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# The Impact of Business Intelligence Capabilities on Strategic Agility in commercial banks in Jordan

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**Abstract:** This study aimed to examine the impact of business intelligence capabilities on strategic agility. Accelerated technological progress has pushed organizations to race towards adopting strategies and techniques commensurate with this progress in order to achieve strategic goals effectively and efficiently by anticipating changes and adapting to them quickly. The study population was composed of managers at commercial banks in Jordan, as it is considered one of the economic pillars and a catalyst for increasing investments. A random sample was used in collecting data those consisted of (190) managers who formed a response rate of (89.62%). Structural equation modeling (SEM) was applied for analyzing the data and testing the study hypotheses. The result concluded that business intelligence capabilities have a positive impact on strategic agility. Moreover, it showed that the business intelligence structure and business intelligence technology as dimensions of business intelligence capabilities have a positive impact on strategic agility, while the business intelligence culture has no impact on strategic agility. Consequently, the study recommended managers use technology to discover the business environment and search for organizational methods that enable the integration of the business intelligence culture with the beliefs and values of employees.

**Keywords:** Business Intelligence Capabilities, Strategic Agility, Commercial Banks, Jordan.

## 1 Introduction

The rapidly fluctuating business environment requires a lot of organizational efforts at various administrative levels to ensure the process of continuous development of capabilities and skills through which the organization achieves its goals [1,2]. In this dynamic environment, the essential role of flexibility and agility that the organization needs to keep pace with changes and to optimally exploit the opportunities that generate them to achieve the strategic vision [3,4,5]. Therefore, strategic agility enables the shedding of light on the internal environment and restructuring the available resources to obtain the competencies necessary to overcome competitors [6,7]. Besides, it increases the organization's ability to deal with external environment factors by monitoring and forecasting their path for taking advantage to format a new opportunity based on innovative products and services that meet the various desires of customers [8,9,10].

With the remarkable expansion in the use of technology and the digitization era that the world is witnessing, a group of management methods have emerged based on the use of technological systems in business management, that perhaps the most prominent of them is business intelligence systems. Business intelligence systems are based on a series of processes aimed at collecting, analyzing, and storing internal and external data for use in making rational decisions [11,12]. Further, business intelligence capabilities are the pillars of the effective and efficient implementation of the organization's activities [13], basic tools used to achieve the best organizational performance [14,15], and confront competitors to obtain the largest market share [16,17].

The Jordanian banking sector has proven its high ability to withstand successive financial shocks and crises due to its possession of high levels of capital that are the highest in the Arab region, which provides it with high durability. The average capital adequacy of Jordanian banks according to the Central Bank of Jordan's bulletin was about 17.5% at the end of 2020, as this percentage is higher than the margin set by the Jordanian Central Bank of 12%. Commercial banks capture most of the market share of the banking services sector in Jordan because of the quality of services they provide, the high confidence and the good reputation they characterize. Hence, the limited studies that dealt with business intelligence capabilities and strategic agility in the Arab environment in general, and the Jordanian business environment in particular, led to conducting this study which seeks to explore the impact of business intelligence capabilities on strategic agility of commercial banks in Jordan.

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## 2 Research Literature

### *2.1 Business intelligence capabilities*

The association of capabilities with intelligence in the business management field refers to the means that organizations use to obtain useful and valuable information that enables management to predict the behavior of competitors, suppliers, customers, and stakeholders with a high degree of certainty [18]. Consequently, an attractive concept has emerged in business management that focuses on enhancing the organization's ability to process the massive flow of data from internal and external business environments by filtering and analyzing it in order to support strategic decisions, which is called business intelligence capabilities [14]. Business intelligence capabilities are described as a set of physical assets and organizational behaviors aimed to transform data into valuable information that is used in making the best decisions and ensure the survival of the organization [15,19].

