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Factors influencing the implementation of business intelligence among small and medium enterprises in Lebanon

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The goal of the study presented in this paper is to examine the factors that influence implementation of business intelligence (BI) among small and medium enterprises (SMEs) in Lebanon. A survey involved 56 managers from the SMEs selected for the research. Consequently, interviews and questionnaires based on the five point Likert scale were used to collect data for the primary research. A literature review has enabled selection of critical success factors identified by previous researchers. Content analysis of the survey data was used to classify the data on BI implementation factors using the three broad perspectives: organisational, processes, and technological perspective.

Keywords: *SMEs, Business Intelligence, Critical Success factors*

1. Introduction

1.1 Background of the study

Business intelligence is a technology based technique for analysing data and presenting actionable information to assist corporate executives in the decision making process. More specifically, it describes the technologies, applications, and processes for gathering, storing, accessing and analysing data to help users to make better decisions (Davenport et al., 2010; Watson and Wixom, 2007). Over time, organisations embraced business intelligence technologies to improve efficiency, attain competitive advantage and automate business processes. A major problem associated with BI adoption, particularly for SMEs, is the potentially substantial investment required during implementation.

Small and medium-sized enterprises take a large proportion of all enterprises in any economy. Given their number, it is no surprise that they contribute significantly to economic growth, employment creation as well as innovation in a particular country (Audretch and Keilbach, 2004). According to Van Gils (2005), SMEs are major drivers

of economic growth and development in an economy more so because they are found in almost every sector in a country. The ever-growing complexities of the environment under which small and medium sized organisations operate impose various complications spanning social, environmental and technological aspects that significantly constraint the success of SMEs (Rodrigues et al., 2012). Amid these complexities, new demands and business opportunities arise. Thus, entrepreneurs must maintain high levels of innovativeness and adapt their business models to meet the dynamics of technology.

Adopting BI solution has become really important in today's hyper-competitive markets where organisations are seeking to become more efficient, agile and proactive in the decision-making processes. The necessity that has been created in the last few years about incorporating IT solutions for helping in the decision making process and the usage of BI tools is recognised by most entrepreneurs.

According to Lönnqvist et al. (2006), the BI tools have a number of advantages for businesses, with emphasis on the following: increase the interaction between users, ease the access to information, reduced cost, versatility and flexibility in adapting to the reality of the company and is useful in the process of decision making. Also, Guarda et al. (2012) state that BI bridges unalike systems and users that have to access information, providing a setting that enables right to use information needed for daily activities and by doing so this allows organisation to analyse business performance in various aspects.

Although major organisations have led the way in introducing and implementing BI solutions, the recent increase of globalisation, competition and the information needs in an organisation has forced SMEs to consider the purchase of BI tools (Wong, 2005). These software applications do help a small business compete with larger ones, increase market share or provide insights and patterns that otherwise cannot be seen (Grabova et al., 2010). Olszak and Ziemba (2012) conducted a study on SME owners and directors who gave their views that using technology to analyse large volumes of data is equally critical for SMEs. The present study sought to examine key adoption factors of BI systems in order to develop a framework consisting of major implementation issues that can boost the adoption and implementation rates of BI systems among SMEs in Lebanon. The approach used was to conduct interviews with top managers of 10 companies in Lebanon. Content analysis was conducted on the data with the aim of discerning some of the major factors that affect the implementation of BI systems.

1.2 Statement and significance of the problem

While new technologies have reduced the importance of economies of scale in many activities and enhanced the potential contribution of small and medium enterprises, the productivity growth is not following this trend. SMEs have hard time dealing with such problems. Thus, enhancing their competitiveness is crucial for their survival, and implementation of BI systems may be considered as one of the drivers of competitive potential. However, the degree of implementation of BI systems differs significantly between large corporations and small enterprises around the world (Wong, 2005). It is necessary to scope out some of the fundamental factors that curtail or

encourage the extent of implementation of BI technologies in order to enable SMEs to compete favorably among themselves and with other large corporations within the same industry.

