

Impact of Business Intelligence Competencies on the Organizational Capabilities in Jordanian Banks

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Abstract: This study aims to identify the role of business intelligence competencies (Managerial competencies, Technical competencies and cultural competencies) on the organizational capabilities in Jordanian banks (process improvement, innovations, flexibility, agility). Hence, a questionnaire was used to gather data to achieve the purpose of this study. Since it is difficult to cover the total population, a convenient sample was used. Therefore, 385 questionnaires were distributed and 340 were retrieved, 320 of which were suitable for analysis. Structural equation modeling via PLS3 was used to analyze the data. The findings from this study show that the level of availability of Business Intelligence competencies and organizational capabilities in Jordanian banks were medium. The core conclusion of this study proves that business intelligence competencies have a significant impact on the organizational capabilities in Jordanian banks. The main recommendation of this study was to continually assess the efficiency of business intelligence competencies in Jordanian commercial banks in order to develop them in line with the changing environment and new business requirements.

Keywords: Managerial Competencies, Technical Competencies, Cultural Competencies, Flexibility, Agility

Introduction

Today, information technology has assumed great importance because it is the starting point for innovations and success in organizations. Business Intelligence tools are new technologies that have important effect on all organization aspects. So, organizations have to pay attention to the Business Intelligence Competences. Business Intelligence with fewer competencies will not attain its objective. And, to use these tools in an effective way, some competencies must be available to produce business intelligence services and programs and use them to make decisions efficiently and effectively. All organizations seek to enhance their capabilities by using new strategies, techniques and technology, as they have realized that meeting customer needs and being responsive to internal and external circumstances would be their drivers to obtain and maintain competitive advantage. So, all organizations are seeking to acquire new technology to increase their capabilities. We note that some companies adopted the tools of business intelligence and some did not give any attention. This study is intended to identify the impact of business intelligence competencies (managerial, technical and cultural) on the organizational capabilities in Jordanian banks.

General Background

Business Intelligence Competencies

In the last few decades, companies and institutions of all sizes have become interested in the concept of business intelligence because it plays a great role in making rational decisions in a timely manner, especially in light of the great competition and globalization. These companies have to adopt new systems that help them identify customer needs and desires, as well as analysis of data and the extraction of reports necessary to work; in addition to monitoring the work performance (Rouhani *et al.*, 2016). Business intelligence systems are responsible for creating effective knowledge and information to help decision makers and strategic leaders in their tasks (Olszak and Ziemba, 2004). Recently, organizations have started seeking new tools that assist analyzing large amounts of data from different resources (Olszak and Ziemba, 2007). Prior researchers (Kumar, 2013; Al-ma'aitah, 2013; Muhammad *et al.*, 2014) listed many tools, such as Data Warehousing, Data Mining, Extraction Transformation Load (ETL) and On-Line Analytical Processing (OLAP), which are integrating to implement a comprehensive BI system as shown in Fig. 1.

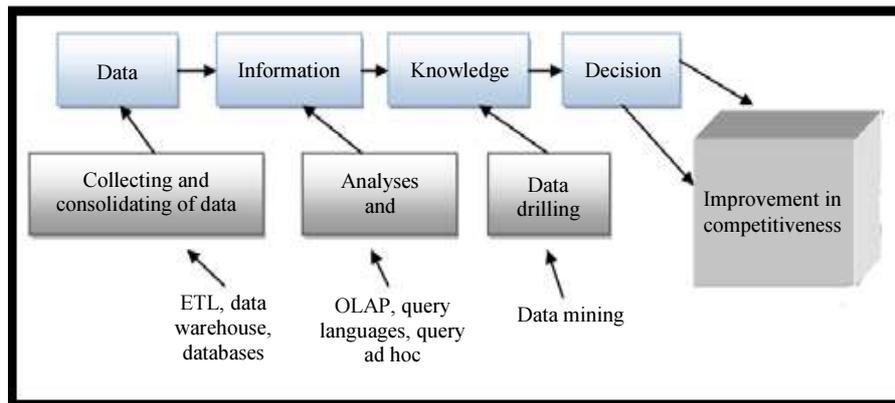


Fig. 1: Business Intelligence

Rouhani *et al.* (2016) Argued that business owners must employ further suitable BI tools to attain more realistic advantages. Ramakrishnan *et al.* (2012) confirmed that businesses work in a turbulent environment and BI systems help these businesses in supporting decision making and enhancing performance through dealing with huge amount of information and achieving competitive advantages. Prior researches prove that businesses should take into consideration some aspects before applying BI systems, such as organizational strategy, structure, culture and process (Arefin *et al.*, 2015). Up to date researches have recommended that a BI system enhances business performance through information provided and used by managers (Cui *et al.*, 2007). Sangari and Razmi (2015) asserted that there are competences for business intelligence's success and he divided them into three dimensions: Managerial competences, cultural competences and technical competences. In addition, he defined BI competences as the ability of the organization to produce business intelligence services and programs and to use them to make decisions efficiently and effectively.

