Revue Française d'Economie et de Gestion
ISSN : 2728- 0128
Volume 4 : Numéro 3

Vers une compréhension de l'impact des systèmes Business Intelligence sur l'apprentissage organisationnel et la performance des entreprises marocaines : La vision de l'utilisateur

Towards an Understanding of the Impact of Business Intelligence Systems on Organizational Learning and Performance of Moroccan Companies: The User's perspective

FINNAOUI Kenza
Doctorant
Ecole National de Commerce et de Gestion
Ibn Zohr
ERETTLOG
Agadir, Morocco
kenza.finnaoui@edu.uiz.ac.ma

ZEROUALI OUARITI Ouafae
Enseignant chercheur

Ecole National de Commerce et de Gestion
Ibn Zohr
ERETTLOG
Agadir, Morocco
o.zerouali@uiz.ac.ma

Date de soumission : 30/01/2023

Date d'acceptation : 05/03/2023

Pour citer cet article:

FINNAOUI.K. & ZEROUALI OUARITI O. (2023) «Towards an Understanding of the Impact of Business Intelligence Systems on Organizational Learning and Performance of Moroccan Companies: The User's perspective », Revue Française d'Economie et de Gestion «Volume 4 : Numéro 3 » pp : 346 – 367.

Résumé

Au cours de cette dernière décennie, les systèmes Business Intelligence ont suscité un intérêt croissant auprès des entreprises marocaines. En raison des conditions environnementales de plus en plus concurrentielles, les Managers sont amenés à adopter les systèmes BI pour exploiter les données organisationnelles et soutenir la performance. Etant donné que les travaux de recherche dans le contexte marocain concernant l'implémentation et l'utilisation des systèmes BI sont limités, cet article contribue, à travers une étude exploratoire, à la compréhension de la manière dont les systèmes BI affectent l'apprentissage organisationnel et la performance. A l'issu de cette étude, les auteurs ont relevé que les systèmes BI sont une source d'apprentissage qui permettent à l'entreprise d'être réactif face aux changements de l'environnement. Ces réactions sont soit des modifications mineures qui permettent de maintenir les processus dans les limites souhaités, ou des changements majeurs qui permettent d'émerger de nouvelles stratégies. Également, cette recherche identifie les raisons d'implémentation des systèmes BI, ainsi que le lien qui existe entre les systèmes BI et la performance organisationnelle.

Mots clés : Système Business Intelligence; Apprentissage organisationnel; Apprentissage d'exploitation; Apprentissage d'exploration; Performance organisationnelle

Abstract

Business Intelligence systems gained significant interest among Moroccan companies in the last decade. Due to increased competitive environmental conditions, managers are led to adopt BI systems to take advantage of organizational data and support performance. To cope with the lack of research in Morocco concerning the implementation and use of BI systems, this article contributes, through an exploratory study, to the understanding of how BI systems affect organizational learning and performance. At the end of this study, authors noted that BI systems are a source of learning that allows the company to react accordingly to the environment changes. These reactions are either minor modifications that sustain the processes within the desired limits, or major changes that allow new strategies to emerge. Moreover, authors identify the reasons for implementing BI systems, as well as the link between BI systems and organizational performance.

Keywords: Business intelligence, Organizational learning, Exploitation learning, Exploration learning, Organizational performance.

Introduction

Companies are currently operating in a dynamic and highly competitive environment where resistance to change is causing a challenge to business survival. To cope with uncertain situations, Argyris and Schon (1996) recognize that organizational learning (OL) is a primary component in the strategic management of organizations. It is even considered the most important source and an essential tool for improving the level of competitiveness. OL is defined by Fiol and Lyles (1985, p. 803) as " *the process of improving actions through better knowledge and understanding*". According to Huber (1991, p. 89), learning occurs in an organization "*if, through its processing of information, the range of its potential behaviors is changed*".

However, given the large number of transactions that companies record daily, it becomes difficult for managers to monitor their activities proactively and agilely. Manual processing of databases with classic tools such as Excel is time consuming and can hide calculation errors. Also, the possibilities of interpretation and discovery of new data interdependencies are very limited. As a result, information and indicators on events that have taken place will be communicated later on, with a risk of reliability, and reactions will only materialize after the fact. Thus, companies are becoming aware of the need to adopt Business Intelligence (BI) technologies that have the ability to analyze organizational data and transform it into intelligence ready to be exploited in the decision-making process (Fink et al., 2017).

BI systems are increasingly becoming popular with companies that want to improve their OL level and create innovation. With the expansion of business activity and the increase in transaction volume, it has become difficult to manipulate transactional data and communicate the information needed for day-to-day management and decision making. Companies that use BI systems to manage their businesses achieve a high level of competitiveness and performance through a number of factors, including: improved product and service quality, business process efficiency, reduced order fulfillment rates, increased sales, and improved partner relationships. Over the past two decades, BI systems have become a topic of increasing interest to management science researchers. The advantage of BI systems is seen by many authors as a necessity for businesses to meet market demands and achieve high performance (Elbashir et al., 2020, 2013; Peters et al., 2016). While most academic research has focused on studying the role of BI technologies to create an integrated management control systems and generate organizational performance, little research has turned to studying their impact on OL, namely Lee and Widener (2016) and Fink et al. (2017). In the other hand, research in developing countries concerning BI systems is still under development. Recently, Jaradat et al. (2022) tried

to examines the factors impacting the adoption of BI systems and its impact on decision-making performance in Jordian companies. In another study carried out in Jordian context, Alzghoul et al. (2022) tried to explain how business intelligence capability impacts decision-making speed, comprehensiveness, and firm performance. During the same year, Al-Okaily et al. (2022) studied the factors that contribute to data warehousing effectiveness in the BI era of Jordanian banks. In the Nigerian context, Lateef and Keikhosrokiani (2022) tried to predict the success factors that would impact the implementation of BI systems in small and medium companies in Nigeria.