This research aims to answer the following question: What are the important factors that determine the adoption of BI systems in small and medium sized enterprises? Successful implementation of BI systems can significantly affect market competitiveness in SMEs and provide a means to manage the information more efficiently.

The SME sector plays a crucial role in economy: the European Union account for approximately 20,399,291 enterprises, of which 99,8% are SMEs (European Commission, 2013). In this regard, the development of SME market is acknowledged as one of the main targets of the governments around the world. As use of IT to support business intelligence activities is a recognised competitive business instrument, a better exploration of information needs and BI implementation factors is needed in this sector, evaluating important tradeoffs between required functionality and acceptable implementation costs.

2. Review of existing research

This paragraph focuses on examining literature on the subject matter of the current study. First, we look at the definitions of some of the terms used in the present study. Then, the concepts will be looked at separately regarding factors that influence implementation of BI in SMEs. The overview of published sources on the key concepts sets the key data collection requirements for the primary research to be conducted, and forms part of the emergent research design process.

2.1. Definition of terms

Small and medium sized enterprises. There is no universal definition of the small micro enterprises and definition varies from regions and between countries (Carter and Jones-Evans, 2006). For the purpose of this study, a category of micro, small and medium-sized enterprises (SMEs) is defined by the following factors: those that employ fewer than 250 persons, whose annual turnover does not exceed 50 million EUR, and whose annual balance sheet does not total above 43 million EUR. Within this category, small enterprises are defined as enterprises that employ less than 50 persons and whose annual turnover does not exceed 10 million EUR. In addition, micro enterprises are those which employ less than 10 people and whose annual turnover does not exceed 2 million EUR (European Commission, 2005).

In Lebanon, the SME sector consists mainly of micro enterprises; about 90% have fewer than five employees, though these are not integrated into the main growth sectors through forms of sub-contracting and despite several initiatives and some funding, much remain to be done to transform the SME sector into the engine for economic development in Lebanon. Over the years, the country has gradually developed a vibrant entrepreneurial environment and a strong foundation of SMEs which contributed positively to its open economy. The nation has performed significantly well in coming up with an entrepreneurial friendly ecosystem for business individuals and SMEs. It is important to note here the difference between an European SME and a Lebanese SME, which is mainly associated with size in terms of number of employees and turn-over leading to the adoption of

the term MSE (Micro) instead of SME in most reports.

A Census conducted by the Central Administration of Statistics (CAS) in 2006 showed that there was at that date 199,450 economic units (enterprises). However, there were only 377 units (or 0.2% of the total number of units) with more than 100 employees, while 175,786 units (88% of the total) had less than five employees. An additional 10,687 units (5% only of the total) had between 5 and 10 employees. Other enterprises representing only 3% of the total had between 10 and 100 employees. In addition, the census showed that 61% of the units had less than 100 square meters surface and only 14% had a surface larger than 200 sq. m. In terms of sectorial breakdown, 64% of enterprises were active in the trade and service sectors, 12% in industry, 10% in agriculture and 7% in the tourist sector. On the innovation and technology front, the SMEs sector is seen to lag behind, mainly because of the country's inability to tap into its innovative capacity (UNDP 2011).

2.2. Business Intelligence (BI) Systems

The term "Business Intelligence" is frequently used to describe the technologies, applications, and processes for gathering, storing, accessing and analysing data to help users to make better decisions (Davenport et al., 2010; Wixom and Watson, 2007). These systems refer to decision making, information analysis and knowledge management. According to Azvine et al. (2006), BI is all about the capture, access, understanding and the analysis of raw data into information/knowledge in order to improve business. Wells (2008) recognises BI as the capability of an organisation to explain, plan, predict and solve problems, think more abstractly, understand, invent, and learn so that organisational knowledge can increase, provide information for the decision-making process, enable effective actions, and support establishing and achieving business goals. Fundamentally, BI means to have access to right information at the right time, in order to make the right decision. Understanding the data that is generated through the day-to-day business of a company plays a major role of the business strategy for creating competitive SMEs.