Organizational Capabilities

Organizational capabilities indicate a company's ability to execute a range of tasks, taking advantage of organizational resources (Carmeli and Tishler, 2004). Moreover, Hwang (2011) argued that organizational capabilities are qualifications that guide organizations to do better than their competitors using modern business tools. So, organizations should enhance and manage their capabilities to increase organizational performance and market share.

Verona (1999) Divided organizational capabilities into four types: Technological, which refers to R&D and manufacturing; external integrative, such as culture and absorptive structure; internal integrative, such as culture and integrative structures; and marketing capabilities, such as marketing mix policies. Some researchers focus on two areas of organizational

capabilities: Exploration and exploitation. Exploration focuses on exploring new knowledge about organization opportunities, while exploitation focus on innovative methods of learning McGrath (2001). Wang and Ang (2004) described organizational capabilities using three items: Cost leadership, quality and innovation, which have an effect on competition.

Hwang (2011) confirms that firms can increase their capabilities like cross-functional coordination, information access, process improvement, innovativeness, flexibility and agility by using information technology. So, through successful BI implementation, firms can increase their capabilities. For the purpose of this research, we will refer to organizational capabilities through process improvement, innovativeness, flexibility and agility. And we will investigate how Business Intelligence Competencies will impact these capabilities.

Literature Review

Recently, explosion of the data has become a key concern in information technology; for example, Wall-Mart conducts more than one million bargains per hour (David, 2012). So, business intelligence will play an important role in dealing with such huge amounts of data. David (2012) refers to BI as processes, technologies and tools required to achieve an action plan through transforming data to information and information to knowledge. Prior researchers studied BI from many aspects. Ramamurthy *et al.* (2008) Supports a comprehensive model about organizational factors which affect BI adoption. Hayen *et al.* (2007) provided that organizational, technical and project management capabilities are factors that have important roles in BI's success. White (2006) refers that BI application could be used at all organizational levels (operational, tactical and strategic). Ahmad (2015) assured that many of the strategic management studies refer to BI as a competitive key and he explored the relationship between employing effective BI and sustaining

competitive advantages. Arefin *et al.* (2015) Argued that BI effectiveness and organizational effectiveness are affected by many organizational factors, such as strategy and structure. In addition, they provide that deploying a successful BI mediates the relationship between the organizational factors and organizational effectiveness. Moreover, Al-ma'aitah (2013) indicted that BI tools have a vital role in the decision-making process and enhancing organizational effectiveness. Williams and Williams (2007) argued that BI tools play an important role in knowledge discovery. Furthermore, knowledge sharing is affected by OLAP, data mining and data warehousing positively (Zabadi *et al.*, 2015).

Rouhani *et al.* (2016) Asserted that BI functions have a significant impact on organizations' benefits and outcomes. Finally, Muhammad *et al.* (2014) confirmed that BI tools could help financial sectors to improve their services and get sustainability by adapting to rapidly changing environment. On the other hand, many previous studies have addressed the concept of organizational capabilities from many aspects. Pandey *et al.* (2018) indicated that availability of organizational capabilities, especially infrastructure, will lead to knowledge management process successfully. Also, he pointed out that the relationship between the two concepts is interchangeable. Rahman and Carpano (2017) suggested a framework linkage between governance system with organizational capabilities and performance.

Tuan and Takahasi (2010) applied their study on 120 firms in Vietnam and proved that there are strong relationships between organizational capabilities, performance and competitive advantages.

Hwang (2011) assured that adoption of an ERP system in organizations has a significant effect on business strategy and organizational capabilities. In addition, adopting an ERP system will lead firms to achieve superior levels of economic performance. Löffsten (2016) studied the use of modern technology in

firms and its relevance to organizational capabilities. The findings proved that there is a significant relationship and it helped firms' long-term survival.

Research Model and Hypotheses

Depending on the previous literature, the research model (Fig. 2) supposes that business intelligence competencies will affect the organizational capabilities in Jordanian banks.

In the following paragraphs, there is more explanation about the research model elements and hypotheses.