In the Moroccan context, Jadi and Jie (2017) analyzed and suggested an implementation framework of BI in Morocco e-government systems. In another study conducted in 2014-2015, Bachrane et al. (2015) presented the results of a survey concerning the practices of economic intelligence (which is according to the authors a component of BI) within shipping companies in the area of TangerMed. Moudni and Chafik (2021) established a synthetic literature review to analyse the adoption and acceptance of artificial intelligence and big data tools in Moroccan organizations. In 2022, Oubibi et al. (2022) gave insights about the challenges and opportunities for developing the use of data and Artificial Intelligence in Morocco. El Haddadi et al. (2022) proposed a BI Web portal of public Sustainable purchase in Morocco based on real time data.

To contribute to the current body of knowledge on the implementation and use of BI systems, this study adopts a field research approach to explore the influence of BI systems on OL and performance. Moreover, for better understanding, this study tries to detect the reasons behind BI systems implementation, which might deepen the analysis of the nature of the influence of BI. Our study has especially chosen to focus on different contexts of BI systems use in Moroccan companies. The managers selected to participate in this study occupy diverse positions and work for companies in various sectors.

The contribution of this study has a dual perspective. From a theoretical perspective, this study contributes to BI research by unveiling organizational aspects that are influenced by BI systems, sheds light on the main aspects related to the BI project and tries to detect the main reasons behind BI systems implementation. From a practical perspective, this study tries to fill the information gap in the use of BI systems by companies in developing countries, particularly Morocco, where little is known about how BI systems are deployed. It also provides useful insights for managers who intend to implement BI systems and for those who are struggling to create value from them. Thus, this research will attempt to answer the following main question:

How the use of Business Intelligence systems influences organizational learning and the performance of Moroccan companies?

Finally, this paper is organized as follows: in the next section, the theoretical background of OL, its relevance in the company, as well as the importance of using BI systems will be expounded upon. This serves as a basis for conducting the qualitative study with 11 senior and middle managers from Moroccan companies. The third section explains the research methodology and the conduct of the study. The fourth section presents the results of the interviews. Lastly, we will conclude the study with a discussion and by outlining the main strengths and limitations of the research.

1. Theoretical background

1.1. Organizational learning

OL has been the subject of scientific studies in fields such as sociology and psychology before reaching the management sciences. With the publication of Argyris' (1977, 1976) seminal work on OL and Senge's (1994) book on the learning organization, the scientific literature on this topic has become very extensive (e.g Crossan et al., 1995; Dodgson, 1993; Fiol and Lyles, 1985; Huber, 1991). Despite this growth, many researchers agree that there is inconsistency in the definitions given and a lack of cumulative work in the area of OL. Some authors approach the notion of learning by type and level of learning, others by intended outcome. The inconsistency in the literature is also due to the confusion of the notion of OL with organizational adaptation: "*Change, learning, and adaptation have all been used to refer to the process by which organizations adjust to their environment*" (Fiol and Lyles, 1985, p. 805).

Huber (1991) considers OL as a process that reflects the ability of organizational members to acquire new knowledge and ideas, to accept them, and to see them as potentially critical to the survival of the organization. The acquisition of knowledge – whether intentionally or unintentionally – involves awareness, analysis of the environment and past events in relation to expectations, performance monitoring and self-assessment of the organization's problems and concerns (Huber, 1991).

For his part, Hames (1994) explains that learning is not limited to the acquisition of new values and knowledge. It is a process that focuses attention on the need for companies to change old practices and routines in order to adapt to changing situations in their internal and external environments and to develop and generate innovations. It is indeed a situation of a paradigm shift where the environment is perceived in a different way, leading to necessary transformations to ensure the future of the company. Corrections can be either minor change

in operational policies, called "exploitation learning", or major modifications in the existing strategy, structure and action plans, called "exploration learning"[1] (March, 1991).

1.2. The relevance of organizational learning in companies

OL is a primary component in the strategic management of organizations (Argyris, and Schon, 1996). It is even considered the most important source and an essential tool for improving the level of competitiveness (Alegre and Chiva, 2008; Styhre et al., 2004). To explain this link, Leavy (1998) postulated that strategy is not a simple planning process but rather an OL process, whose usefulness is to drive organizational reflection and transformation. Levinthal and March (1993) outline two characteristics of OL that influence strategic flexibility and the creation of competitive advantage. The first is that OL increases average performance while the second sees it improves reliability.

The OL process provides managers with the ability to acquire high levels of knowledge which promotes innovation and improves skills. Evidently, groups of people that are more knowledgeable and experienced will tend to perform better than the less knowledgeable and less experienced (Levinthal and March, 1993). On the other hand, increased reliability is a result of the first characteristic, as informed and experienced employees will tend to deal with uncertainties and surprises.