Business intelligence systems are dynamic, and their roles in an organisation have been changing over time. Initially, BI systems were simple, static and analytical programs that were used to handle specific functions in an organisation. Today, they have evolved into solutions that can be utilised for strategic planning, operations management, tracking the profitability of organisational brands as well as the management of customer relationships (Negash and Gray, 2008). According to Sauter (2010), BI systems are not only a category of technologies but are determinants of a different organisational management technique that spans new techniques of data collection, storage, processing to analysis and utilisation of the resultant information.

A typical Business Intelligence system has the following components:

1) On-line analytical processing which refers to the way end users navigate through data along various dimensions.
2) Advance analytics for analysing data using statistical and other quantitative techniques to predict and show patterns.
3) Data warehouse which handles integration of numerous organisation records for aggregation and query tasks.
4) Real-time (BI) functions for real-time analysis and distribution of information.

Over the past decade, the construct of BI has been understood much more generally to imply aggregating aspects of various components of decision support framework (Baars et al., 2008) and generating detailed information which is critical for decision making (Negash, 2004). Thus, many definitions of BI systems focus on the capability of an organisation to bolster business efficiency and to attain strategic organisational goals.

2.3 Critical Success Factors for BI systems

Critical Success Factors (CSFs) embody a set of factors where the accomplishment of positive results will guarantee a viable position for the individual, sector or organisation (Vodapalli, 2009). In regard to BI, these factors can be categorised as either organisational, process or technological.

The implementation of a BI system is not a standard application-based IT project, which has drawn attention of many CSF studies. Consequently, Yeoh and Koronios (Yeoh, Koronios 2010) went on to propose a framework that encompasses organisational factors as well as those based on process and technology. Put together, all these factors determine overall business orientation which in turn leads to implementation success and business benefits. Figure No. 1 below illustrates critical success factors in business intelligence.

The organisational dimension. This dimension requires a great sense of commitment both by the management of an organisation and sponsors of a project. According to Yeoh and Koronios, the BI initiative must be designed to uncover numerous issues that are universal in the entire organisation and must therefore be positioned under the authority of senior

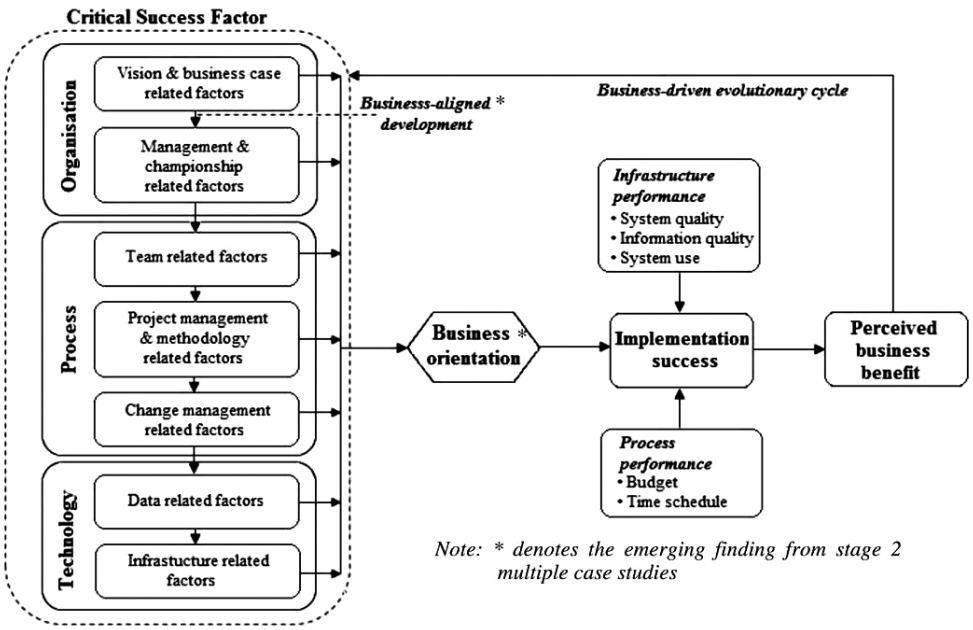

Figure No. 1. ***The Model of BI Success*** *(Yeoh, Koronios 2010)*

managers. In addition, the authors argue that there should be a clear vision and well established business case.