Managerial Competences

Sangari and Razmi (2015) Defined managerial competences as the adequacy of an organization to establish information and knowledge relevant to its work in order to enhance its decision-making processes. So, to accomplish this objective, organizations should possess a set of clear procedures and methods to collect information and knowledge about their external environment on an ongoing basis as well as provide clear procedures and methods for effective knowledge and information dissemination and analyzing results. Lonnqvist and Pirttimaki (2006; Petrini and Pozzebon, 2009) have defined it as the efficiency and effectiveness of the organization to create unique knowledge which could help it make decisions and learn excellence from other organizations in the same field. Lonnqvist and Pirttimaki (2006) emphasized the importance of access to timely and effective information, not only for excellence and success, but also for survival. He also emphasized that managerial competencies have important roles in achieving business intelligence system strategies. Temtime and Pansiri (2005) Confirmed that managerial competences have important implications on organizational flexibility.

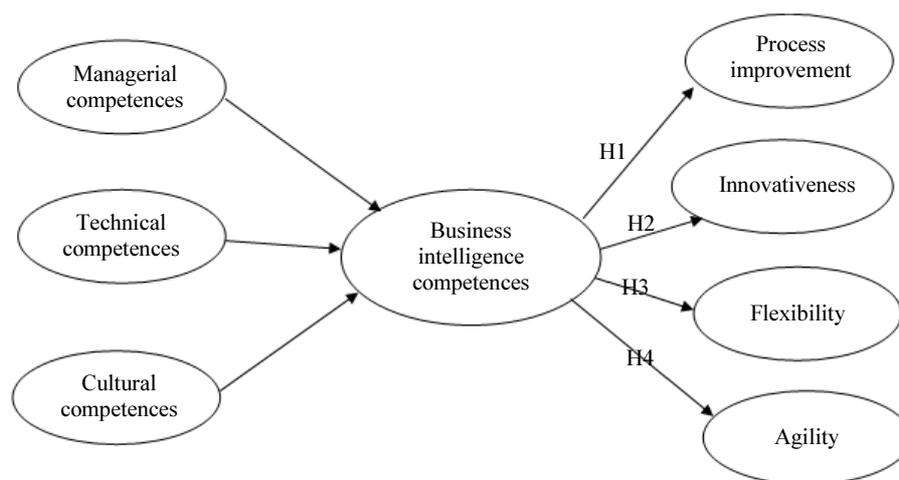


Fig. 2: The model of research

Technical Competences

Petrini and Pozzebon (2009) referred to it as the ability of the organization to provide business intelligence software and optimize their applications for storing historical data and making online analysis processes. This dimension refers that an organization should have the appropriate software to analyze and categorize the data which is needed by the individuals and decision makers. Moreover, the results should be represented graphically to make them easy to understand. The organization should also have a dedicated database to assist decision-makers in developing strategies based on analyzing customer trends as well as applying different models to predict the future behavior of the organization's customers by using data mining techniques. Also, he referred that technical skills play an important role in applying knowledge management processes in an organization.

Cultural Competences

Sangari and Razmi (2015) defined it as the organization's ability to develop a culture of information gathering in an effective and efficient way. Machuca and Costa (2012) defines it as the organization's ability to develop a strong and powerful business intelligence culture in internal and external processes and to disseminate the culture of using business intelligence tools for greater benefit. Al-ma'aitah (2013) emphasized the importance of shared understanding and belief in the importance of business intelligence tools and the added value that can be gained from applying these tools in work and the importance of considering it as a strategic asset of the organization.

Process Improvement

Ravichandran and Rai (2000) defined it as a collection of actions to define, analyze and improve the processes in the organization to achieve the objectives and purposes of the organization. In addition, they contribute that processes improvement is high related to information system field and organizations which will adopt new technology will achieve process improvement. Coskun *et al.* (2008) argued that using information technology and applying new techniques on data help organization in process improvement, such as reducing cycle time, cycle cost, reduced delay in delivery, accomplishing activities, reduced paperwork and developing new services and products.

Eicker *et al.* (2008) argued that organizations must focus on their core competencies, which are appreciably affected by the skills and the knowledge of their workers, because it will lead to improve process management. Golfarelli *et al.* (2004) refers that BI that includes useful data warehouse improves operational processes and company strategy. Tellez (2015) Indicated that improved customer and employee satisfaction is affected by cultural competences.

H1: Business Intelligence Competencies has a Significant Impact on the Process Improvement.

Innovativeness

Koufteros (1995) defined it as the extent to which an organization is capable of improving their product quality, characteristic and performance. Organizations should launch their products and services at lower cost and in an efficient way. So, they are forced to use new techniques. Business intelligence systems help organizations identify customer needs (Turban, 2010). In addition, they help in designing and developing more cost-effective products and services.