Researchers in the business intelligence capabilities divided into two trends for determining appropriate dimensions to measure this variable. The first trend considered the dimensions of business intelligence capabilities to be technical capabilities and organizational capabilities [17,19,20], while the other trend was more detailed, where they considered its dimensions represented by business intelligence technology, business intelligence structure, and business intelligence culture [14,15,21,22]. Business intelligence technology is the cornerstone of the business intelligence system as it enables the organization to make the most of the big data that is collected and analyzed from the internal and external sources of the organization [19,23,22,24], also Ni et al. (2019) emphasized that business intelligence systems are not complete without taking into account the latest available technology developments [25]. Business intelligence structure enables building interconnections between different administrative levels in the organizational structure by relying on disseminating information and knowledge about competitors, customers, and other stakeholders in order to make rational decisions and stimulate innovation [14]. As for business intelligence culture, it is concerned with directing the behavior of individuals and motivating them to use technology in the implementation of their work to reach effectiveness which is led to achieve the strategic organization's goals [17,26].

### *2.2 Strategic agility*

The concept of strategic agility first appeared in the research prepared by the American Iacocca Institute in 1991, which considered it as the company's ability to achieve planned profits in an unpredictable business environment [27]. The idea of strategic agility emerged from the increasing need of an innovative newly developed management paradigm by contemporary organizations to achieve distinction and outperform competitors in the turbulent and dynamic environment [28,29].

This concept continued attracting and gaining more attention due to the changes and transformations that took place in the business environment in the twenty-first century, most notably the spread of technology in various organizational aspects and the increasing dynamism of the business environment. As a result, a set of perspectives aimed at defining strategic agility emerged, where Nyamrunda and Freeman (2021) referred to strategic agility as the organization's efforts to detect changes in the business environment related to opportunities and threats to respond to them quickly through the alignment of appropriate resources, operations, and strategies [30]. While Doz (2020) indicated it as the organization's ability to invest its resources effectively and efficiently manner in order to create value for the organization and its customers by recognizing and adapting to the surrounding internal and external circumstances [31]. In the same context, strategic agility was considered as an evolving ability at a third order that contributes to keeping pace with the strategic direction of the organization in a timely manner and adjusting it to achieve the organization's long-term vision [7,32,33].

Since there are different opinions on the concept of strategic agility, the dimensions used for measurement have varied according to the nature of the research field and the researcher's vision. Through a review of the previous literature, it was found that there are two main trends that have identified the most popular dimensions of measuring strategic agility.

The discussion of the literature under the concept of strategic agility suggests several key components or variables of strategic agility that must be explored in understanding the appropriate dimensions of the concepts [34]. The first trend pioneer was Doz and Kosonen (2010), who measured strategic agility through strategic sensitivity, leadership unity, and resource fluidity [35], as it was supported by [7,9,36,37,38]. As for the second trend, it measured strategic agility based on clarified vision, core competencies, selecting strategic targets, shared responsibility, and taking actions [39,40,41,42,43]. Hence, this study relied on the second trend in measuring strategic agility for its

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applicability and comprehensiveness in various business sectors.

Clarified vision is the source of the organization's vitality to motivate employees for adopting change in order to achieve success and excellence [42], and it is the compass that gathers and directs efforts to reach long-term goals through a good awareness of strategic plans [44]. Core competencies refer to the accumulated knowledge and skills that the organization builds on its employees and invests them in achieving competitive advantage and overcoming the challenges of the changing business environment [32]. Selecting strategic targets reflects the outputs that the organization seeks to achieve in the future [45]. Shared responsibility focuses on the functional role and the organizational accountability systems for decisions made in front of stakeholders, whether internal or external [8]. Taking actions demonstrates the organization's ability to exploit its resources effectively and efficiently to meet and respond to fluctuations in the business environment [41].

## *2.3 Business intelligence capabilities and strategic agility*

The significance of using business intelligence systems in organizations lies in the fundamental role that these systems play in providing the necessary information to decision-makers, as well as building required capabilities to achieve competitive advantage [46]. Transforming collected data about changes in the business environment in terms of customer desires, suppliers' capacity, or intensity of competition into valuable information contributes to enhancing the ability of managers to make rational decisions about the use of resources and to exploit opportunities to adapt to these changes [15,18]. Therefore, business intelligence systems lead to achieving rapid harmony with the dynamics of the business environment by improving the agility of the organization in the long term and making it more capable of perceiving the business environment and responding to it in order to ensure the survival and growth of the organization in the future [47]. Thus, the main study hypothesis indicated:

H1: Business intelligence capabilities have a positive impact on strategic agility.