The process dimension. This dimension of process management requires change management strategies that are centered on the users. The authors suggest that this can be achieved through formal participation of the users in order to achieve user-driven iterative approach to changing requirements.

The technological dimension. Under this approach, the authors state that BI systems should be more scalable and based on a flexible technical framework in order to allow for system expansion whenever there is need for expansion. Moreover, data quality and integrity issues must be sustainable in order to make it possible to conduct cross-functional and cross-departmental use of data.

The use of CSFs is important in the implementation of BI systems as these factors determine whether business objectives are met and why these should be met. Following Leidecker and Bruno (1987), the CSFs are responsible for the properties that can influence the success of an enterprise that is creating its position in a specific industry, supposed that the variables and properties of such an industry are preserved, sustained or managed. Also, the use of CSFs can help the identification of characteristics and the resources that should be at the disposal of a project team to focus on primary matters (Greene and Loughridge, 1996). According to Rockart (1979), "Critical success factors are the few key areas where things must go right for the business to flourish. As a result, the critical success factors are areas of activity that should receive constant and careful attention from management". Essentially, there is a set of factors that influence the success of BI systems. These factors are called CSFs and these help in the alignment of the organisation with the BI solution.

The critical success factors impacting the implementation of BI tools have attracted the attention of a number of researchers (Eckerson, 2005; Yeoh and Koronios, 2010; Olszak and Ziemba, 2012). CSFs could be considered as a set of tasks that should be addressed in order to ensure BI systems success (Olszak and Ziemba, 2012). However, some of the results might not be adequate for the special case of SMEs (Hwang et al., 2004; Scholz et al., 2010). The implementation of BI tools is not the same as the implementation of other IT systems. That is, implementing BI systems is not a simple activity of just buying the application/tool; rather, it is a complex activity and requires an appropriate infrastructure and a certain amount of resources utilised over a long period of time (Yeoh and Koronios, 2010). The identification of CSFs is important in the process of IT implementation and management, especially in the case of Business Intelligence. By ensuring that some particular events occur that affect the success of the project and by minimising negative impacts, this contributes to the success of the project. The knowledge of the CSFs is important in planning activities and events as to achieve the objective/goal. Several definitions of CSFs are presented in Table No. 1.

The topic of success factors of Business Intelligence in the literature is not only confined to the above frameworks. Empirical studies published in articles as well as books are targeted at practitioners that treat success factors individually without organising them, limiting themselves to classifying such factors into categories or simply enumerating them. These factors are identified as managerial issues, changing

Table No. 1. ***Summary of literature on the CSF of business intelligence***

Author	*Factors*
Chen et al. (2000)	User satisfaction
Sammon and Finnegan (2000)	Business driven approach, management support, adequate reserve as well as budgetary and ability into existing systems, data worth, supple enterprise model, the integration of a data warehouse
Yeoh and Koronios (2010)	Management support, clear vision and business case, Business champion, balanced team, Iterative development approach, data quality
Watson and Wixom (2001)	Data quality, system quality, management support, adequate resources, user participation and a skilled project team
Watson and Haley (1998)	Management support, adequate resources, change of management, metadata management

requirements and objectives, organisation and staffing, team issues, project planning and scheduling, data quality and security among others.