Woszczyna (2014) found that human capital and competencies of both managers and employees are important factors for managing innovation in organizations. Farhadfar and Abtahi (2014) argued that management of innovation and technical competences are related. Woszczyna (2014) said that cultural competences may be a vital element of innovative activity.

H2: Business Intelligence Competencies has a Significant Impact on Organization Innovativeness.

Flexibility

Narasimhan *et al.* (2004) defined it as to what extent an organization could be faced with the needs of the customers without more costs, time and organizational trouble. Turban (2010) illustrate that BI and decision support systems could support organizations to be more flexible and meet all environmental factors. Flexibility in products and services enhance organizations' competitive advantages and increase market shares (Sanchez, 1995). To enhance organization flexibility, organizations should depend on information technology in all their activities. Temtime and Pansiri (2005) Confirmed that Managerial Competences have important implications for Organizational Flexibility. GhalichKhanian and Hakkakb (2016) Proved that BI applications have significant effect on flexibility and agility by enhancing decision-making process and supporting organizations in reacting to the rapidly changing environment. Ngo and Loi (2008) referred that market flexibility and outcome are affected by culture.

H3: Business Intelligence Competencies has a Significant Impact on Organization flexibility.

Agility

Lee (2004) defined it as to what extent an organization adapts to a continuously shifting and irregular business environment, so that it can survive and take advantage of changes and opportunities. Coronado *et al.* (2002) Confirmed that Information Technology is an essential element of agility. Turban (2010) support that BI and decision support system play an important role in achieving organizational agility. Sangari and Razmi (2015) provided that managerial competence, technical

competence and cultural competence are key enablers of organization agility and performance.

H4: Business Intelligence Competencies has a Significant Impact on Organization agility.

The Measurement

In this research, measures and constructs were adapted from related studies to achieve the study's intention. Table 1 describes the study constructs.

Instrument Development

A questionnaire was used to gather data to achieve the purpose of the study. The questionnaire was adopted from previous studies and it was modified when required. A total of thirty-two (32) items were

developed, as shown in Table 1. The constructs of business intelligence competencies were adopted from (Sangari and Razmi, 2015), while organization capabilities construct was adopted from (Hwang, 2011). The questionnaire was presented to 7 arbitrators in the field of information systems. All comments were taken into consideration to modify the questionnaire.

Sampling and Questionnaire Distribution

The sample of the study consisted of the directors, their deputies, their assistants and the heads of the departments in the Jordanian commercial banks. Since the whole population is complicated to determine, a convenient sample has been used. Therefore, 385 questionnaires were distributed and 340 were retrieved, 320 of which were valid for analysis.

Table 1: Study Instruments

Construct	Code	Measurement Item	
Business Intelligence Competencies	BIC		
	Managerial Competences (MC)	MC1	The Bank's procedures and methods have been well defined to consistently gather knowledge and information about customer trends, services and competitors.
		MC2	The Bank's procedures and methods have been well defined to consistently collect, manipulate, store and distribute knowledge and information.
		MC3	The Bank's procedures and methods have been well defined to consistently analyze knowledge and information.
		MC4	The Bank's procedures and methods have been well defined to ensure easy and timely access to required knowledge and information.
		MC5	Decisions are taken depending on accurate, valid and credible information.
	Cultural Competences (CC)	TC1	The Bank has a data warehouse to store historical data.
		TC2	The Bank uses effective and appropriate technological tools to support data integration and analysis.
		TC3	The Bank uses effective and appropriate technological tools to support information distribution and dissemination.
		TC4	The Bank has computerized decision support systems that assist in decision-making.
TC5		The bank has data mining tools to explore hidden relations.	
Organizational Capabilities	CC1	Knowledge and information are used effectively in all aspects of the Bank's business.	
	CC2	Bank management recognizes the value of information and knowledge in achieving competitive advantage.	
	CC3	The Bank's management considers information and knowledge as strategic assets.	
	CC4	The Bank's management is interested in sharing information and knowledge with business partners.	
	CC5	The Bank shares business partners and customers in decision-making.	
Process Improvement (PI)	OC		
	PI1	The bank is able to reduce new services evolution cycle times.	
	PI2	The bank is able to reduce delays in transaction processing.	
	PI3	The bank is able to reduce of using paperwork.	
Innovativeness (IN)	PI4	The bank is able to reduce transaction costs.	
	IN1	The bank is able to establish new services with unique features.	
	IN2	The bank is able to enhance service quality.	
	IN3	The bank is able to promote services with superior performance.	
Flexibility (FL)	IN4	The Bank's management encourages research and development.	
	FL1	The bank is able to change services design according customer needs.	
	FL2	The bank is able to change services volume according customer needs.	
	FL3	The bank is able to change services design without exaggerated cost.	
Agility (AG)	FL4	The bank is able to change services volume without exaggerated cost.	
	AG1	The bank is able to quickly respond to emerging environmental opportunities.	
	AG2	The bank is able to quickly respond to emerging natural threats.	
	AG3	The bank is able to quickly respond to competitors' actions.	
	AG4	The bank is able to quickly respond to the internal problems.	