The organizational culture supports the organization's vision and future aspirations by relying on integrating the employees' aspirations within its strategic objectives [48]. In view of the tremendous and rapid developments in the technological field, the organization has to think carefully about rebuilding its organizational culture in proportion to these transformations [49]. Therefore, the business intelligence culture contributes to providing a new vision for the organization as an interactive social fabric on appropriate methods to motivate employees for accepting transformations and engage in the implementation of tasks using smart systems [14]. Thus, the business intelligence culture plays in increasing the ability of individuals to accept change and make them more flexible in dealing with volatile circumstances, which improves the strategic agility of the organization as a whole [16,25]. Hence, the sub-hypothesis of the study was as follows:

H1a: Business intelligence culture has a positive impact on strategic agility.

Dessler (2017) Referred to the organizational structure as a set of communication channels that ensure the flow of information between the various administrative levels in the organization to achieve its desired goals [50]. The business intelligence structure works to improve the flow of information by developing open organizational structures that accelerate the arrival of information about the business environment to decision-makers [18]. It also leads to the timely arrival of the decisions to the concerned persons [14]. Consequently, it is clear that the structures based on the foundations of business intelligence systems have a fundamental role in improving the ability of the organization to adjust its strategy in due time and make decisions that accelerate the process of adapting to the changes in the business environment [12,22]. Therefore, the sub-hypothesis of the study indicated:

H1b: Business intelligence structure has a positive impact on strategic agility.

The idea of strategic agility stems from improving the organization's flexibility to face the uncertainty and fluctuations of the business environment through reaching accurate forecasts [30]. Thus, the organization's exploitation of its resources and technological capabilities in the process of data collection and analysis enables access to high-quality data about the business environment in its various aspects and then analyzing it using contemporary technologies increases the accuracy of the resulting information, which is reflected in making the best decisions about the future of the organization [14,22]. Therefore, the third sub-hypothesis of the study was as follows:

H1c: Business intelligence technology has a positive impact on strategic agility.

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The logical framework for the current study as shown in Figure (1) presents that aims to examine the impact of business intelligence capabilities and their dimensions represented by business intelligence culture, business intelligence structure, and business intelligence technology on strategic agility.

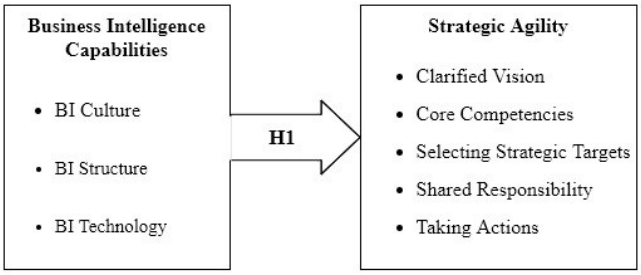


**Fig. 1:** Logical model of the study.

## 3 Methodology

### *3.1 Sampling and procedure*

The Jordanian banking sector has witnessed significant improvement since 2017, where Figure (2) shows this development by presenting a summary of the financial soundness indicators of banks working in Jordan.

