

Business Intelligence as a Challenge for the Managerial Function: Case Study on Managerial Decision Making in Algerian Companies

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Type of manuscript: research paper

Abstract: *In the literature review, the subject of changes in organizations and business professions as a result of digital advances and digital is quite frequent. These changes concern all sectors of activity and professions without exception. Thus, under the influence of digitalization, individual campaigns have transformed, changed, or disappeared altogether. The same applies to individual professions related to digitalization. The aim of the article is to investigate the main problems and determine the ability of the managerial profession to face the challenges and threats that arise in the conditions of digitization of organizations and the use of business analytics tools. Among the many functions of the manager's profession, the article examined the role of strategic decision-making as one of the most complex and difficult to digitize. The object of the study is the skills of strategic decision-makers in organizations from different sectors of the economy (pharmaceutical industry, agri-food industry, career industry, construction and real estate, metallurgy and metal materials, multinational, business administration, communication & Marketing, e-business, auditing & accounting, banking). New decision-making skills were identified and described based on the study of the skills of fifteen different managers and eight consultants and analysts. All managers should gradually acquire these skills to complete their basic training, gain knowledge and interpersonal communication skills, and understand the latest know-how which appears in the digital age. It will allow him to meet his company's current and future needs and better retain and fulfill job duties. The results of this study show us that in addition to his professional development based on technology and digital, the manager develops based on his personal growth and professional knowledge. The contribution of digital tools to decision-making skills is the same regardless of the field of activity he exercises during his career.*

Keywords: business intelligence, digitalization, skills, strategic decision.

JEL Classification: O33, D70, M10.

Received: 23 June 2022

Accepted: 30 July 2022

Published: 30 September 2022

Funding: There is no funding for this research.

Publisher: Sumy State University

Cite as: Seguer, Z.S., & Hasna, A.M. (2022). Business Intelligence as a Challenge for the Managerial Function: Case Study on Managerial Decision Making in Algerian Companies. *Business Ethics and Leadership*, 6(3), 35-46. [http://doi.org/10.21272/bel.6\(3\).35-46.2022](http://doi.org/10.21272/bel.6(3).35-46.2022).



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Introduction

With the advent of each new industrial revolution, organizations change, mutate or disappear, giving rise to new forms of organization, work and management; new professions appear, and others are transformed or disappear. Each of these four industrial revolutions requires humans to possess specific skills and abilities to develop to remain relevant in demanding work environments continually. The first industrial revolution was driven by mechanization, and physical skills were essential. The second industrial revolution is about cognitive skills, focusing on mass production. The workforce has to shift from using physical skills to applying cognitive skills. The third industrial revolution involves automation of production, and the skills required are soft skills supported by emotional intelligence. The ongoing fourth revolution involves digital skills that need to be mastered (Park, 2019), as it focuses on the integration of various technologies that enable ecosystems to function intelligently and autonomously, the decentralization of factories and the integration of product-services. The skills required have evolved from physical to digital skills over the last two centuries; the requirement for these digital skills will become more important as we progress through the current revolution (Marnewick, C. & Marnewick, A., 2021). So, what about manager skills?

We can say that the last revolution resulted in the digitization of business processes in the company, allowing traceability of all internal and external information flows, backup, history and transparency in information sharing. Automating certain operations has also made it possible to eliminate recurring tasks in the company, simplify procedures, and save time. Based on managerial competencies, there are five main pillars: Technical competence, Conceptual competence, Interpersonal and communication skills, Decision-making skills and Diagnostic and analytical skills (Hadi, W.W., Wasliman, I., & Fatkhullah, F.K., 2022). In terms of decision-making, making a strategic decision requires the ability to propose a strategy, have a vision for the company, and project oneself into the future. Knowing how to take the necessary distance so as not to let emotions take control and distort a decision taken in a hurry, making decisions alone or collectively, being quick, organizing focus group meetings to decide collectively, taking advantage of the collective intelligence of one's collaborators, being aware of the issues at stake and acting accordingly, so the lack of one or more of these skills or appropriate knowledge on certain specific points can lead to a harmful decision for a strategic decision-maker, for which they will have to suffer the negative consequences.