Data Analysis and Results

For the purpose of testing the hypotheses of the study and to ensure the fitness of the model we will use PLS software. So, there are two steps that should be conducted to analyze PLS model (Hair *et al.*, 2006). Firstly, we evaluate the reliability and validity of the model constructs. Second, we evaluate the structural model by interpreting the path coefficients and determining the sufficiency of the study model. The following sections show both of these two steps.

Measurement Model Results

In the beginning, factor loadings were investigated for all constructs to determine discriminant validity; the result was accepted for all constructs because its passed the cut-off value, 0.5 as suggested by (Hair *et al.*, 2006) as shown in Fig. 3. So, the model constructs of this study achieve good convergent validity except

item (CC3) whose loading was (0.449) and will be dropped and not included in the next step of the analysis.

Moreover, composite reliability, AVE and Cronbach's alphas of the constructs were investigated to measure the convergent validity as proposed by Fornell and Larcker (1981). The results for all constructs were adequate and acceptable. Composite reliability values beyond 0.70, the Cronbach's alphas are above the 0.70, AVE results above 0.50 as shown in Table 2, (Field, 2005; Hair *et al.*, 2006).

In addition, the Fornell–Larcker criterion was used to measure discriminant validity by examining the cross-loading comparisons between constructs. Hair *et al.* (2006) suggested that AVE of each latent construct should be higher than the construct's highest squared correlation with every other latent construct. Table 3 shows that this study meets this criterion.