However, Levitt and March (1988) and Hardy (1996) raise the risk that OL does not always lead to optimal situations for creating and maintaining competitive advantages. They explain this by the fact that organizations often tend to practice exploitation learning that focuses attention on implementing current strategies and neglects any exploration learning that leads to intelligent behaviors that serve to unearth new opportunities. Although the idea of the need to create a balance between exploitative and exploratory practices has been challenged by some researchers (Ebben and Johnson, 2005), there is a general consensus and a sizable body of literature in organizational science that supports the importance of this balance, commonly referred to as 'organizational ambidexterity'. While exploitation learning allows for the continuous refinement of action plans necessary to implement existing strategies and to solidify and maintain market preeminence, not to mention that survival in a highly competitive environment also depends on the ability to identify the need for a total strategy revision.

[1] The scientific literature presents several classifications of organizational learning that have the same meaning. For March (1991), learning reflects the balance between exploitation and exploration practices; Argyris (1977) uses the classification of single and double loop learning. Kloot (1997) talks about adaptive and generative learning. And for McKee (1992), it is about production-oriented and innovation-oriented learning.

1.3. The importance of using Business Intelligence systems

The scientific literature is replete with definitions given to BI systems. Among the most relevant definitions is that of Wieder and Ossimitz (2015, p. 1164), who consider BI *"as an analytical, technology supported process which gathers and transforms fragmented data of enterprises and markets into information or knowledge about objectives, opportunities and positions of an organization."* For Lonnqvist and Pirttimaki (2006, p. 32), BI is *"An organized and systematic process by which organizations acquire, analyze, and disseminate information from both internal and external information sources significant for their business activities and for decision-making".* For their part, Rikhardsson and Yigitbasioglu (2018, p. 38) consider BI as an "*umbrella term in that it encompasses a variety of technologies and methodologies that enable organizations to collect data from internal and external sources, prepare it for analysis, develop and run queries against the data, and create reports, dashboards and data visualizations to make the results available to end users."*

Clearly, the proposed definitions agree that BI systems are a combination of:

- IT tools, technologies and functionalities.
- Processes for collecting, analyzing data from internal and external sources and distributing information. These processes are supported by the technologies mentioned above.
- Knowledge that results from the sharing of information across the company and manifests itself in a better understanding of the business environment, leading to better decision making.

Possessing the adequate knowledge is a key antecedent to OL. However, the human capacity to memorize and interpret information is clearly very limited and prone to error (Dewett and Jones, 2001). The capacity of BI systems to integrate and analyze data and communicate information has made it easier for managers and subordinates to monitor and interpret events related to their business unit. Due to the sophisticated technical features of BI systems, managers will have access to instant management control information and reports with powerful visualization and analysis capabilities that make sense of source data, facilitate the management of the activity of different business units, and enable the alignment of business strategy with corporate goals (Elbashir et al., 2008; Lee and Widener, 2016; Peters et al., 2016; Rikhardsson and Yigitbasioglu, 2018)

According to Lee and Widener (2016), BI systems use is associated with better OL. The results of their survey suggest that Query, Analysis and Reporting (QAR) features affects exploitation learning, while Data Visualization (DV) features leads to better exploration learning. QAR are BI systems capabilities that provide managers with *"clear and aggregated information for each financial measure, with the ability to navigate and query historical data according to different dimensions and the same logical analytical framework of the past*" (Finnaoui et al., 2021). Lee and Widener (2016) explain that these capabilities should make it easier for managers to realize ad hoc analysis when variances between results and strategy occur, understand its origin, and adjust it according to the predefined strategy. This type of control is what Simons (1995) calls as diagnostic control system. This system facilitate exploitation learning that keeps a process within desired limits. It is used to motivate, monitor, and reward the achievement of specific goals.

Concerning DV features, it's used by top management team (TMT) to clearly visualize financial and non-financial information within an open framework, allowing top managers to assess risks, diagnose problems and identify opportunities without relying on pre-established analytical relationships (Lee and Widener, 2016). According to Simons (1995), this type of control is a part of interactive control system which facilitate exploratory learning that leads to questioning the basis on which strategies have been constructed and leads to the emergence of new ideas and strategies.

Other studies tried to depict the importance of using BI systems through their influence on organizational performance. Elbashir et al. (2013) published one of the prominent studies in this area. They find out that a successful assimilation of BI systems leads to a better performance. They also explain why some organizations are able to generate a higher business value from BI systems than others.

While research that has assessed the relationship between management control systems and OL is abundant (e.g Kloot, 1997; McCarthy and Gordon, 2011; Simons, 2014, 1995), little research has focused attention on the impact of BI systems on OL (Fink et al., 2017; Lee and Widener, 2016). Although Lee and Widener (2016) and Fink et al. (2017) researches demonstrate the relation between BI systems and OL, the quantitative approach used by these authors gives too general information without giving a deeper understanding of the studied phenomenon. Also, the exploratory study done by Fink et al. (2017) only focused on three companies which limits the generalization of the results. Hence, our understanding of the impact of BI systems on OL remains limited. In the other hand, we observed that the scientific work related to the adoption

and use of BI systems is still limited in the Moroccan context in contrary to the developed countries where the subject has been extensively studied.