In this context, ICTs are becoming essential support for decision-making, in particular, decision support systems (DSS) and business intelligence, which provide stakeholders with a large amount of information and the problem-solving models needed to process it. As companies progressively rely on technology to make data-driven decisions, these new technological tools cut across all business functions, so it will be essential for managers to be aware of these specialized tools to maintain competitive advantage but also for their evolution as managers. Our ambition is, therefore, to understand how the profession of manager has evolved through the acquisition of new skills in a digitalized and equipped environment by focusing on one of its most essential functions, namely decision-making.

Literature Review

The competencies of managers have been a subject of historical interest in the literature; several authors, For Eric, have treated it (2019). Competence is the demonstrated ability of the individual to perform, i.e., the possession of the knowledge, skills and personal characteristics necessary to satisfy the particular demands or requirements of a particular situation, Fanchini (2016) detailed the skills according to the types of subdivisions that are often found in research, for example, the trilogy of skills corresponding to subdivisions between skills or theoretical knowledge (general theoretical knowledge and disciplinary knowledge), knowledge or practical knowledge – Doing things (transversal skills) and behavioral skills related to interpersonal skills Gausse, M. (2018).

In their study, based on a synthesis of different definitions of the concept of competence, Douar, B., & Kalbaza, A. (2017) possess that competence is the ability of an individual to act and respond in the

correlation capable with execution at the right time for the activities. The individual is at the heart of a process that consists of selecting, combining, and mobilizing his knowledge, skills, capacities and behaviors on the one hand and the environmental resources on the other to achieve an objective.

Furthermore, Schneider, K. (2019) shows in his research that competence is seen as a structure. However, etymological reconstructions, logical conceptual systems from the sciences of education and psychology, and representative philosophical analyzes provide a framework from which new conceptual relations of competence are derived: the ability to perform actions specific to a domain is generally successful cognitive ability. He concludes that the innovative approach to defining the concept of capability presented in his research lays the groundwork for operationalizing the concept of capability. Functionally and psychologically, competence focuses on a person's ability to cope with needs. However, his findings suggest that this skill also has a developmental function.

Individuals' knowledge represents the body of knowledge that enables them to understand a situation or phenomenon. It comprises information, principles, theories, and practices known through experience and education (CEFRIO, 2016). Skills represent know-how, i.e., the ability to apply knowledge to perform a task or solve a problem. Attitude, or know-how, highlights the individual ways of thinking and motivations that underlie people's behavior. When put into an organizational context, these attributes become competencies as they enable the execution of an organizational goal or a specific task. Competence is a capacity that can be developed and is manifested in performance, not just in potential. In all skills, acquisition and application change from voluntary to involuntary, from conscious to subconscious. In other words, the process gradually moves from requiring effort to becoming effortless (Bagheri, J., Daryani, S., Ardabili, F., Ahmadi, M., Azadi, B., 2021).

Previous studies indicate that job skills positively and significantly impact career sustainability (Zhang, W., Chin, T., Li, F., Lin, C.L., Shan, Y.N., and Ventimiglia, F., 2022). Decision-making is one of the fundamental skills of a manager. Deciding means choosing a solution by comparing several possibilities. To run a business, managers are constantly making choices; without decision-making, the company cannot function (Jacques Rojot, 2016). Policymakers should understand the limitations and potential of their decisions when making decision. Therefore, the experience and understanding of the decision maker can influence the outcome (Janssen, M., Hartog, M., Matheus, R., Yi Ding, A., & Kuk, G., 2022).

As part of the decision-making process, every manager must find a good way to solve a problem that will lead his or her organization to great success. However, managers need to understand all the troubleshooting steps to solve problems quickly and effectively. First, they have to find the problem and define it. After that, they have to find different solutions to the problem. The manager must then decide with his or her staff while implementing solutions and evaluating the results. Every organization has many problems, and if managers do not solve them again, it can have a negative impact on the organization or department (Riyaz Khan, M., Al Zadjali, A.S.D., Al Barwani, A.A.N., Al Ghailani, F.M.S., & Al Harthy, R.M.N, 2022). Nechirwan Burhan et al. (2020) identifies training as the most important HR factor, helping employees and managers to develop their skills and mindset. Among the authors of recent books that also deal with the subject of the manager's role and skills, Cécile Dejoux and Emmanuelle Léon (2018) question in "Métamorphose des gestionnaires: à l'ère du numérique et de l'intelligence artificielle" the ways of managing in the digital age and artificial intelligence, specialists in the field, they condense more than 20 interviews with managers in this book to explain the current methods of managing in the digital age.