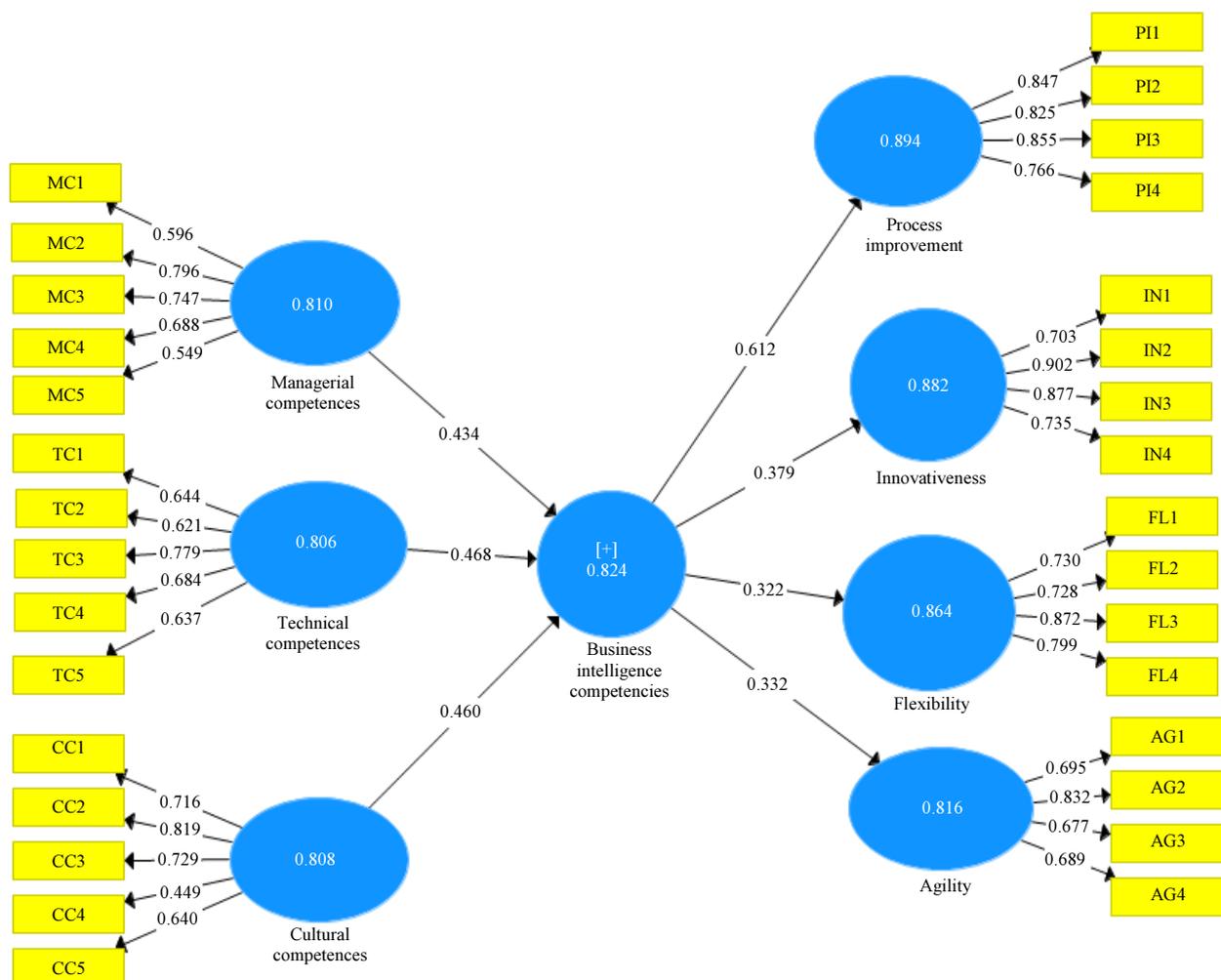


Fig. 3: Factor loading and composite reliability for each item

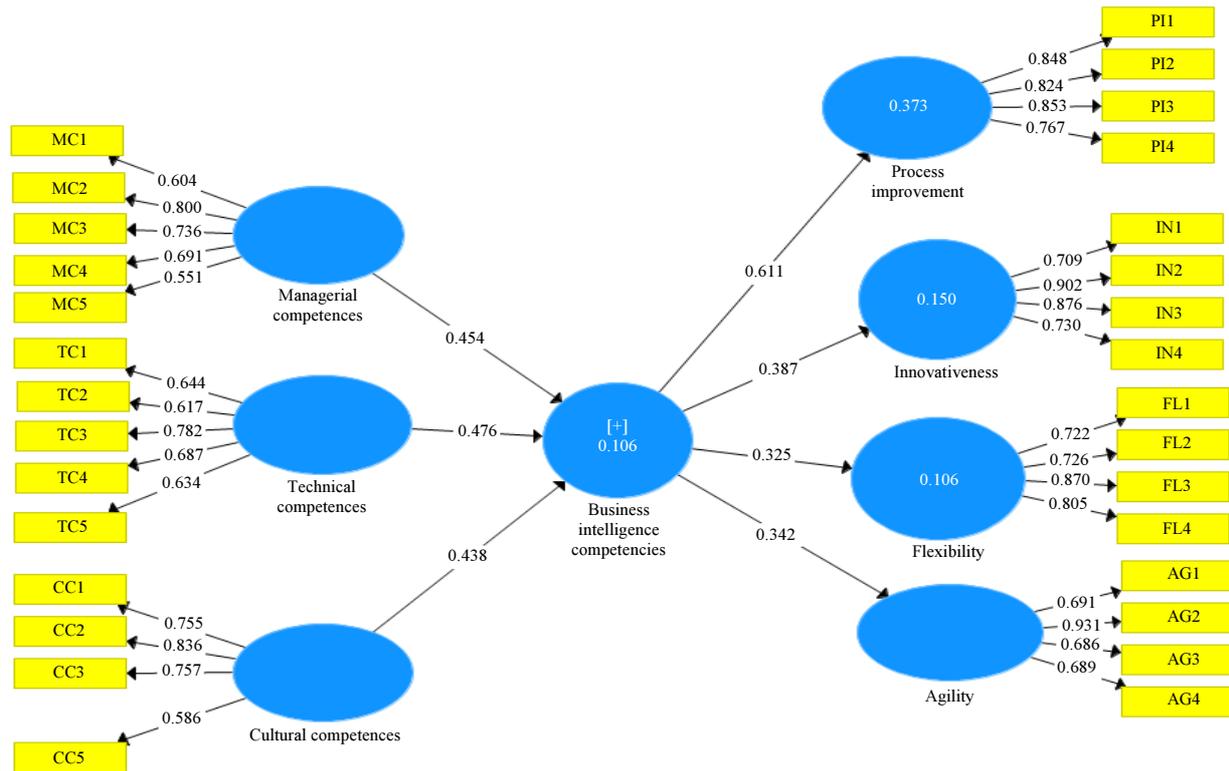


Fig. 4: The Results of the structured model

Table 2: Validity and reliability estimates of the constructs

Construct	AVE	Composite Reliability	Cronbach's Alpha
Managerial Competences (MC)	0.564	0.810	0.710
Technical Competences (TC)	0.556	0.806	0.701
Cultural Competences (CC)	0.565	0.808	0.707
Process Improvement (PI)	0.679	0.894	0.842
Innovativeness (IN)	0.654	0.882	0.819
Flexibility (FL)	0.616	0.864	0.799
Agility (AG)	0.527	0.816	0.711