To conclude, even though the scientific literature has demonstrated that BI systems influence OL and decision making, this area of research remains open to many descriptive research questions that should help to obtain more meaningful explanations of the studied phenomenon. In order to contribute to the literature on the BI systems implementation and use and their impact on OL, we asked, "How do BI systems affect OL and performance?"

To answer our research question, we premised our research on Simons (1995) Management control framework who explains that managers use the management control information to either perform diagnostic control or interactive control to best manage their business and cope with market changes. This author argues differently than Lee and Widener (2016), and makes the cases that: *"[...] A diagnostic control system may look identical to an interactive control system. The distinction between the two is solely in the way that managers use these systems. For example, the same profit planning system or balanced scorecard can be used either diagnostically or interactively. As we shall see, this choice has profound implications for maximizing ROM and the effective implementation of strategy"* (Simons, 2014, p. 226). Therefore, in our study we don't make any distinction between QAR and DV features (Lee and Widener, 2016). Based on Simons (1995) framework, all BI systems capabilities are concerned with exploitation and exploration learning.

2. Methodology

In order to address the need for information on current practices regarding the use of BI systems for OL and performance needs, we adopted a qualitative study (Lillis and Mundy, 2005; Roslender and Hart, 2003) involving managers from different companies that use BI systems in a daily basis for business steering and decisions making purposes.

According to Marshall (1996, p. 522) "*Qualitative studies aim to provide illumination and understanding of complex psychosocial issues and are most useful for answering humanistic 'why?' and 'how?' questions*". Lillis and Mundy (2005) explain that qualitative studies are "*limited-depth studies conducted at a non-random selection of field sites, thus lying somewhere between in-depth cases and broad-based surveys*". Taking into consideration that our aim is to provide a wide and comprehensive picture of the impact of BI on OL and performance and not an in-depth analysis, the field study is appropriate to investigate a large number of units and have access to different and pivotal data that may not be observed through other method of

research. Moreover, due to the proximity that the researcher has to subjects, this method allows for the collection of a more comprehensive and accurate data.

Specifically, our study is based on data collected from senior and middle managers of Moroccan companies operating in different sectors. Certainly, to identify patterns in the observations, targeting multiple research sites might be beneficial (Lillis and Mundy, 2005) because it gives to the researchers the possibility to gather more information on a phenomenon and get insights about its present extension (Roslender and Hart, 2003). The criteria for the selected sample of managers are twofold: the hierarchical position held and the size of the company in which they work. We believe that BI technologies require a certain level of investment that cannot be afforded by small companies, or at least the need will not be expressed by this category of companies. Therefore, to understand the impact of BI systems on OL, it was necessary to target the profiles of managers who are involved in the decision-making process.

From a methodological point of view, the interviewed managers were carefully selected on the basis of their LinkedIn profile, which is a business and employment-oriented platform used for professional networking. The number of profiles identified and contacted through email was 78 managers, among which 11 agreed to participate in the research, six stated that they were unable to contribute to the study because they did not use BI systems, and the remaining 61 did not respond. Table 1 presents information on the profiles of the interviewed managers and the companies they work for. The email informed the potential respondents as to the nature of the study who, those who agreed, were then interviewed via Google Meet or by telephone.

To gather data, we used the semi-structured interview (Adams, 2015) because it combines the flexibility of the unstructured interview with the pre-planned and standardized questions of the structured interview. Questions in the semi-structured interview are often followed-up by why and how questions that provide more clarification and leads to in-depth exploration and analysis of emergent issues (Adams, 2015; Wengraf, 2001).

The interviews with managers were conducted during the months of February and March 2021 and lasted approximately 40 minutes each. According to Adams (2015, p. 493) "*About one hour is considered a reasonable maximum length for SSIs in order to minimize fatigue for both interviewer and respondent*". The interviews were tape-recorded, transcribed, and then analyzed. The interviews began with general questions about the organization (business activity, date of foundation, number of employees), the interviewees (position held and duration with the company), and the BI systems used (BI vendors, level of sophistication,

company-level coverage, and BI system sponsors and promoters), before gradually evolving into a more elaborate discussion. The interview questions addressed themes identified in previous research (Elbashir et al., 2011; Lee and Widener, 2016; Nespeca and Chiucchi, 2018) that are summarized in Table 2.

3. Results

3.1. BI project management

Before moving on to questions related to the use of BI systems, managers were asked about a few aspects related to the BI project, in this case the promoters and sponsors of BI systems in the company, the level of sophistication, BI vendors, and the coverage of BI systems in the company.

Nespeca and Chiucchi (2018, p. 289) define sponsors as the people who decide to implement BI systems in the company and sponsors as the people who approve the BI project in the company. 42 percent of the interviewees state that the need to adopt BI systems was expressed by the BU managers. Another 33 percent said the need came from senior management. The rest of managers (25 percent) state that the management control function and the IT department are behind the decision to implement decision support systems. Also, all the managers interviewed confirm that the decision to adopt BI systems was ratified by the Top Managers.

In terms of level of sophistication, the interviewed managers state that the BI systems adopted are of medium level. They are oriented towards reporting, analysis of past transactions and performance visualization. Only manager eight (from company H) adds that his company is planning to turn to BI systems with advanced analysis, data mining and predictive capabilities. Microsoft Power BI is the BI system used by 54 percent of our sample. 18 percent have opted for open source and the rest have opted for Qlick, Oracle, and Tableau.