Among the stages of the manager's metamorphosis mentioned by these two authors, we note the acquisition of new managerial skills and the fundamental and essential skills (knowing, deciding, motivating, and developing talents). These new managerial skills are digital, collaborative, and geographical. Managers must master Internet tools and robotics, learn to work differently, and share information, consider new ways of organizing work, accept the dematerialization of employees' work and rethink their workspaces. With the emergence of coworking, fablabs and teleworking, the workplace is no longer just the office. In the same report, the authors state that skills need to be developed on three levels: technical, collaborative and cognitive. Technical skills are the individuals' ability to use technologies effectively; collaborative skills are the ability of an individual to collaborate with technologies. Technical skills are the individuals' ability to use technologies effectively; collaborative skills are the ability of an individual to collaborate with technologies, using them to establish effective communication channels and solve different problems, finally, cognitive skills represent an individual's ability to process and analyze information, considering the data's relevance and reliability (Gamache, 2019: 22). Self-development of a manager is a process of

conscious development of oneself as a leader, which includes improvement of one's knowledge, skills, personal and functional qualities, competence in general, and ensuring the effectiveness of the professional activity. Having the necessary characteristics, traits, skills and competencies to respond to various life and work situations is the most fundamental factor for gaining a competitive advantage at the individual level (Arhipova, O., Kokina, I., 2022).

In recent years, organizations have utilized new digital technologies to improve their overall decision-making processes. To analyze the company's situation properly, decision-makers have relied on digital technology, which represents a decision-making aid in various forms. Digital tools (such as software and databases) are used in the decision-making process for various purposes, such as gathering, summarizing, and analyzing data, as well as to save time and improve communication (Logeais, C.G. & Ilieva, M., 2021). Terribile et al. (2015) defined decision support as a smart system that provides operational answers and supports decision-making to specific demands and problems based on collected data. The development of decision support computing took place in the 1970s and it was the large firms that first understood the added value of decision support tools. Having voluminous databases at their disposal, they began by querying them directly using requests, but these requests could lead to bugs that prevented the entry of information, so this method quickly showed its limits in terms of human and material resources. It was, therefore, necessary to develop these tools from the 1970s onwards, which evolved as follows (El Golli, I.G., 2008):

- The Info Centre: The info Centre is an exact copy of the databases in a new environment (1970s and 1980s) where users can access the database from software installed on their desktop, so they can report on their company's activity and gain important advantages for managing their business and conducting their strategies. On the other hand, an info Centre consumed a lot of IT resources. This sometimes-limited companies, who often only integrate one source of data, from a business application.
- KBS: Knowledge-Based Systems.
- EIS: Executive Information System offering the first dashboards in the 1990s.
- Data warehouses: Data warehouses are the place where large volumes of data are stored.
- Multidimensional databases: A database where each indicator is analyzed according to several criteria or dimensions.
- Business Intelligence: This includes data analysis and reporting functions.

Generally speaking, "business intelligence" can have different definitions, and the term is used differently depending on the context. It refers to the means, tools and methods used to collect, consolidate, model and restore a company's data to provide decision support and enable a company's management to have a view of all the activities processed, with a view to defining a new strategy. Commercially speaking, Business Intelligence represents BI solutions integrated into business software packages, such as SAP, SAAS, Oracle BI, Tableau, QlickBI, Microsoft Power BI etc. Business Intelligence is also the new name for "Decision System support" (Bastien, 2019).

Business Intelligence is also referred to as Business Analytics, Data Science, and Decision Science because all these terms support the same objective, which is using tools and techniques to transform data. BI can also be approached very differently from one company to another, depending on its size and sector of activity. Generally, SMEs and very small companies, which do not generate a lot of data, do "Information Management" with the tools they have at their disposal. Often, a simple Excel spreadsheet is enough to satisfy their basic reporting and statistical needs, but also because for SMEs, the term Business Intelligence is often mistakenly perceived as a technology applicable only to large organizations. This misconception about BI means that most decisions made from the top are based on the results of various information and communication technology (ICT) tools (Raj, R., Wong, S.H., & Beaumont, A.J., 2016).