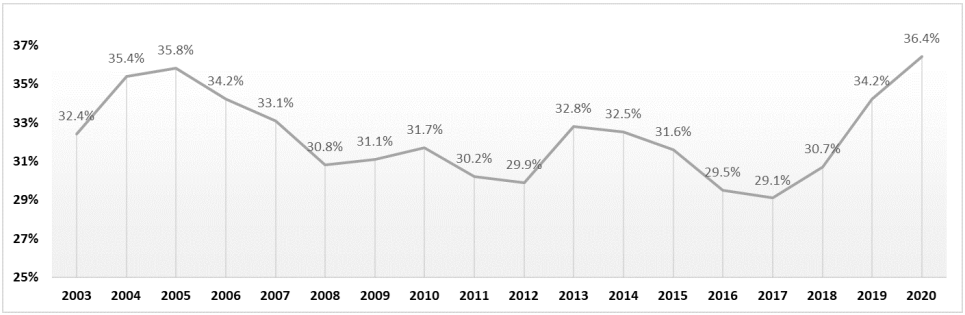


**Fig. 2:** Summary of Financial Soundness Indicators Evolution (2003-2020).

The banking sector represents a link between investors and savers, and the development of this sector is considered an indicator of the country's development and an attractive factor for foreign investments. The Jordanian banking sector consists of 25 banks, 21 commercial banks and 4 Islamic banks, their total assets accounted for 179.4% of GDP, while their deposits accounted for 116.3% of GDP, and credit facilities granted accounted for 92% of GDP. These indicators show the relatively importance of the banking sector compared to the Jordanian economy. Therefore, this study was conducted in commercial banks through a survey sent to a random sample of 400 managers in commercial banks. 212 were answered from the sent surveys, while it was found that the valid ones for statistical analysis were 190 that represented 89.62% of the sent surveys.

It was found that the percentage of males in the study sample was 63.92%, and the percentage of females was 36.08%. The age group (from 40 to less than 50) formed most of the study sample 38.73%, followed by the age group (from 30 to less than 40) that formed 31.14%, then the age group (50 and over) with a percentage of 18.35%, and finally the age group (less than 30) that represented 11.78\% from the study sample. The results also indicated that managers with a master's degree were 58.86%, those who hold a doctorate degree 12.66%, and those who held a bachelor's degree were 28.48\% from the sample. Moreover, the majority of the sample of managers who had job experience (from 10 to less than 15) with a percentage of 43.92%, while those with job experience (less than 5) formed 8.86\% the lowest percentage of the study sample.

### *3.2 Measures*

A survey based on a self-administered electronic questionnaire was used in this study, which was designed using Google Forms. It contained three parts: an introduction explaining the purpose of the study and the strategy for using the data, a part devoted to demographic and functional data, and a part devoted to the study variables. The answers in the third part were distributed on the five-points Likert scale, where the scale values ranged between 1 "strongly disagree" and 5 "strongly agree".

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Business intelligence capabilities: represented the independent study variable that was measured through 16 items developed based on [14,22]. Business intelligence capabilities were considered a second-order construct that subdivided into three first-order constructs. Business intelligence culture was measured using 6 items (e.g., Bank management emphasizes the use of updated information in decision-making at various administrative levels). Business intelligence technology was measured through 4 items (e.g., the bank uses modern technologies to collect data on developments in the business environment). Business intelligence structure was measured through 6 items (e.g., the organizational structure of the bank accelerates the flow of information between departments and divisions).

Strategic agility: was the dependent variable in this study, as it was measured through 20 items that were developed based on [41,51]. Strategic agility is a second-order construct divided into five first-order constructs. Clarified vision was measured through 4 items (e.g., the bank has a general goal that all employees understand). Core competencies were measured using 4 items (e.g., the bank's employees possess the skills and experience necessary to provide the best services to customers). Selecting strategic targets was measured through 3 items (e.g., the bank develops implementation plans that are easy to understand and effectively achieve their outputs). Shared responsibility was measured using 5 clauses (e.g., the bank strengthens the collective commitment towards the decisions leading to the realization of the comprehensive vision). Taking actions was measured through 4 items (e.g., the bank adjusts its resource investment strategy to exploit the available opportunities).

Control variables: Four categorical variables were used in the current study as control variables. They were analyzed using means and standard deviations. Gender includes both categories of males and females. The age group included four groups: less than 30 years, from 30 to less than 40 years, from 40 to less than 50 years, and 50 years and over. Educational level is divided into bachelors, masters, and doctorates. Work experience was divided into four categories, which were less than 5 years, from 5 to less than 10 years, from 10 to less than 15 years, and 15 years and more.