Finally, according to 83 percent of the interviewees, BI systems cover most business functions and activities. The rest of the interviewees declare that the management control function is the only one to use these systems.

Table 1 : Interviewees Profiles

Managers	Companies	Activity	Number of employees	Date of foundation	Position held	Length of time
Manager 1	Company A	Construction	8500	1991	Director of Management Control	10 years
Manager 2	Company B	pharmaceutical	1300	1976	Senior Management Controller	3,5 years
Manager 3	Company C	Large retail (Food industry)	7500	1990	Hypermarket manager	3 years
Manager 4	Company D	Large retail (Food industry)	2800	1985	Director of Management Control	8 years
Manager 5	Company E	Large retail (Food industry)	1800	1998	CIO	23 years
Manager 6	Company F	Export of fruits and vegetables	100	1998	Director of Sales and Marketing	3 years
Manager 7	Company G	Retail (office and school supplies)	500	1986	Head of cash and credit management	2,5 years
Manager 8	Company H	Retail Bank	300	2015	Executive Director of Finance, Strategy and Development	6 years
Manager 9	Company I	Micro-finance	1600	2000	Director of Management Control	9 years
Manager 10	Company J	Industry	20000	1948	Director of Management Control	2 years
Manager 11	Company K	Transportation	8500	1923	Director of Sales and Marketing	2 years

Source: developed by the authors

Table 2: Topics and issues discussed during the interviews

Topics covered		
BI Project Management	**Implementation decision**	**Organizational learning**	**Organizational performance assessment**
Who are the promoters and sponsors of BI systems in your company? What is the level of BI coverage? Who are your BI vendors? How sophisticated are your BI systems?	What are the reasons behind the decision of investing in BI systems?	What situations do you use BI systems for? Do the performance measurement capabilities of BI systems accurately address your learning and decision-making needs? Do they help you address problems in a different way?	How would you rate the performance of the organization after the implementation of BI systems? Did the company gain a competitive advantage?

Source: developed by the authors

3.2. The reasons for implementing BI systems

Whether it is for business steering and reporting needs, or for day-to-day operational needs such as inventory management, follow-up of the recoveries and customer profitability, two major reasons have motivated Moroccan companies to implement BI systems: improving the timeliness and reliability of information.

Regarding the timeliness of information, manager seven specified that "*our information system SAGE 100 was unable to provide us with personalized indicators in real time, capable of supporting decision making. We had to perform daily extractions that contained a large mass of data that we processed manually on MS Excel, which consumed a lot of time, while having a great risk of error."* While manager two adds *"the classic tools like MS Excel do not allow cascading according to different dimensions and to perform more advanced analyses.*" Managers four and nine confirm that BI systems have allowed them to optimize the production time of reports and to increase the power of analysis.

Regarding the reliability of information, manager nine explains that "*before the adoption of BI systems, there were other*

functions that produced the information. On several occasions, we found ourselves in situations where the results of our calculations were not identical, which called into question the reliability of our calculation methods and the relevance of our decisions that could be based on erroneous information. Our BI system allowed us to have consistent and reliable information."

Having timely and reliable information is essential to react to negative deviations at the right time and avoid any surprises at the end of the month. Indeed, manager three explains that "*thanks to the BI systems, the managers in our company no longer waste time looking for information. The performance indicators have become identical, reliable and fast which has improved our efficiency and way of working and increased our profit margin.*"

Other reasons for adopting BI systems were highlighted by Managers one, five and six. Manager one emphasizes that "*the size of our company was growing and we didn't have enough insight into what was going on in our projects. We currently have about 60 projects underway and 40 projects in closing that we could no longer manage in parallel and know the levels of performance and compliance with the pre-established budgets"*. According to Manager five, "*the decision to implement BI systems was a response to the increase in market competition that requires business unit managers to closely monitor the performance of our stores*". For Manager six, "*the appointment of the new general manager was followed by a decision to digitalize all processes, which was concretized by the implementation of an integrated information system (ERP) and later by a BI system.*"

3.3. Impact of BI systems on organizational learning

In this section we will analyze the impact of BI systems on exploitation and exploration learning. We note that all interviewees confirmed the usefulness of BI systems for exploitation learning needs and two thirds confirmed it for exploration learning needs. In order to clearly illustrate the relationship between these two variables, we asked our interviewees to support their observations with concrete examples.

3.3.1. BI systems and exploitation learning

Regarding exploitation learning, all interviewees believe that it is inconceivable to track strategic objectives and react to inconsistencies that may arise without BI systems.

Manager six confirms that BI systems have unlocked new dimensions of analysis. He explains that "*BI systems allow us to track two aspects on daily bases that are necessary to ensure the achievement of strategic objectives. First of all, by using BI systems, we can make a prompt management of customer orders in terms of quantity and variety of products, while reconciling*

them with the initial budget. In case we are far from the pre-established budget, BI systems allow us to make corrective decisions at the appropriate time, thus avoiding any surprises at the end of the month. Secondly, BI systems help us to avoid order blockages due to payment rejections of our customers. Any obstruction is considered a failure because it will cause the frustration of the customer who would refuse our services in the future. For this component, BI systems instantly communicate the financial status of our customers which allows us to retain them by alerting them when they are close to their ceilings."