Business Intelligence has grown considerably since then due to the advancement of BI tools and the willingness of companies to adopt new strategies to stay ahead of the game. Other studies have seen BI as a Decision Support Information System. It consists of the following main steps; analysis, insight, action and performance measurement (Sun, Zou, & Strang, 2015). Jin & Kim (2018) argue that BI has developed in line with the applications and technologies that help businesses collect, store, analyze and access data more efficiently. These four advanced technological pillars on which BI is currently based are cloud, mobile, big data and social technologies (Alnoukari, M., 2022).

Thus, since its introduction in the 1990s, when it was mainly adopted in IT and business companies where a regular set of data matrices was used to generate information and design future planning, in the early 2000s,

BI evolved into a more analytics-focused tool, identified in the literature as Business Analytics (BA). BA takes a more liberal stance on the data sets used to gain new insights and make sense of organizational performance by emphasizing statistical and mathematical knowledge. BI has focused on reporting, while BA emphasizes reporting and predicting the future. The latest term that has evolved from BI and BA is Big Data or Big Data Analytics, which represents larger volumes and complex data sets requiring dedicated tools to synthesize information while maintaining the same focus on reporting and predictive analysis (Paradza, D. & Daramola, O., 2021). Historically, digital decision support tools have evolved and continue to grow while providing companies with increasingly sophisticated and practical decision support. It has required adaptability to change with each evolution, “the first to be affected by a change in the company are the executives and decision makers”, 2019. In his article, Djerdjouri (2020) concludes that the managerial culture should evolve to embrace more data-driven decision-making. Organizations need to realize the importance of collecting, storing and analyzing internal and external data to exploit the information obtained from BI and analytical systems to improve business processes. So, what is at stake with BI decision support tools in the evolution of managers' jobs? To answer this question, we have assumed that managers have acquired new skills that are necessary and complementary to their basic functions.

Methodology and Research Methods

In this section, we detail the research methodology chosen for this study to define the steps followed in collecting, analyzing, and interpreting the data collected.

1. Choice of methodological approach. To understand the phenomenon of organizations' digitalization and explore how it has changed decision-makers' work, we have chosen a qualitative methodological approach.

2. The data collection tool. For data collection, we used two approaches:

➤ A first field approach allowed us to collect data by interviewing eight different BI consultants on the content of their training courses dedicated to decision-makers/managers and the various feedbacks from their clients. These data led us to elaborate a semi-directive interview guide for managers. Why is a BI consultant potentially beneficial in addressing this issue? Unlike the data analyst, who processes extractions from databases, and the data scientist, who works on raw data and has solid programming skills, the BI consultant works on the technical side of his job as well as on the business side of his client (Erell Le Gall, n.d.). He first analyses the reporting needs and participates in modeling the data warehouses and data lakes. As his objective is to ensure that the company's various BI tools are configured as closely as possible to the expectations of the decision-maker/manager, he is a relevant source of information concerning the added value of BI tools for this business.

➤ A second approach in the form of direct interviews with 15 different users of BI within their business enabled us to collect data relevant to our hypothesis concerning the new skills of decision-makers.

3. The choice of the semi-structured interview. The aim of this research is to find out what the new skills of the decision-maker are and to understand how the technological advances of digital solutions dedicated to companies are changing the job and the functions of the decision-maker. We opted for the semi-directive interview to be as close as possible to the managers, to analyze their daily life and thus to be able to collect relevant information.

4. Content of the interview guide. The interview guide was structured around four main themes: the digital maturity of companies, the comparison between old and new digital decision support tools, the change brought about by digital in the decision-making process and finally, the new skills of the decision-maker in the digital age.

5. Selection of BI consultants and decision makers surveyed. Before starting our survey of decision makers/managers who are users of BI solutions, we approached BI consultants to find out more about the BI tools and software and the training they offer to future users of these tools. Our selection criteria were based on the type and brand of BI software they represent, such as Oracle BI, Power BI, Qlik, etc. Our selection criteria for the decision-makers/managers were based on the frequency of use of these digital decision-making tools, but also on the diversity of the sectors in which they work, as we felt it was important to diversify the sectors of activity to try to bring out the new skills of decision-makers, whatever their field of activity.

