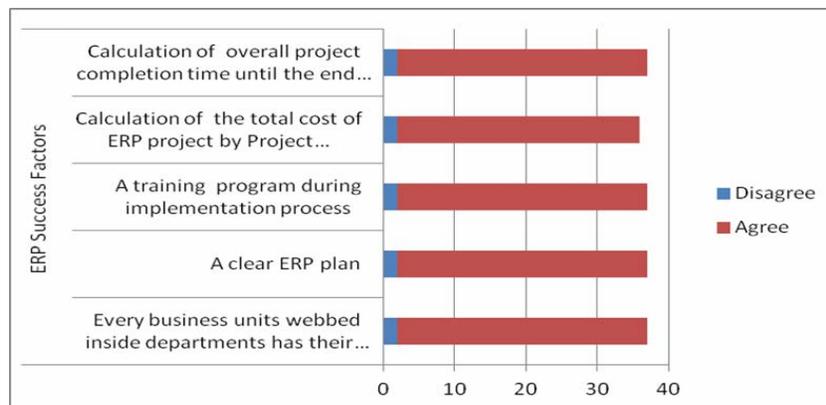
The companies are slightly agreed on that outsourcing services can work and there will not be any conflicting views of the company staff (Figure 9). Therefore, outsourcing ERP applications were not disagreed, but at the same time not considered by the companies.

Figure 9
ERP Outsourcing
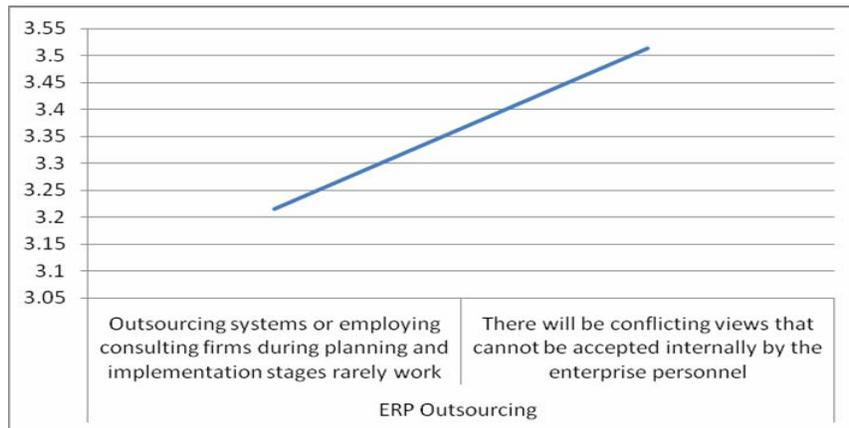
Contrarily, ERP insourcing is considered by the companies that expertise team members within the company could make more precise software operation planning, decrease long delays and outsource related cost in short run, and increase profit gain in long term (Figure 10).

Figure 10
ERP Insourcing
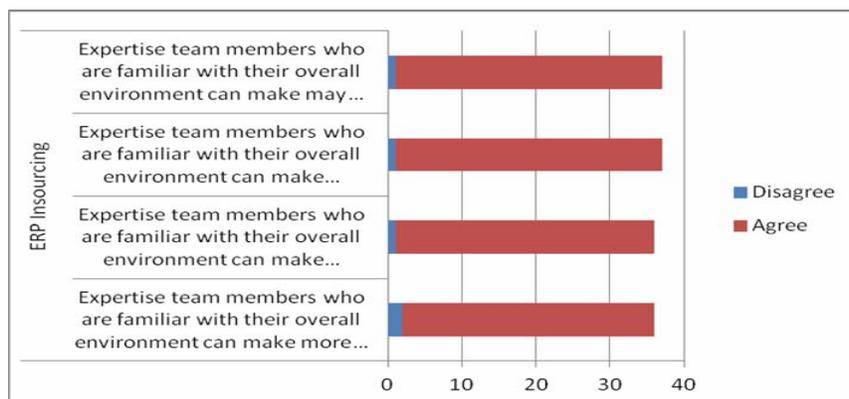
5. Discussion

According to the literature, the importance of ERP as a comprehensive organization wide system has been growing for vast variety of organizations and industries. On the other hand, the empirical findings showed that the BiH scene does not present a satisfactory result. There is a need for qualified staff to run ERP-like systems through BiH SMEs. Even the awareness of ERP is not reasonable.

Additionally, it is observed that there is not enough number of organizations in BiH to conduct the survey. However, the majority of available companies resist filling out the survey. Furthermore, many organizations among the surveyed SMEs do not want to be in a further research and some of them do not want to get the results of the survey even they have completed the survey.

On the other hand, there are some managers who are interested on ERP and other types of high technologies. For example, Almir Zeric, General Manager, Dell-Disti suggested to study on online ERP, Cloud computing etc." (Almir Zeric, General Manager, Dell-Disti). Therefore, future studies may consider adoption and diffusion of new technologies in Bosnia and Herzegovina.

Despite, BiH high-technology enterprises feel the force of outside competitive environment in order to implement ERP; they don't feel political support. Hence, it is necessary for them to inform government about the issue or make strategic decisions in order to overcome this problem. Secondly, this study observed that the enterprises have motivated to implement ERP-like projects and feel the organizational strength to start the implementation. But, they cannot find proper consultation firms in order to adapt the projects to the organizations. Moreover, the surveyed organizations are aware of the possible advantages, disadvantages, difficulties and critical success factors of ERP implementation. Finally, the organizations seemed not to outsource ERP implementation but instead to develop in-house.

6. Conclusion

This study becomes important in ERP implementation that it somewhat clarifies the ERP-related considerations in Bosnian market. Therefore, it may have some important implications for the enterprises that they should consider the external competitive environment and the political situation. They should also consider the outsourcing and insourcing options which are identified by this research in order to successfully implement ERP.

Since this study has presented a current snapshot of ERP considerations from Bosnian high-tech firms, its implications become important. For practice, external environment is not found to be supportive. It is suggested that companies may influence the external forces by effectively reporting their situation and creating a

competitive business environment. Moreover, the organizations in Bosnia should be aware of the technological progresses and develop employee skills by arranging and attending training programs. In this scenario, the role of universities and academicians becomes important.

Although one response could also be counted as one organization and 28 hand-filled responses may also be accepted as interviews, the fundamental limitation of the study is the number of respondents.

Second limitation is the lack of high-tech organizations. On the other hand, some of the targeted organizations haven't applied ERP yet, and some does not know what ERP was.

We aimed and employed the survey through all available enterprises in Bosnia. But, the examination of one specific industry for future research may be suggested. Future studies may consider one specific ERP product through the industries.

Future research may develop Bosnia specific adoption and diffusion models based on the current study findings and search the most influential factors in order to explain the implementation and diffusion processes.

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Abbreviations

ERP: Enterprise Resource Planning

BiH: Bosnia and Herzegovina

SMEs: Small and medium-sized enterprises

SCM: Supply Chain Management

SRM: Supplier Relationship Management

CRM: Customer Relationship Management

BI: Behavioral intention

TAM: The Technology Acceptance Model

PU: Perceived Usefulness

PEOU: Perceived Ease of Use

MNC: Multinational Corporation

CSFs: Critical Success Factors