According to Manager Four, the ability of BI systems to integrate management accounting practices helps the controllers of his company to visualize and analyze the performance level of all stores and understand the reasons behind any production decline and remedy it.

For the managers of Company G, the BI systems help to cope with inventory in terms of quantity while attaching for each item its real value, cost price in different currencies and its selling price; a matter that was not allowed by the SAGE software. Manager three adds that "*the daily and prompt monitoring of stocks allows us to avoid any shortages that can slow down the achievement of the forecasted turnover, but also to avoid having a very high level of stock that is a sign of problems in the orders.*"

Manager seven also explains that "*due to BI systems, we have the ability to analyze our key performance indicators and their variations by customer categories, products and also in terms of payment instruments [...] The visibility that our BI system offers in terms of analysis has enlightened us on the critical situation of accounts receivables that led us to make corrective decisions, change our operational policy and require payment on delivery.”*

3.3.2. BI systems and exploration learning

Also, BI systems offer interactive control capabilities that are a source of exploratory learning. According to our interviewees, it is the main tool for daily meetings.

To concretize this link, Manager six explains that "*due to the indicators brought up by the BI systems, we understood that citrus fruits have been in decline for three successive years for reasons that are independent of our supply chain management. This situation has undoubtedly caused a drop in the turnover of the citrus market which is the heart of our business. During our daily meetings, BI systems allow us to continually reinforce the idea that diversification of our products must be a priority [...] Since last year, we have changed our strategy by bringing the citrus basket down in exchange for another market segment that has more future [...] To position ourselves, BI systems have been called upon to determine the right commercial strategy, develop a customer offer and an adapted logistics solution*".

Also, Manager seven states that "*because of the visualization and analysis capabilities provided by the BI systems, not only have we noticed that the percentage of sales of a product category was low, but we also understood the reasons behind this situation [...] The BI systems were behind our decision to target a new market segment where our products were not sold.*"

In addition to reporting and profit analysis capabilities, Manager eight adds that "*BI systems are also used to analyze the consumption pattern and behaviors of our customers through various indicators necessary for their segmentation [...] BI systems capabilities help us to develop products and adopt marketing strategies adapted to the needs of our target*".

3.4. Impact of BI systems on performance

To clearly cover the topic of BI use, we asked managers whether BI systems was behind their companies' improved performance over the past years. It is worth noting that more than a third of the interviewees declined to answer this question because they find it difficult to establish a direct link between these two variables. However, Manager five drew attention to the essential character of BI systems: "*imagine if a decision was made to stop using BI systems within the group, what impact you think this would have on performance? [...] the lack of visibility and day-to-day monitoring of our stores' activity would undoubtedly reduce our performance.*"

Manager seven also confirms that "*the clarity and real-time potential of the KPI reports provided by the BI systems allow us to make timely decisions to address failures, manage stock-outs, avoid shortfalls and also target new market segments which inevitably improves our performance.*"

For companies in a growth phase and operating in a highly competitive market, BI systems allow them to conquer market share by adapting strategy to their customers' behavior. This is what managers eight noted: "*Unlike our competitors, who are oriented towards mass marketing, our company, which is still in a growth phase, tries to stand out through quality of service, technology and innovation, which are very differentiating factors in a competitive sector [...] Thanks to the monitoring and analysis capabilities of BI systems, we have been able to gain a competitive advantage and increase our performance.*"

Discussion

Based on the analysis of the interviews made with 11 managers from different companies, it appears that the need for instantaneous and reliable information is the main reason that motivate companies to use BI technologies. Additionally, according to all interviewed managers, using BI systems to perform diagnostic control would be a source of exploitative learning that allows managers to avoid deviation from planned strategies and ensure their implementation. On the

other hand, using these same systems to perform interactive control would trigger exploratory learning that allows managers to be responsive to changes that may occur, anticipate market trends, deal with competition, and adapt quickly and effectively to new market conditions.

More in details, in the context of exploitative learning, using BI systems to perform diagnostic controls would allow the company to remain stable in a changing environment. Feedback loops and budget variance information will detect operating problems and trigger adjustment of goals related to the plans and programs needed to implement planned strategies (Kloot, 1997; Simons, 1995). The information provided by BI systems can be used to link outcomes to organizational strategies and assumptions and to correct inconsistencies and operating problems without challenging current organizational norms (Kloot, 1997).

Furthermore, the feedback from BI systems is also used to constantly question existing plans and to discuss strategic uncertainties and the possibility of adopting a new strategy which is necessary to achieve the desired competitive position (Gschwantner and Hiebl, 2016). To sum up the managers' point of view, continuing with the same business strategy would be unreasonable due to uncertainties and market dynamics. Using BI systems to perform interactive control will make managers focus on planning activities that open up the debate about the environmental changes that are taking place. Certainly, BI systems have a key role to detect problems due to these changes.

Yet, even if according to the majority of our interviewees, it is difficult to link the use of BI systems to organizational performance, the benefits of BI systems in terms of improving the quality of information and monitoring performance will inevitably affect the quality of decision-making, which will impact both the performance of the operational units and organizational performance.