6. Analysis of the interviews. Qualitative data analysis – of which Content Analysis is the best known – is the most common method for studying qualitative interviews or observations (Krippendorff, 2003). It consists of transcribing the qualitative data, developing an analysis grid, coding the information collected and processing it. Content Analysis is the method that seeks to report what the interviewees said most objectively and reliably possible. BERELSON (1952), its founder, defines it as “a research technique for the objective, systematic and quantitative description of the manifest content of communication”, and this is what we applied as a method for this qualitative study.

Results

Results of the First Approach. After consulting several BI Consultants who work for such brands as Microsoft BI, Oracle BI, and Qlik, we learned that as part of their business. These digital solutions companies include training in the project contract for the integration of BI solutions within organizations. It is light training for the managers/decision makers, unlike the IT managers who are more into deep technical detail. According to the Qlik trainers, the so-called “light” training concerns the last stage of the BI process and consists of explaining to managers/decision-makers how to extract information from the data collected and stored, how to use the dashboard display tool, the restitution tool and how to interpret the graphs. According to the Oracle BI Solution trainers interviewed, the significant contribution of BI solutions in a company is the unification of the company's data in a single model that allows a 360-degree view of what is happening in the company. To better explain the subject, they gave us the example of a company with four software programs, one that manages payroll, the second for accounting, the third for inventory management and the fourth for purchasing. In this case, there are four sources of information and knowing that the decision-making process requires the consolidation of data from the four software programs into a single model, a BI solution facilitates this consolidation and analysis despite the multitude of sources (which can even be Excel files). The Oracle BI solution is best suited to companies generating large amounts of data (Big data) and having multiple data sources.

According to the trainers of Microsoft's Power BI solution, technically, the term Business Intelligence refers to any system or process that uses current and historical data to provide decision support. Thus, BI is a new name for a Data-Based Decision Support System. An expert system can be a BI system; connected objects that serve to provide data to support decision-making can be considered as BI; an artificial intelligence can serve as a BI system if its final objective is to assist decision-making. Commercially speaking, the terms are often separated; when we say BI, we mean Data Warehousing and related activities up to dashboarding. Connected Objects (IoT), Artificial Intelligence (AI) and Expert Systems (which are not relevant compared to machine learning) have their names as they require different software development activities than a BI system in the traditional sense. The Power BI training course for managers, with an hourly volume of between 15 and 21 hours, is designed to explain what Business Intelligence is, why it is an essential tool for companies and how to carry out a Business Intelligence project in the company successfully. The course covers the following knowledge areas for the practical use of BI tools.

Table 1. Details and Content of BI Training for Managers and Decision-Makers

Content of the training	Hourly volume of the course
<ul style="list-style-type: none"> ➤ Managing a BI project in your company ➤ What is Business Intelligence and why do we care? ➤ The future of competitive markets and Data ➤ What can BI do for your organization? ➤ Identify pain points ➤ Building an analysis strategy ➤ Preparing for change ➤ Change management ➤ Project pitfalls and solutions 	<ul style="list-style-type: none"> ➤ (2-4 hours theory, 1-hour practical workshop for strategy development)
<ul style="list-style-type: none"> ➤ Using the BI Solution as a consumer 	(7-hour training course on data analysis and visualization with Power BI as a manager)

Source: Compiled by the authors according to information collected from Oracle BI trainers

According to digital transformation and IT trainers dedicated to companies, thanks to the digitalization of companies and the integration of IT tools, decision-making is formalized, and the decision is based on a vision of the entire staff, so it is imperative to train all staff, especially top managers. The types of training and learning for better use of digital tools for managers can vary from one company to another, it can be in the form of a seminar to bring managers up to speed, training to upgrade technical and managerial skills or in the form of coaching, assistance and advice.