## 4 Results

### *4.1 Measurement model*

Confirmation factor analysis (CFA) was used to test the validity and reliability of measures of business intelligence and strategic agility.

**Table 1:** Descriptive statistics, correlation matrix of constructs and CFA summary

| | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| 1. BICU | **.722** | | | | | | | |
| 2. BIST | .621 | **.771** | | | | | | |
| 3. BITE | .525 | .628 | **.731** | | | | | |
| 4. CLV | .689 | .605 | .712 | **.749** | | | | |
| 5. CCO | .714 | .671 | .654 | .524 | **.746** | | | |
| 6. SST | .597 | .720 | .557 | .671 | .637 | **.778** | | |
| 7. SRE | .554 | .705 | .482 | .662 | .724 | .505 | **.725** | |
| 8. TAC | .708 | .694 | .587 | .593 | .642 | .683 | .691 | **.753** |
| Mean | 3.71 | 3.66 | 3.75 | 3.62 | 3.44 | 3.58 | 3.60 | 3.52 |
| SD | .894 | .925 | .881 | .864 | .974 | .836 | .905 | .915 |
| Loadings | .682-.771 | .724-.813 | .670-.782 | .691-.824 | .702-.794 | .733-.835 | .703-.744 | .716-.812 |
| AVE | .522 | .594 | .534 | .561 | .557 | .605 | .526 | .567 |
| MSV | .435 | .388 | .417 | .499 | .380 | .473 | .396 | .487 |
| CR | .867 | .854 | .873 | .836 | .834 | .821 | .847 | .839 |
| α | .859 | .850 | .869 | .833 | .829 | .818 | .842 | .836 |

The results listed in Table (1) showed that the item loadings on their constructs were within the range (0.670-0.835) which were greater than 0.50, therefore all items were retained [52,53,54]. The values of average variance extracted (AVE) indicated that it ranged within (0.522-0.605) that were higher than the minimum threshold of 0.50 adopted in the test convergent validity of the measures [55,56,57]. Moreover, the average variance extracted values were higher than the maximum shared variance (MSV), as well as the square root values of the average variance extracted the square root of AVE greater than the correlation among other constructs, thereby the study measures have discriminatory validity [58,59,60]. The reliability of the measures was evaluated using the internal consistency by Cronbach alpha coefficients (α) that ranged within the domain (0.818-0.869) and the composite reliability using the McDonald's Omega coefficients (CR) whose values were within the range (0.821-0.873). Hence, all of these values were greater than the minimum threshold indicated by 0.70 in order to consider the measures having reliability [61,62,63]. In addition to determining the validity and reliability of the scale, the CFA allows identifying the

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construct validity of the used model through the goodness of fit indicators.