Conclusion

In conclusion, the purpose of this study is to understand how the BI systems influences OL and performance of Moroccan companies. To answer this question, the research was conducted using an exploratory field study which involved senior and middle managers of several Moroccan companies. Authors chose this method because it focuses on the opinion of the interviewees who were at liberty to speak unhindered, thus allowing for a better understanding of the studied phenomenon. The results provide theoretical and practical contributions, especially for companies that are considering adopting BI systems or for those that are still struggling to derive value from them. Furthermore, our study identifies the reasons for implementing BI systems and improves the understanding of the influence of BI systems on OL needs. Finally, this study provides more insight about how BI systems leads to better performance.

Furthermore, it is necessary to highlight the main strengths and limitations of this study. A notable strength of this study is the characteristics of the sample. The BI users who participated in the interviews were at high hierarchical level in their respective organizations which provide us with better insights and rich information concerning the use of BI systems. Since interviewing participants from a single organization limits the generalizability of results to other organizations, we decided to interview managers from different organizations. Despite these strengths, it should be noted that our research adopted a qualitative approach which restricted the sample selection. We only focused on the experience of 11 companies operating in the Moroccan context. In order to identify possible cross-country patterns, future research can carry out a similar analysis using the same approach in different developing countries. Finally, our research focuses on the analysis of BI systems in a post-implementation phase. Thus, this work can be complemented by studies with a longitudinal view in order to determine the obstacles that may hinder the success of a BI project and to observe the evolution of organizational changes that take place from adoption to completion of the BI project.

REFERENCES

Adams, W.C. (2015). Conducting Semi-Structured Interviews. in: Handbook of Practical Program Evaluation. John Wiley & Sons, Inc., Hoboken, NJ, USA, 492–505.

Alegre, J. & Chiva, R. (2008). Assessing the impact of organizational learning capability on product innovation performance: An empirical test. Technovation, 28, 315–326.

Al-Okaily, A. Al-Okaily, M. Teoh, A.P. & Al-Debei, M.M. (2022). An empirical study on data warehouse systems effectiveness: the case of Jordanian banks in the business intelligence era. EuroMed Journal of Business ahead-of-print.

Alzghoul, A. Khaddam, A.A. Abousweilem, F. Irtaimeh, H.J. & Alshaar, Q. (2022). How business intelligence capability impacts decision-making speed, comprehensiveness, and firm performance. Information Development, 0.

Argyris, C. (1977). Organizational learning and management information systems. Accounting, Organizations and Society, 2, 113–123.

Argyris, C. (1976). Single-Loop and Double-Loop Models in Research on Decision Making. Administrative Science Quarterly, 21, 363–375.

Argyris, C. & Schon, D.A. (1996). Organizational Learning II: Theory, Method, and Practice, 2nd ed. Addison Wesley.

Bachrane, M. Alami, J.E. & Hanoune, M. (2015). Economic Intelligence Information and Process in Shipping Companies in Morocco: The Case of TangerMed Area. JITR, 8, 50–60.

Crossan, M.M. Lane, H.W. White, R.E. & Djurfeldt, L. (1995). Organizational Learning: Dimensions for a Theory. The International Journal of Organizational Analysis, 3, 337–360.

Dewett, T. & Jones, G.R. (2001). The role of information technology in the organization: a review, model, and assessment. Journal of Management, 34.

Dodgson, M. (1993). Organizational Learning: A Review of Some Literatures. Organization Studies, 14, 375–394.

Ebben, J.J. & Johnson, A.C. (2005). Efficiency, flexibility, or both? Evidence linking strategy to performance in small firms. Strategic Management Journal, 26, 1249–1259.

El Haddadi, T. & Ben Ahmed, M. & Mourabit, T. (2022). Establishment of a Watch Platform of Public Sustainable Purchase in Morocco, in: Innovations in Smart Cities Applications Volume 5, Lecture Notes in Networks and Systems. Springer International Publishing, Cham. 435–444.

Elbashir, M.Z. Collier, P.A. & Davern, M.J. (2008). Measuring the effects of business intelligence systems: The relationship between business process and organizational performance. International Journal of Accounting Information Systems, 9, 135–153.

Elbashir, M.Z. Collier, P.A. & Sutton, S.G. (2011). The Role of Organizational Absorptive Capacity in Strategic Use of Business Intelligence to Support Integrated Management Control Systems. The Accounting Review, 86, 155–184.

Elbashir, M.Z. Collier, P.A. Sutton, S.G. Davern, M.J. & Leech, S.A. (2013). Enhancing the Business Value of Business Intelligence: The Role of Shared Knowledge and Assimilation. Journal of Information Systems, 27, 87–105.

Elbashir, M.Z. Sutton, S.G. Mahama, H. & Arnold, V. (2020). Unravelling the integrated information systems and management control paradox: enhancing dynamic capability through business intelligence. Accounting & Finance, 1–40.

Fink, L. Yogev, N. & Even, A. (2017). Business intelligence and organizational learning: An empirical investigation of value creation processes. Information & Management, 54, 38–56.

Finnaoui, K. Megder, E.H. & Zerouali Ouariti, O. (2021). Factors Enhancing the Use of Business Intelligence to Support Organizational Learning: A conceptual Model, in: 2021 IEEE 11th Annual Computing and Communication Workshop and Conference (CCWC). Presented at the 2021 IEEE 11th Annual Computing and Communication Workshop and Conference (CCWC), 0619–0626.

Fiol, C.M. & Lyles, M.A. (1985). Organizational Learning. Academy of Management Review, 10, 803-813.

Gschwantner, S. & Hiebl, M.R.W. (2016). Management control systems and organizational ambidexterity. Journal of Management Control, 27, 371–404.