According to the founders and trainers of the MOUFID BI solution, which is mainly dedicated to the manager, to manage own company, he/she must be as close as possible to his environment. He needs to have a state-of-the-art tool to pilot his company. Based on accurate, fair, regular and reliable information for the manager, MOUFID BI allows a very regulated recording of data according to the company's accounting. MOUFID BI professionals measured this risk and they found that it is a significant risk that can influence the manager's decision, much more so if the manager has instability within his/her company; for example, every year, he/she changes CFO or accountant, in this case, the information changes and it is dispersed, and each time he/she receives information from various sources and various nails. The MOUFID BI solution is designed to solve this type of problem on both sides, either for accounting professionals or for managers, as the information is stored on an intelligent platform, which allows, firstly, the quality control of the information, is it accurate? is it reliable? and this through a detailed report on the functioning of the data regarding the respect of the profession's functioning.

Secondly, thanks to the second financial space and after checking the accuracy of the info and eliminating the number of errors that may be in the information and correcting them, we can move on to the 2ème step, which is the financial diagnosis and we get an automatic report with universal KPIs, (over 200 KPIs) and more than 42 Reports that are displayed simultaneously. Generally, at this stage of diagnosis, the manager will need a second controller to elaborate the work for him, but thanks to the solution, this work will be done instead of the controller with the help of a report that is done in 3 seconds, well established and well presented with a simple language for a manager to make his decisions.

This solution is dedicated to all companies, from small to large, in all sectors of activity, and it is a solution that can be adapted to each company's needs. The BI tool is then an indispensable tool for a manager or a decision-maker, because by having a tool that is conditioned by programming, the risk of error is zero. Many MOUFID BI users have really seen the dimensions of their company. They have become aware of its potential through the KPIs but also of the errors over several years, which form a risk for them in decision-making, a risk of tax adjustment, risk of a false image, or of not respecting the real image of the company. Among these different users, we can cite some examples. With the help of this BI solution, a company manager quoted on the stock exchange was able to speak a different language from the latter, thanks to the information and reports generated by the platform. Another example, a giant group with a significant turnover exceeding one million dollars in Algeria, was able to see thanks to several KPIs of its several companies, but also in a single report very well established and very well presented, he could easily make decisions for each company, and even for companies that he tended to put in the dungeon and that were with high potential.

Although our research focuses on digital tools for collecting and processing data internal to the company, it did not prevent us from discussing with analysts and market research professionals to get an idea of how this aspect has evolved following the advent of the digitalization of organizations, but also for the contribution of data external to the company in decision-making. According to the analysts and market research professionals we interviewed, their profession has evolved considerably. Indeed, since 2004 they have moved from (pen and paper) to Excel software and then to other software such as (Statistica), which allows data processing. In terms of data delivery frequency, they went from over a month's delay to weekly for one client. Over time, they could deliver daily and then instantly online. As the questionnaires came in, the trends were adjusted. So, they went from something utopian 15 years ago to something that is now systematic, and it's now standard to provide online data or dashboards that are updated progressively.

Furthermore, the customization of data processing tools and the popularization of data processing teams has evolved. It used to be something exclusive that belonged only to the big developers. Today, these tools are accessible to everyone and can be developed in record time, i.e., you can create the equivalent of SPSS software just by having a good developer and a good statistician to carry out the logic and the logical instructions to be given to the software so that it systematically processes the information, something that was not done 20 years ago, and which was exclusive.

Result of the second approach: The second approach, we interviewed 15 different decision-makers, each from a different sector.

Table 2. The Fields of Activity of the Companies Interviewed for This Study

Sector of activity	Field of activity
Industry	Pharmaceutical industry
	Food industry
	Career industry
	Construction and real estate
	Metallurgy and Metal Materials
Service	Multinational
	Business administration
	Communication & Marketing
	E-commerce
	Audit & accounting
	Bank

Source: Compiled by the authors

After transcribing the answers to the questions in our interview guide by each interviewee onto our analysis grid and synthesizing them, we obtained the following results for each axis:

➤ *The digital maturity of companies and its impact on the organizational level.* The empirical approach shows that digitalization firstly does not necessarily transform the company's information system; in some cases, the company's information system remains the same. It is just digitized to allow for the rapid circulation of information, its traceability, storage as a historical database and above all its reliability.