A study conducted by Watson and Haley (1998) sought to outline critical success factors that were uniform in among organisations. Their approach involved conduction a survey of 111 organisations that were known to make use of data warehouse and related Business Intelligence technologies. In their findings, they established that success factors included management support, adequate resources, change management and data management techniques. In addition, they opined that quick implementation, the ability to adjust business requirements, useful information and ease of navigating were necessary in the implementation of a good data warehouse strategy.

In another related study, a survey of 42 BI system users conducted and observed that the satisfaction demonstrated by system users played an important role in the overall success of a data warehouse (Chen et al., 2000). Sammon and Finnegen (2000) used a case study approach to come up with important factors which were known to guarantee success of a data warehouse. In their findings, they established that these factors were the following: adopting a business driven approach, board support, adequate human and financial resources, high data quality, an adjustable enterprise model and data stewardship as well as the availability of any automatic data extraction technology. In a survey, conducted on 11 organisations, Watson and Wixom (2001) established that quality in organisational data and its system were the most critical success factors for any BI system. They further observed that the quality of a system was constrained by management support, available resources and participation of the end users and the level of skills demonstrated by the project team.

The variables used in a study by Shin (2003) are system throughput, ease of use, ability to locate data, access authorisation, and data quality. The variables were further subdivided into currency, level of detail, accuracy and consistency. The data was gathered from a single large US enterprise, based on a single project, therefore even the

author agrees that his study can be treated as a case study (Shin, 2003, p. 157), finding that 70% of end user satisfaction could be explained by the independent variables that were measured.

The study conducted in Current Practices in Data Warehousing (Watson, Annino, Wixom, Avery, & Rutherford, 2001) concentrated on some of the factors influencing data warehousing projects success. Survey respondents were asked to provide answers to questions about who sponsored the data warehouse, which organisation unit was the driving force behind the initiative, about solution architecture and end users, about implementation costs, operational costs, solution approval process, after implementation assessment and the realisation of expected benefits as well as the expectations. To describe success, two questions were used, one about ROI and the other about the perceived successfulness of implementation.

The authors decided to concentrate on the three dimensions presented by Yeoh and Coronios, each being assigned a set of questions that, to the authors' opinion, best describe the attitudes of business users towards the implementation and use of BI systems.

3. Research findings

The focus of the current study was to examine the factors that influence implementation and adoption of or BI systems among SMEs in Lebanon. To do this, the researchers presented structured questionnaires to 56 managers of 10 different SME-type companies, using a 5-point Likert scale in questions on BI implementation factors. The purpose of the survey questions was to specific responses concerning BI systems in general.

Limitations of the study

Since this study is limited to a 10 SMEs in the country, findings should be generalised with caution to other SMEs. Generalizing the findings that will be generated by the study to other sectors in other areas should be done with caution due to variance in manager's perception and financial status of a company. In addition, the subject of BI in SMEs restricted the sampling from the beginning, as not all SMEs do use BI systems, and some of them are not aware of the benefits of its use.

Another limitation was the geographical restriction, since interview results originated from organizations in Lebanon; therefore, the interviews only reflect a local approach towards BI. The scope of the study should be enlarged and more research on other countries should be deployed. As well, further research is required to test the practical validity of the framework in the process of BI implementation.

Data analysis

The 10 organisations from which the sample of managers had been selected were SMEs that had developed and operated BI technologies in their respective markets, as they are well informed with the dynamics of the SMEs sector and how their market generally operates. In total, 56 managers were questioned. The sample interview questions used in the interviews centered on BI system implementation. A set of the questions has been aimed at the presence and use of BI tools in assorted information systems used in surveyed SMEs. Table No. 2 below provides a summary of specific BI tools implemented within the information systems in use.

The sorted graph of the sum of points from Table No. 2 for each of the BI tools in use is presented in Figure No. 2.