Hames, R.D. (1994), The management myth: exploring the essence of future organisations, Business & Professional Press, Sydney.

Hardy, C. (1996). Understanding Power: Bringing about Strategic Change. British Journal of Management, 7, S3–S16.

Huber, G.P. (1991). Organizational Learning: The Contributing Processes and the Literatures. Organization Science, 2, 88–115.

Jadi, Y. & Jie, L. (2017). An implementation framework of business intelligence in e-government systems for developing countries: Case study: Morocco e-government system, in: 2017 International Conference on Information Society (i-Society). Presented at the 2017 International Conference on Information Society (i-Society), 138–142.

Jaradat, Z. Al-Dmour, A. Alshurafat, H. Al-Hazaima, H. & Al Shbail, M.O. (2022). Factors influencing business intelligence adoption: evidence from Jordan. Journal of Decision Systems, 0, 1–21.

Kloot, L. (1997). Organizational learning and management control systems: responding to environmental change. Management Accounting Research, 8, 47–73.

Lateef, M. & Keikhosrokiani, P. (2022). Predicting Critical Success Factors of Business Intelligence Implementation for Improving SMEs' Performances: a Case Study of Lagos State, Nigeria. Journal of the Knowledge Economy.

Leavy, B. (1998). The Concept of Learning in the Strategy Field: Review and Outlook. Management Learning, 29, 447–466.

Lee, M.T. & Widener, S.K. (2016). The Performance Effects of Using Business Intelligence Systems for Exploitation and Exploration Learning. Journal of Information Systems, 30, 1–31.

Levinthal, D.A. & March, J.G. (1993). The myopia of learning. Strategic management journal, 14, 95–112.

Levitt, B. & March, J.G. (1988). Organizational Learning. Annual Review of Sociology, 14, 319–338.

Lillis, A.M. & Mundy, J. (2005). Cross-Sectional Field Studies in Management Accounting Research—Closing the Gaps between Surveys and Case Studies. Journal of Management Accounting Research, 17, 119–141.

Lonnqvist, A. & Pirttimaki, V. (2006). The Measurement of Business Intelligence. Information Systems Management, 23, 32–40.

March, J.G. (1991). Exploration and Exploitation in Organizational Learning. Organization Science, 2, 71–87.

Marshall, M.N. (1996). Sampling for qualitative research. Oxford University Press, 13, 522-525.

McCarthy, I.P. & Gordon, B.R. (2011). Achieving contextual ambidexterity in R&D organizations: a management control system approach. R&D Management, 41, 240-258.

McKee, D. (1992). An Organizational Learning Approach to Product Innovation. Journal of Product Innovation Management, 9, 232–245.

Moudni, Y. & Chafik, K. (2021). Analysis of the variables of intention of the adoption and acceptance of artificial intelligence and big data tools among leaders of organizations in Morroco: Attempt of a theoretical study. European Scientific Journal, ESJ, 17, 106.

Nespeca, A. & Chiucchi, M.S. (2018). The Impact of Business Intelligence Systems on Management Accounting Systems: The Consultant's Perspective, in: Lamboglia, R., Cardoni, A., Dameri, R.P., Mancini, D. (Eds.), Network, Smart and Open, Lecture Notes in Information Systems and Organisation. Springer, Cham, 283–297.

Oubibi, M. Zhou, Y. Oubibi, A. Fute, A. & Saleem, A. (2022). The Challenges and Opportunities for Developing the Use of Data and Artificial Intelligence (AI) in North Africa: Case of Morocco, in: Motahhir, S., Bossoufi, B. (Eds.), Digital Technologies and Applications, Lecture Notes in Networks and Systems. Springer International Publishing, Cham, 80–90.

Peters, M.D. Wieder, B. Sutton, S.G. & Wakefield, J. (2016). Business intelligence systems use in performance measurement capabilities: Implications for enhanced competitive advantage. International Journal of Accounting Information Systems, 21, 1–17.

Rikhardsson, P. & Yigitbasioglu, O. (2018). Business intelligence & analytics in management accounting research: Status and future focus. International Journal of Accounting Information Systems, 29, 37–58.

Roslender, R. & Hart, S.J. (2003). In search of strategic management accounting: theoretical and field study perspectives. Management Accounting Research, 14, 255–279.

Senge, P.M. (1994). The fifth discipline: the art and practice of the learning organization, 1. Currency paperback ed. ed. Currency Doubleday, New York, NY.

Simons, R. (2014), Performance measurement and control systems for implementing strategy, 1 ed., new internat. ed. ed. Pearson, Harlow, Essex.

Simons, R. (1995), Levers of control: how managers use innovative control systems to drive strategic renewal. Harvard Business School Press, Boston.

Styhre, A. Josephson, P.-E. & Knauseder, I. (2004). Learning capabilities in organizational networks: case studies of six construction projects. Construction Management and Economics, 22, 957–966.

Wengraf, T. (2001), Qualitative Research Interviewing. SAGE Publications, Ltd, 1 Oliver's Yard, 55 City Road, London England EC1Y 1SP United Kingdom.

Wieder, B. & Ossimitz, M.-L. (2015). The Impact of Business Intelligence on the Quality of Decision Making – A Mediation Model. Procedia Computer Science, 64, 1163–1171.