Digital enables the creation of new channels to the information system and thus allows the creation of new internal and external sources of data collection and sharing by, for example, giving customers access to the information system and thus offering companies the opportunity to collect information on their behavior and improve their sales and marketing strategy on this basis. In other cases, the information system is created with the emergence of new forms of enterprise thanks to digital technology, such as management companies. They are widespread in developed countries because it is only thanks to advanced digital management and decision support tools that these companies can carry out their business and manage several companies simultaneously. On an organizational level, integrating digital tools has increased the number of staff specializing in the digital and IT field, such as community managers, IT managers, BI managers, data analysts, computer engineers and developers. For some companies, they call on digital professionals to intervene externally; for others, it is essential to create an entire IT, digital, or IT department.

The larger the company, the greater the sources and quantities of its data, and this requires staff with specialized digital profiles.

➤ *The difference between old and new decision support tools.* Technological advances in decision support tools have evolved considerably and are constantly evolving. They offer decision-makers, regardless of their field of activity or the form of their company, increasingly effective and efficient decision support.

The first observation is that with the help of these tools, the decision-maker benefits from new means of collecting data that he did not think he could obtain before and from the feedback of information in real time, accessible via the smartphone thanks to the mobile version of the software for visualizing the dashboards and key performance indicators.

In the industry, construction and real estate sectors, for example, digital simulation techniques can be used to test and validate a project's performance and make decisions based on a representation of reality while projecting over several years by developing scenarios. This simulation software is connected to a system that provides real-time data throughout the building's life cycle. This smart system then provides a digital twin of the entire project giving decision makers increased visibility into the short, medium and long-term future for tactical and operational decision-making. This ability to evolve both services and the future direction of the business by reducing operating costs by developing an unlimited number of scenarios and experiments in a risk-free environment and increasing forecast accuracy is seen as a decision support tool for decision makers, who can then make the right decision at the right time with confidence.

We have noted other observations from other industrial fields such as the quarrying industry, for example, the difficulty felt by decision-makers without the help of digital tools and resources is to get reliable and relevant information from the field by employees, the difficulty of supervising the productivity and

profitability of machinery, recurrent trips to the field to monitor all the production activity on a day-to-day basis, and the non-consolidation of data coming from different and unstructured sources. Thanks to digital technology, everything has changed. A list referenced on the warehouse keeper's software allows them to monitor and distribute spare parts by machine to know each year how much each device has consumed and whether it is profitable. The good management of the old machines has allowed them to avoid losses, the geolocation system allows them to know the circuit of the machine and to calculate the time of its activity, the system of follow-up of the activity of the engines of the machines by recording the hours of (the starting of the engine, the starting of the activity, the stops and the resumptions and the definitive stop of the activity), all these data are useful for their future strategic orientation.

We have retained the same observations and information in common on the industry sector concerning this axis. Moreover, in the services sector such as communication, digital has become the primary tool of communication and marketing agencies that have adapted to the new digital era by recruiting digital specialists to strengthen their skills and meet the needs of customers increasingly oriented towards communication via social networks, Google Ads and other means of sponsorship via mobile applications. For a multinational company, using advanced digital tools is a must for its proper functioning and durability on the international market. The BI solution makes the difference for this type of company, having many data sources with a large volume. The latter allows a natural explanation of collection, processing, analysis of data, and representation of key information by country, region, point of sale, and in real-time, so the decision-makers have a global vision of the state of their activity which was not possible with the old tools.

In the banking sector, the professionals have evolved from summary sheets for credit files and traditional work tools to internally developed BI solutions such as GAB, which has allowed the mastery of many management tools such as: remote sales animation, transmission of more reliable data through the network, a better connection with the sales network and with the various structures, both locally and internationally, the creation and sharing of agendas, the sharing of documentation and regulatory supports and the mastery of the workflows used. In the end, it can be said that decision support tools are either digitized or replaced by others or augmented by digital or created and added to the decision-making process.

➤ *The impact of digitalization on the decision-making process of decision-makers.* Through the observations made on this axis, the decision-making process varies from one company to another. The change may be in the means of data collection depending on the type of data collected and the company's field of activity, but also the volume and timeframe of data collection. Whatever the business, the change in their decision-making processes can be the same, such as considerable time savings, accuracy, and quality of relevant information. For the first stage of the decision-making process, identifying problems, anomalies or signs of target achievement is done automatically and instantaneously using indicators and alerts that can be viewed on dashboards and in the form of mobile or e-mail notifications. This stage is automated or semi-automated.