Table No. 2. ***Information Systems and Business Intelligence Tools***

Information systems	*Business intelligence tools in use*									
	Dimens. queries	*Reporting*	*Graphing*	*BPM*	*Bench Marking*	*General Analytics*	*Data Mining*	*Text Mining*	*Ext. search*	*Other*
ERP	12	9	3	20	3	6	3	11	8	7
Operations management system	3	21	3	9	6	9	10	4	3	15
Accounting systems	7	18	2	16	5	9	12	3	2	8
Supply chain management systems	19	9	3	13	8	5	3	6	5	11
Inventory management systems	12	15	3	12	11	7	10	3	3	6
CRM	20	7	3	19	3	8	4	9	6	7
Personnel Management Systems	6	11	3	23	3	3	5	6	17	4
Sales and distribution management systems	5	19	3	16	3	5	14	7	4	11
Project management systems	3	15	4	21	14	3	4	5	3	7
Other	4	23	4	19	5	5	10	3	4	4
Sum	**91**	**147**	**31**	**168**	61	60	75	57	55	80

Generally, as the responses indicate, every information system in the surveyed organisations uses tools or techniques of business intelligence including data analytics, data mining and text mining among others. The specific BI components are listed horizontally at the top of the table. The most frequently used tools are the business process modeling (BPM) analysis and reporting, while graphing and text mining are the least used tools. The frequent use of reporting explains itself, while the popularity of BPM is influenced by its growing use as a primary instrument for developing and upgrading management information systems of any kind.

In the next phase, the interviewees were asked to rank the selected factors of each dimension (Organisational, Processes, and Technology), according to their importance for BI implementation. The semi-structured interview approach assisted in the identification and discussion on the implementation. Table No. 3 presents a summary of data on the responses to the factors of BI implementation, and assigns certain dimensions (O – organisational, P – Process, T – Technology) to the mentioned factors. The following tables Nos. 4-6 present the data on number of responses supporting the more prominent factors for each dimension. To ensure the internal consistency of