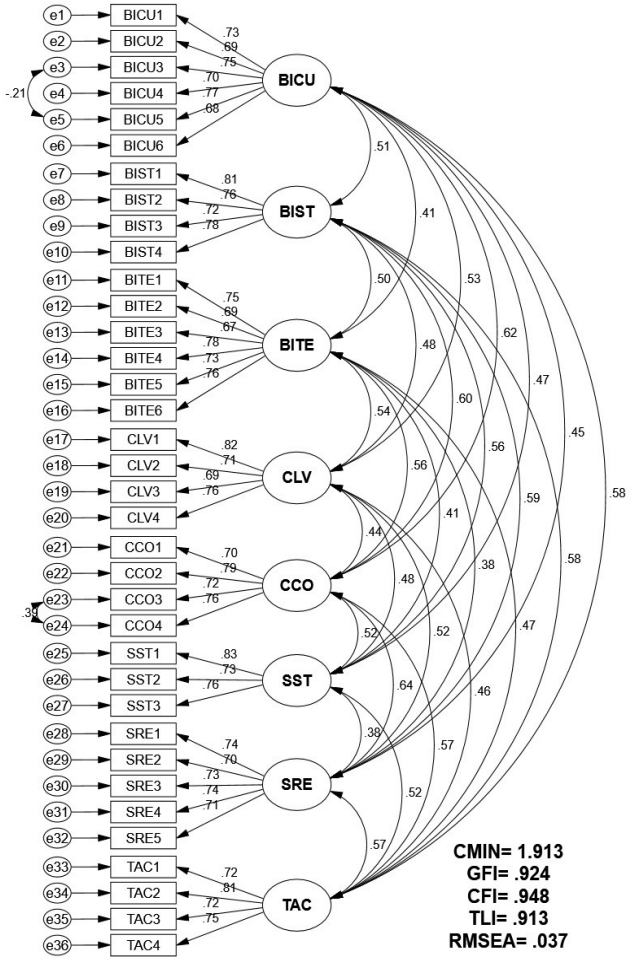


**Fig. 3:** Measurement model (CB-SEM).

Figure (3) shows the results achieved that the chi-square to degrees of freedom ratio (CMIN) was 1.913, which is less than the highest acceptable value of 3, and the values of the goodness of fit index (GFI), comparative fit index (CFI), and Tucker-Lewis index (TLI) were greater than 0.90 which is the lowest limit for acceptance. Finally, the value of root mean square error of approximation (RMSEA) was less than 0.08, the upper limit for acceptance of this indicator. According to [64], the results of these indicators were within the appropriate limits for considering the study model

## *4.2 Descriptive statistics*

Table (1) presented the results of the descriptive analyzes of the dimensions of business intelligence and strategic agility at commercial banks in Jordan. It is evident that business intelligence technology, as one of the dimensions of business intelligence capabilities, ranked first at a high level (M= 3.75, SD= 0.881), followed by business intelligence culture at a high level (M= 3.71, SD= 0.891), while the business intelligence structure was ranked last at a moderate level (M= 3.66, SD= 0.925). However, all the dimensions of strategic agility were at a moderate level, as it was found that the first place was for clarified vision (M= 3.62, SD= 0.864) and the last place for core competencies (M= 3.44, SD= 0.974).

Besides, the results indicate moderate levels of correlation between the dimensions of the variables, where the values of Pearson correlation coefficients ranged within the range (0.525 -0.724). It was also found that the values of the correlation coefficients between the dimensions of business intelligence capabilities ranged within the range (0.525-0.628), which is less than 0.80 the agreed-upon value for considering the data free of multicollinearity [65,66].

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### *4.3 Structural equation model*

Structural equation modeling (SEM) was used to verify the hypothesized relationships in this study as it is a multivariate technique that allows explaining the relationship between the first and second order variables alike [67].