Table 3: Discriminant Validity Using Fornell and Larcker (1981) Criterion

Construct	AG	CC	FL	IN	MC	PI	TC
Agility	0.726						
Cultural Competences	0.332	0.682					
Flexibility	0.488	0.057	0.785				
Innovativeness	0.521	0.083	0.518	0.809			
Managerial Competences	0.666	0.069	0.587	0.628	0.681		
Process Improvement	0.123	0.668	0.117	0.016	0.064	0.824	
Technical Competences	0.084	0.678	0.069	0.133	0.149	0.558	0.675

Assessing the Structural Model and Testing Research Hypotheses

A measurement of the structural model was conducted to find out the significance of the paths and the predictive power of the model through the PLS algorithm. The significance of path coefficients evaluated depends on the standard error, t-statistics, R² value and confidence interval (Chin, 1998). R² should be

greater than 0.10 (Hair et al., 2006). Figure 4 displays the results of the structured model.

The bootstrap also was used to find out T Statistics and P-value. Figure 5 shows P-values for each path. All paths are significant (P-value <= 0.05)

Hypotheses testing results are shown in Table 4. All hypotheses were supported (P-value <= 0.05 and T>2) AS suggested by (Hair et al., 2006).

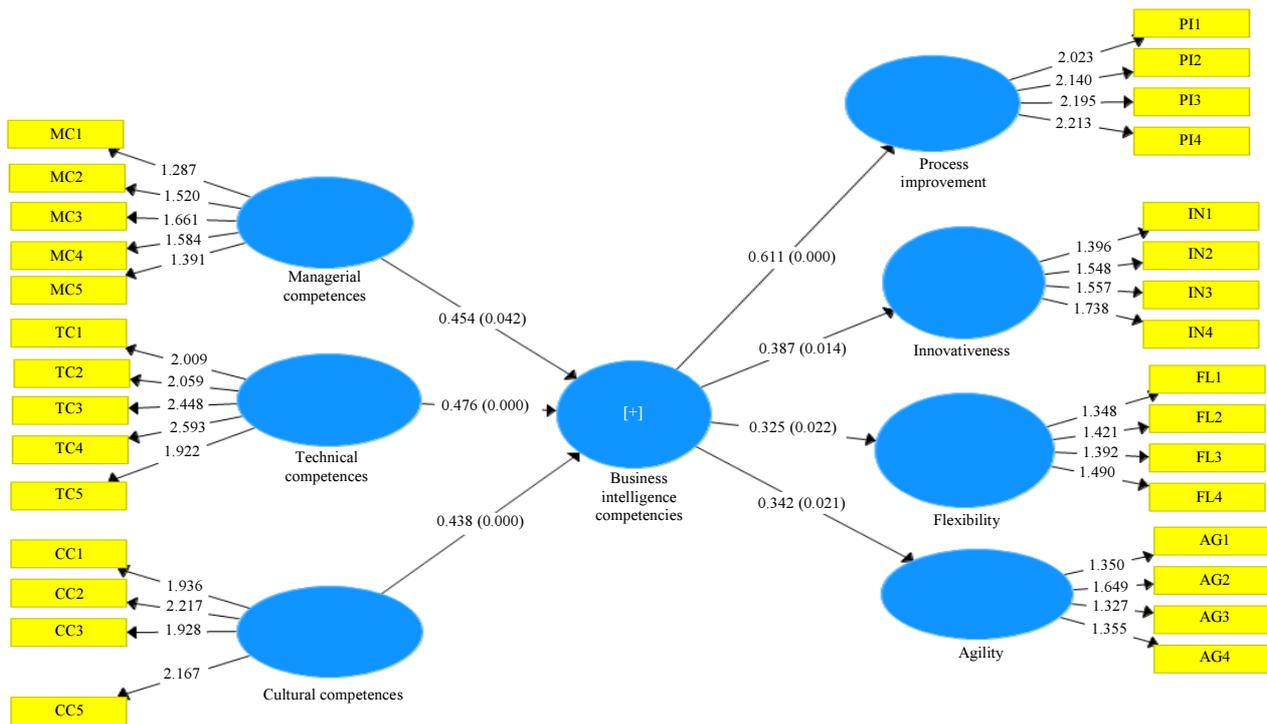


Fig. 5: Path coefficients and p-values

Table 4: The path coefficient and hypotheses results

H#	Path Coefficient (β)	T Statistics	P value	The results
H1	0.611**	3.525	0.000	Supported
H2	0.387**	2.466	0.014	Supported
H3	0.325**	2.293	0.022	Supported
H4	0.324**	2.320	0.021	Supported