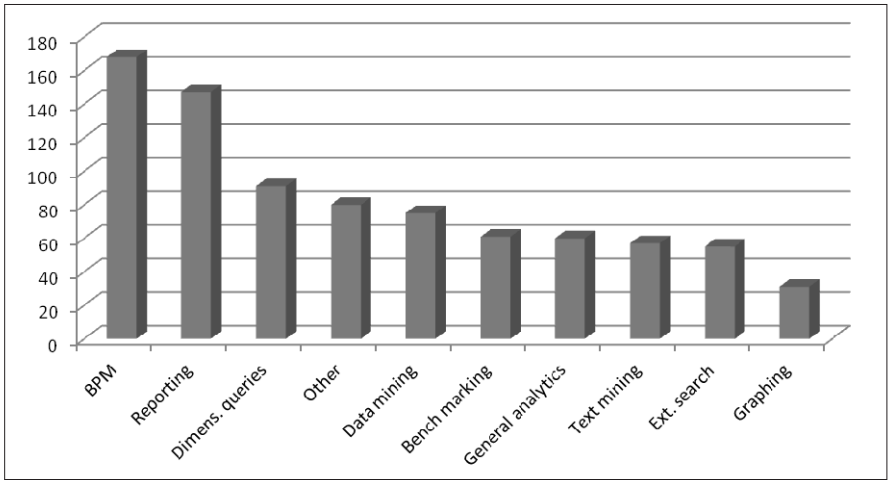

Figure No. 2. ***The most frequently used BI tools***

Table No. 3. ***Responses for BI implementation factors***

BI implementation factors	*Dimension*	*Strongly oppose*	*Oppose*	*Neutral*	*Propose*	*Strongly propose*
Very few staff (mainly from the IT department) have knowledge on business intelligence	*O*	*1*	*5*	*12*	*22*	*16*
The BI system requires special analytical skills	*P*	*4*	*5*	*10*	*19*	*18*
The BI system has enabled me to learn about the business environment	*O*	*13*	*6*	*12*	*16*	*9*
Employees quickly adapted to the use of business intelligence information	*P*	*2*	*19*	*8*	*18*	*9*
I am content with the BI system skills acquisition that my organisation offers	*O*	*11*	*8*	*13*	*13*	*11*
Presence of business intelligence information in my firm will help me to remain competitive	*O*	*7*	*12*	*13*	*15*	*9*
The expression “HIGH QUALITY” well illustrates this new service of BI in the organisation	*O*	*9*	*10*	*13*	*12*	*12*
In my organisation, there is a quick adaptation to the use of BI	*P*	*7*	*13*	*12*	*14*	*10*
Do BI tools well assist the works in meeting their goals?	*T*	*9*	*11*	*12*	*14*	*10*
Have the employees responded quickly to the need of business intelligence information in the firm?	*P*	*8*	*15*	*7*	*19*	*7*
Is the business intelligence applied well in your firm?	*O*	*5*	*16*	*11*	*10*	*14*
Do you trust the BI tools much?	*T*	*5*	*17*	*9*	*14*	*11*

BI implementation factors	*Dimension*	*Strongly oppose*	*Oppose*	*Neutral*	*Propose*	*Strongly propose*
With the new strategy of business intelligence in place, I get excited about working as I am convinced that my firm is enjoying competition over the rival firms	*O*	*7*	*13*	*14*	*9*	*13*
BI has helped you achieve your employee work with other employees and create the intelligence culture in the company?	*O*	*12*	*10*	*10*	*19*	*5*
Do your employees pay much attention to business intelligence information?	*O*	*7*	*15*	*10*	*14*	*10*
The BI tools have made my work easier that the day go by without me noticing	*T*	*14*	*7*	*13*	*12*	*10*
Does the phrase "INNOVATIVE" describe well the planned implementation of business intelligence information in your firm?	*P*	*7*	*15*	*11*	*11*	*12*
Do you use the BI service frequently?	*O*	*4*	*19*	*12*	*10*	*11*
My firm retains the traditional IT system of information reporting and data storage	*T*	*21*	*8*	*13*	*11*	*3*

survey questions, Cronbach's alpha has been estimated for questions using Likert scale at the value of 0.993, deeming internal consistency of survey questions as excellent.

The Organisation Dimension

Table No. 4 shows the difference between opinions on both ends of the 5 point Likert scale (the difference between sum of counts for "propose" and "strongly propose" and the sum of counts for "oppose" and "strongly oppose") of BI implementation factors belonging to this dimension. In authors' opinion, this allows a clearer picture of the dominating factors.

One can easily understand that BI managers view "Limited number of staff (mostly from the IT department) have knowledge on business intelligence" as the most important in the Organisation Dimension to achieve a successful BI implementation, with the sum difference of 32, giving importance

Table No. 4. ***The organisation dimension factors***

Factor	*Sum difference [(propose +strongly propose) –(oppose + strongly oppose)]*
Very few staff (mostly from the IT department) have knowledge on business intelligence	32
The BI system has enabled me to learn about the business environment	6
I am content with the BI system skills acquisition that my organization offers	5
Presence of business intelligence information in my firm will help me to remain competitive	5

to low awareness of BI, as well as the important role of professional support for BI users. This indicates an attitude that BI is considered mainly an IT function, executed by IT personnel.

The other factors in this dimension have a less expressed grade of support, indicating moderate growth of BI understanding in surveyed organisations.

The BI system has enabled me to learn about the business environment – the interview outcome has shown that significant number of managers considered the ability of BI to produce deeper insights into the business environment as important.

I am content with the BI system skills acquisition that my organisation offers – the respondents saw this as the next important organisational factor in the implementation of a BI system, reflecting the existence of favorable conditions for employees to upgrade their BI skills.

Presence of business intelligence information in my firm will help me to remain competitive – this factor reflects the awareness of the employees of the competitive potential that the use of BI is creating.

The Process Dimension

In order to analyse the degree of importance of the different implementation factors present on the Process Dimension, the respondents were asked to rank the implementation factors identified from literature; the results are presented in Table No. 5. From this we can infer that "BI systems require special analytical skills" is clearly identified as the most important implementation factor, with sum difference of 28; followed by time required for the employees to adjust individually, and organisation-wide speed of adaptation to BI.