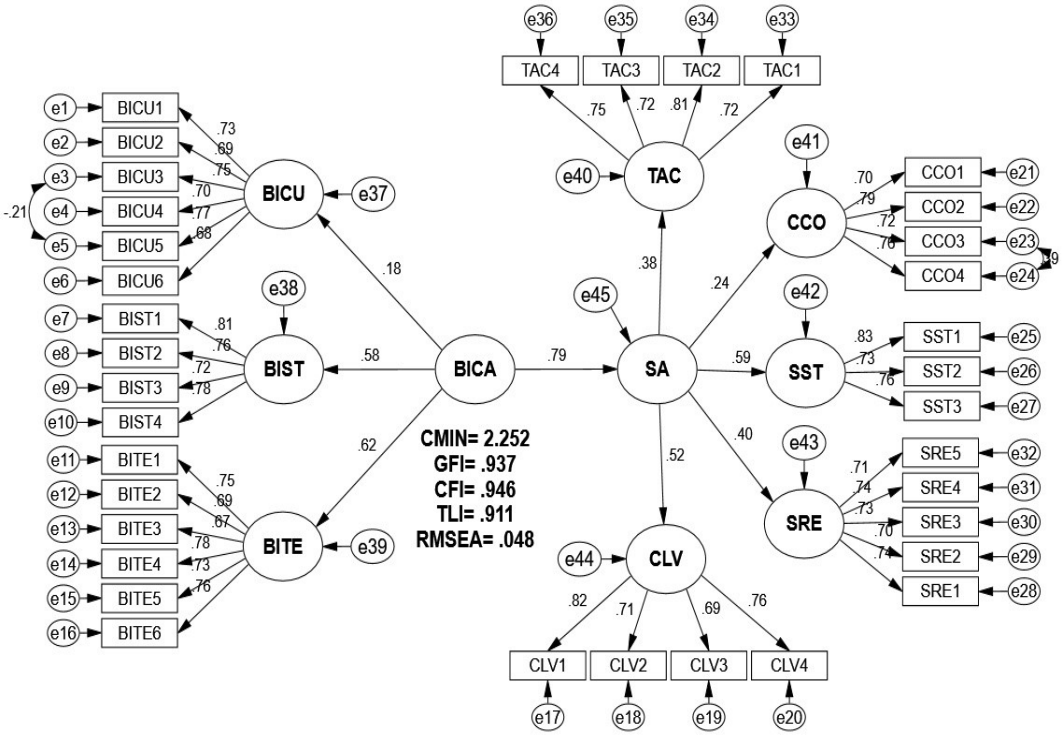


**Fig. 4:** Structural equation model of major hypothesis.

Figure (4) shows the structural model used to validate the fitness of the testing model for the impact of business intelligence capabilities on strategic agility. The results in this figure showed that CMIN was 2.252, values of GFI, CFI, and TLI were within the appropriate limits, and RMSEA value was less than 0.08, thus the model used is considered to have an adequate indicator [68].

**Table 2:** Structural equation model of major hypothesis

| | Path | B | S.E. | β | t-value | p-value |
|---|---|---|---|---|---|---|
| H1 | BICA → SA | .862 | .026 | .79 | 33.15 | *** |
| H1a | BICU → SA | .415 | .038 | .11 | 10.92 | .087 |
| H1b | BIST → SA | .583 | .033 | .39 | 17.66 | ** |
| H1c | BITE → SA | .655 | .031 | .56 | 21.12 | *** |

Table (2) illustrates the results of hypothesis testing where the main hypothesis indicated that business intelligence capabilities have a positive effect on strategic agility. Through the results obtained, it was found that this hypothesis was supported based on the achieved probability value and the impact value (β= 0.79, p<0.001). Hence, business intelligence capabilities have a positive effect on strategic agility. Moreover, three sub-hypotheses emanated from the main hypothesis test the impact of each dimension of business intelligence capabilities on strategic agility.

Figure (5) indicates the model used for this purpose is appropriate based on the value of CMIN that was less than 3, the values of GFI, CFI, and TLI that exceeded 0.90, and the value of RMSEA that was less than 0.08. Besides, the results in Table (2) showed that business intelligence technology had a positive impact on strategic agility (β= 0.56, p<0.001), followed by business intelligence structure (β= 0.39, p<0.01). With regard to business intelligence culture, the results indicate that it had no impact on strategic agility, where its probability value (p-value) was higher than 0.05. Therefore, the second and third sub-hypotheses were supported, and the first sub-hypothesis rejected.

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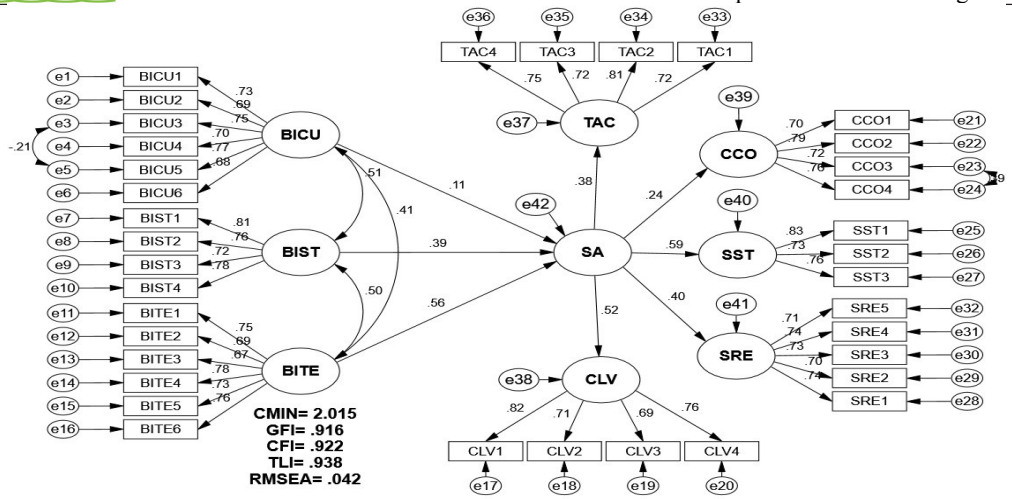