Result and Discussion

Business intelligence concept is still not widespread in Jordanian business environment. Moreover, there is no deep understanding of these concepts and the requirements needed to apply these tools successfully. The purpose of this study is to give more understanding about business intelligence competencies and identifying the fields where its use may be worthy. This study applies to Jordanian Banks and tries to identify to what extent are business intelligence competencies available and the level of banks' capabilities accordingly (process improvement, innovation, flexibility and agility). Moreover, we seek to explore the impact of business intelligence competencies on organizational capabilities. The results indicated that the level of availability of competencies was medium. The ranking was as follows: (Managerial Competences with average = 3.73, Cultural Competences with average = 3.61, Technical Competences with average = 3.52). Based on the previous results, we realize that Jordanian banks should

increase their interest in these competencies and try to enhance them, especially the technical competencies, which got the lowest average. This result is attributable to accelerated development in BI tools. Recently, software companies have provided many tools that help analyze data and identify patterns and trends for future predictions. Therefore, the banks must double their efforts to keep track of developments in this area to utilize them to offer new services. As interest in business intelligence tools and competencies will improve the work of banks such as predicting interest rates and the size of loans and will help in decisions to grant loans or not. It will also help them detect fraud and protect the cards given to customers. Also, the results indicated that the level of capabilities in Jordanian banks was medium. The rankings were as follows: (Flexibility with average = 3.90, Agility with average = 3.67, Process improvement = 3.61, Innovation = 3.51). So, Jordanian banks should pay attention to increasing these capabilities and looking for factors that influence their improvement because improvement in these capabilities will reflect in

improved performance, which will lead to improved and maintained competitive advantage. Moreover, we noticed that innovations got less average, therefore, it is necessary to increase attention to this variable and motivate employees and encourage them to innovate, especially those applying modern technologies need to innovate and differentiate in their use of them. The main conclusion of this study confirms that business intelligence competences have a significant impact on organizational capabilities. The values of path coefficient (β) shows the highest impact of business intelligence competences on process improvement with $\beta = 0.611$, followed by innovations, agility and flexibility, with $\beta = 0.387$, 0.342 and 0.325 respectively. These results are consistent with (Sangari and Razmi, 2015; GhalichKhanian and Hakkakb, 2016; Golfarelli *et al.*, 2004; Oliver, 2008; Woszczyna, 2014; Farhadfar and Abtahi, 2014; Al-ma'aitah, 2017). In addition the findings show that (37%) of the variance in process improvement and (15%) of the variance in innovations and (11%) of the variance in banks agility and finally (10%) of the variance in banks flexibility can be explained by BI competences, as shown in Fig. 4. Hence, organizations should increase their ability to produce business intelligence services and programs to use them in their decisions.

Conclusion and Recommendations

The conclusion of this study is very significant to both educational and specialist communities. This study can provide a better perspective of the role of the business intelligence competences in enhancing organizational capabilities and achieving competitive advantages. Moreover, this study show how the BI capabilities support organizational capabilities in bank sectors and provide their effectiveness to improve quality through enhance decisions. The study provides to organizations precious information and a broad picture of the impact of business intelligence competences in achieving organizational capabilities. So it will provide the practitioners with better knowledge on how to employ and control the BI systems. Further that, it will allow for enhanced planning towards BI systems adoption in the Jordanian business environment.

In the light of the previous findings of the study, the researcher made a number of recommendations as follows: To continue to pay attention to business intelligence and its capabilities because of its importance to the performance of business and organizational capabilities. Attract people with advanced knowledge in the business intelligence field, which have an important role in developing the technological infrastructure. To assess the efficiency of business intelligence competences in Jordanian banks in order to develop it in

line with the changing environment and new business requirements. Spread the culture of business intelligence and incorporate it into the banks' strategies.

Limitations and Future Direction of Research

Quantitative approach was used in this study, so qualitative approach may be applied in the future for this purpose. In addition, other organizational capabilities may be added, such as marketing. Moreover, the current study did not have a chance to gather data from global organizations and all study data was collected from Jordanian banks. As a result, we are restricted in generalizing our results broadly. Finally, we recommend studying impact of business intelligence competences on achieving competitive advantages and using organizational capabilities as a mediating variable.

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Ethics

This article is original and contains unpublished material. The corresponding author confirms that no ethical issues involved.

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Source of Figures

Fig. 1: Source: Muhammad *et al.* (2014), Business Intelligence as a Knowledge Management Tool in Providing Financial Consultancy Services, American Journal of Information Systems, Vol. 2, No. 2, 26-32.