The Technology Dimension

Factors attributed to the technology dimension and their corresponding values of sum difference are presented in Table No. 6.

It should be noted that the ratings of technology-related factors are significantly lower than those of the organisational or

Table No. 5. ***The process dimension factors***

Factor	*Sum difference [(propose +strongly propose) – (oppose + strongly oppose)]*
BI systems require special analytical skills	**28**
Time taken by employees to adjust	**6**
In my organisation, there is a quick adaptation to the use of BI	**4**

Table No. 6. ***The technology dimension factors***

Factor	*Sum difference [(propose +strongly propose) – (oppose + strongly oppose)]*
Do BI tools well assist the works in meeting their goals?	**4**
Do you trust the BI tools much?	**3**
The BI tools have made my work easier that the day go by without me noticing	**1**

process factors; this stresses the importance of the latter as compared to the technology issues. Although the use of BI technology elements is commonplace, as indicated by the data in Table No. 2, the organisational and process factors are assigned prime importance for a successful implementation of a BI.

4. Conclusions and recommendations

4.1 Conclusions

The most important factors along the selected 3 dimensions for BI implementation in SMEs, as the research has shown, belong to the organisational and process dimensions. For organisational dimension, the most important issues are BI awareness, encompassing the existence and use of BI-specific approaches and tools, as well as awareness of the potential benefits and competitive advantage that is conditioned by BI use. For process dimension that reflects the transition issues in BI adoption, the development of user BI skills is of key importance for BI implementation, together with rapid practical testing of those skills and organisation-wide BI adoption effort. The technology dimension provides technical preconditions for BI adoption success, and advanced BI technology should be supplemented by a set of organisational and process measures leading to development of intelligence culture providing necessary flexibility and resilience to cope with future changes in information activities. In general, the research has shown contradictions between technology advances and lack of organisational framework or guidelines for BI implementation.

4.2 Recommendations for further research

Further research on this topic should validate or extend different aspects of the framework. In the interviews conducted, the interviewed experts have suggested the inclusion of system quality and an addition of the Infrastructure Performance dimension.

Regarding the often substantial investment required to implement BI approaches, a viable alternative for SMEs could be to adopt cloud computing solutions that enable organisations to strengthen their systems and information technologies on a pay-per-use basis, providing access to the state-of-the-art BI technologies at reasonable pricing. As cloud-based BI is still in an early phase, and the implications inherent to the adoption of this technology are not well studied and explained, further research on this topic is suggested in a period of several years for the better understanding of the issues of cloud-based BI implementation and acceptance.

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VEIKSNIAI, DARANTYS ĮTAKĄ VERSLO ANALITIKOS DIEGIMUI SMULKIOSE IR VIDUTINĖSE LIBANO ĮMONĖSE

Georges Kfouri, Rimvydas Skyrius

S a n t r a u k a

Šiame straipsnyje pateikiamo tyrimo tikslas yra išnagrinėti veiksnius, darančius įtaką verslo analitikos diegimui Libano smulkiose ir vidutinėse įmonėse. Apklausa, atlikta dešimtyje bendrovių, apėmė dešimt vadovų iš kiekvienos tyrimui pasirinktos bendrovės. Tyrimo duomenys buvo renkami naudojant interviu ir anketas, pagrįstas 5 balų Likerto skalės įverčiais. Literatūros apžvalgoje buvo išskirti kritiniai verslo analitikos diegimo sėkmės veiksniai, įvardyti anksčiau tyrėjų. Surinktų apie verslo analitikos diegimo veiksnius duomenų analizė buvo atlikta trimis kryptimis: organizacine, procesų ir technologine. Pagal šias kryptis buvo nustatyti veiksniai, labiausiai veikiantys verslo analitikos sistemų diegimą tirtose įmonėse.

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