**Fig. 5:** Structural equation model of minor hypotheses.

## 5 Discussion and Conclusion

The present study aimed to test the impact of business intelligence capabilities on the strategic agility of commercial banks in Jordan. The results of the statistical analysis showed that the level of business intelligence technology and business intelligence culture were at a high level of relative importance, while the business intelligence structure was at a moderate relative importance. Consequently, it can be concluded that commercial banks seek to develop their technical systems used in collecting, analyzing, and storing information that are considered necessary in the decision-making process and the transition to more efficient and effective smart systems. It also focuses on including its strategies with considerations and values that motivate employees to adopt the use of modern technology on a large scale because of its role in improving the quality of the outputs provided to customers. Despite this, the organizational structures of commercial banks are unable to keep pace with the rapid developments and the integration of business intelligence systems at all administrative levels due to the difficulty of the sudden transformation process and the fear of the consequences associated with the technological change, especially in terms of confidentiality of information and respect for customer privacy.

Besides, the results related to strategic agility indicate moderate levels of importance for all its dimensions. Therefore, it is observed that commercial banks, through their future vision, emphasize their orientation towards more flexible approaches in dealing with the challenges of the business environment. Commercial banks support the sharing of responsibilities among employees to achieve the best possible results although they maintain a degree of independence when it comes to carrying out tasks related to the privacy aspects of customers. Further, commercial banks set their priorities in line with the dynamism of the business environment and in harmony with the strategic goals that they seek to achieve by exploiting the skills and experiences of employees and developing them to build core competencies based on the optimal use of resources and improving knowledge capabilities.

The results demonstrate that business intelligence capabilities, including business intelligence technology and business intelligence structure, had a positive impact on strategic agility, while the business intelligence culture had no impact on strategic agility. Consequently, business intelligence capabilities as organizational capabilities contribute to increasing understanding and awareness of changes in the business environment, which helps in developing accurate future predictions and making the most appropriate decisions that contribute to achieving strategic goals. Moreover, the business intelligence structure allows to rearrange resources and skills with enough flexibility to exploit the predicted market opportunities, and business intelligence technology helps managers improve the quality of decisions made by providing accurate and real-time information on various aspects of the organization's work and increases the possibility of achieving a superior competitive position by relying on monitoring and analyzing change with the desires of current and potential customers.

## 6 Implications

The findings of the study provided a set of theoretical and practical implications. On the theoretical side, this study developed the logical framework that combines business intelligence capabilities with strategic agility. In addition, it contributes by showing the role of business intelligence in improving the resource-based view and dynamic capabilities in keeping pace with the latest developments in a business environment and integrating advanced technology in building competencies that enable the organization to survive and grow. On the practical side, the study

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provides a set of recommendations for decision-makers by urging them to invest in modern technologies dedicated to collecting, analyzing, and storing data in a safe and accessible manner during the decision-making process. Moreover, it encourages the managers to reconsider their administrative methods to be able to spread the culture of business intelligence at various administrative levels, which helps the organization to adapt quickly to the urgent changes in the business sector, as well as emphasizes the formulation of goals and strategies that all employees can easily realize and work to achieve within planned schedule.

**Conflict of interest**

The authors declare that there is no conflict regarding the publication of this paper.

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