For the information collection stage, BI allows for the diversity of the information source, its consolidation in a single place, searchable, and visualized quickly and instantaneously. As for the choice selection stage, in some cases, where the BI solution is augmented by artificial intelligence, the algorithms can propose solutions to the detected problems with predictions of the likely outcomes and scenarios for each suggested solution. So, it can be said that digital contributes to every stage of the decision-making process.

➤ *The new skills of decision-makers in the digital age.* We have observed that most of the decision-makers interviewed are self-taught and interested in new technologies, and some have had recourse to training for an upgrade in digital. Regardless of the sector of activity in which the manager works, the new skills felt by the interviewees are almost the same, for most of them, in terms of the knowledge acquired, i.e., being aware of the capacities of these tools to provide them with relevant and quality information but also of their operating modes. As far as know-how is concerned, it means learning how to make optimal use of these tools to identify valuable information for decision-making, whether it be strategic or for operational management contributing to the application of the strategy. In terms of interpersonal skills, agility, responsiveness, and speed in processing information were highlighted.

Table 3. Dimensions and New Skills Acquired by Decision-Makers

Dimension of competence	Skills required
Knowledge	To have knowledge
	The latest technological advances in the field
	The ability of these tools to provide relevant and useful information
	New opportunities for strategic data collection
Know how	Agile
	Reagent
	Fast in data processing
	Visionary
	Confident
	Abstract
	Adaptability
	Effective
Know-how	Know how to use these tools optimally
	Knowing how to interpret and make the data speak
	Knowing how to limit the risks
	Making these tools a competitive advantage

Source: Compiled by the authors from the information collected in the study

So, to be a decision-maker, it is not enough to acquire decision support tools, it is necessary to learn how to use them, to become reactive, and to have a more precise vision of the state of one's activity and performance metrics in real time.

Conclusions

Although a strategic manager still has the skills to make strategic decisions before the advent of digital decision support tools and business intelligence, the function of the strategic manager is still evolving. The way a manager made a strategic decision 30 years ago would probably not be the same if he or she had to make it today.

Adopting these digital decision support solutions requires certain skills for a decision-maker, being aware of them, knowing their assets and understanding how they work before adopting them is considered to be an essential step in acquiring these new skills. Therefore, managers' role is changing as their working environment becomes increasingly agile; the business intelligence department must now develop new technological skills.

Thus, decision-making in the digital age, big data and new technologies make it essential for strategic decision-makers to learn and master these tools, to see new ways of perceiving their environment, a new way of thinking, and new know-how. A decision-maker who has a reliable approach and practical tools will feel much more confident and will be able to take calculated risks. That is why it is important to master what these new technologies offer and use them well. Training should be a priority for managers if they wish to adapt to the evolution of their environment, to learn the functionalities offered by these new means, methods and digital decision-making tools, and then to learn how to use and exploit them optimally to benefit from their important contribution to the quality of strategic decision-making and to achieve performance in the management of their organization. Digital not only enables the right strategic decision to be taken, but also enables it to be steered by operational decisions that will ensure that the chosen strategy is implemented in the best possible way.

Whatever the sector of activity in which the top manager carries out his work, the contribution of the digital tool in terms of skills is the same, except for the technical skills of his/her field of activity, the skills differ from one sector to another as well as the functionalities of the tool which is personalized and adapted to the company's fields of activity.

Author Contributions: Conceptualization: Zineb Soltana Seguer; data curation: Zineb Soltana Seguer; formal analysis: Zineb Soltana Seguer; investigation: Zineb Soltana Seguer; methodology: Zineb Soltana Seguer, Amina Messaïd Hasna; project administration: Zineb Soltana Seguer, Amina Messaïd Hasna; resource: Zineb Soltana Seguer; software: Zineb Soltana Seguer; supervision: Zineb Soltana Seguer, Amina Messaïd Hasna; validation: Zineb Soltana Seguer, Amina Messaïd Hasna; visualization: Zineb Soltana Seguer, Amina Messaïd Hasna; writing-original draft: Zineb Soltana Seguer; writing-review editing: Zineb Soltana Seguer, Amina Messaïd Hasna.

Conflicts of Interest: Authors declare no conflict of interest.

Data Availability Statement: The location of report results that underpin the data and references to datasets analysed during the study are not publicly archived.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

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