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# Journal of Intelligence Studies in Business

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### ***The internet is leading the world towards forms of totalitarianism: How to fix the problem***

It is difficult to imagine intelligence studies as separate from information technology as we enter the third decade of the 21st century. The current issue of JISIB bears witness to this integration with a strong focus on big data applications.

Hardly anyone today would or could do without the internet, but the project that started with US government financing in the 1960s, with packet switching, and in the 1970s with ARPANET and saw commercial light in the 1990s is helping countries turn into totalitarian systems where totalitarianism is defined by a high degree of control over public and private life.

Public life is influenced by hacking, troll factories, fake news/propaganda, and interference in elections. Private life is influenced by massive surveillance. To borrow the title of the book by Zuboff (2019) we now live in "the age of surveillance capitalism". Business intelligence systems lie at the heart of this transformation, but so do artificial intelligence and robotics. And the trend is global.

In the West the suppressors are mostly private monopolies (e.g. Google, Facebook), while in the East it is primarily the government that is snooping (e.g. China's Social Credit System). Face recognition is likely to become as popular in the West as it is in the East. It is also easily forgotten that no city was better surveilled than London, which started to build its CCTV technology in the 1960s. The system is now being updated with facial recognition, just like the one we are criticizing the Chinese for having. Some forms of surveillance may also lead to great advances in our societies, like access to government forms and statements electronically and a non-anonymous Central Bank Digital Currency (CBDC), which promises to reduce corruption and tax fraud, and could be used for easy distribution of universal basic income (UBI). Fintech promises to be highly disruptive.

We are moving into an Orwellian world of surveillance more or less voluntarily, often applauding it. "I have nothing to hide" the young man says, but then he later becomes a minister and starts to worry about the traces he has left on keyboards. The Five Eyes intelligence alliance, or any other major service, can pull out extensive analyses of behavior and personality on most of us now as we continue to exchange our personal data for access to searches and social media, but also subscription-based services. Most Chinese think that the social credit system is a good thing. This is for much of the same reason: they believe it will not be used against them and think that they will do well. We all tend to be overoptimistic about our abilities and opportunities. It's not before we fail that the full implications of the system are felt: lack of access, credit, housing, and no more preferential treatments. The result threatens to worsen the lack of social mobility and increase the growing conflict between the super-rich and those hundreds of millions who risk slipping from the middle class to being counted among the poor, many of whom live in the Western world.

The truth is another essential part of our civilization that we are now tampering with. On the internet, few users can tell facts from lies, but we think we can. Most of those who grew up only with the internet never really learned how to think critically. The old library of physical books was the best guarantee that lessons learned from history would be transferred to future generations without anyone mingling. For that same reason, books were also seen as real threats to tyrants and have been censored and burned. The last time that happened in the West on a large scale was in Nazi Germany, but it is happening again now in subtler forms as Amazon and other giants act as arbiter and refuse books with certain content based on value judgements. A world which relies all too much on the internet should recall that the information there can be switched off in a second. Old books are often not even accessible, having been exchanged for online solutions. The situation in the brave new social sciences is much the same, everyone is running after the latest articles without ever questioning if the same ideas have been published before (difficult to know now). Thus, much academic literature suffers, becoming a tedious process of repetitions under new brands. In a society where everyone is a writer, no one really reads or has much of importance to say at the end.

How do we solve these problems? Step one on the internet is serious encryption as to make data private. Step two is to give all personal data back to the users, that is, to take it away from the private companies and then indirectly away from the security services. That will eliminate the “free” business model and lead to more subscription-based products instead. Step three is to break up the monopolies, and before that to tax them properly. Step four is to return to books that have stood the test of time (real peer-reviewed) whether online or offline. (The learning process is probably only half as good on the screen). We need to go from a culture of skimming data back to reading and discussing it. Technology and management practices should be a part of that solution. Otherwise it looks like we will continue down the road that leads to totalitarianism. The internet right now is making shopping easier, but most people are becoming less aware of realities, less smart, less critical. Only a small part of the population is able to use it to their advantage for understanding the world around them. It would be great to see more articles develop ideas and products for how we as societies can go in this direction.

When looking at the articles in this issue we are reminded that intelligence studies is no longer an Anglo-Saxon body of literature but has become truly international.

The first article entitled “Interpreting, analyzing and distributing information: a big data framework for competitive intelligence” is by Erlaine Binotto et al. It presents a big data intelligence framework.

The second article entitled “Competitive intelligence and absorptive capacity for enhancing innovation performance of SMEs” by Abdeslam Hassani and Elaine Mosconi suggests a way in which competitive intelligence enhances innovation performance for SMEs.

The third article entitled “A framework for big data integration within the strategic management process based on a balanced scorecards methodology” by Mouhib Alnoukari shows how to integrate big data into the strategic management process using a balanced scorecards methodology.

The fourth article entitled “Competitive intelligence approach for developing an e-tourism strategy post COVID-19” by Franky Tulungen et al. shows a strategy for how to boost tourism after the COVID-19 pandemic by developing e-tourism based on a competitive intelligence approach.

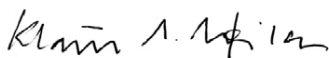
The fifth article entitled “La veille stratégique entre l'efficacité décisionnelle et l'optimisation de la gouvernance: etude restreinte dans les organismes publics tunisiens” by Mostapha Tayeb Ben Amor and Fatma Chichti (in French, abstract in English) suggests an intelligence framework for the public sector. The study is based on interviews with public sector organizations in Tunisia.

The last article entitled “Integrating science and technology metrics into a competitive technology intelligence methodology” by Marisela Rodriguez-Salvador and Pedro F. Castillo-Valdez presents a new framework for competitive technology intelligence (CTI) providing a broader scope to science and technology metrics where quantitative tools such as patentometrics and scientometrics are used.

As always, we would above all like to thank the authors for their contributions to this issue of JISIB. Thanks to Dr. Allison Perrigo for reviewing English grammar and helping with layout design for all articles. I wish I could say that the COVID-19 pandemic is soon over, but unfortunately it still has a grip on our societies.

On behalf of the Editorial Board,

Sincerely Yours,



Prof. Dr. Klaus Solberg Søylen  
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## Interpreting, analyzing and distributing information: A big data framework for competitive intelligence

Eduardo Luis Casarotto<sup>a,\*</sup>, Guilherme Cunha Malafaia<sup>b</sup>, Marta Pagán Martínez<sup>c</sup>, and Erlaine Binotto<sup>a</sup>

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**ABSTRACT** This paper aimed to develop a data-based technological innovation framework focused on the competitive intelligence process. Technological innovations increasingly transform the behavior of societies, affecting all sectors. Solutions such as cloud computing, the Internet of Things, and artificial intelligence provide and benefit from a vast generation of data: large data sets called Big Data. The use of new technologies in all sectors increases in the face of such innovation and technological mechanisms of management. We advocated that the use of Big Data and the competitive intelligence process could help generate or maintain a competitive advantage for organizations. We based the proposition of our framework on the concepts of Big Data and competitive intelligence. Our proposal is a theoretical framework for use in the collection, treatment, and distribution of information directed to strategic decision-makers. Its systematized architecture allows the integration of processes that generate information for decision making.

**KEYWORDS** Big data, competitive intelligence, technological innovation

### 1. INTRODUCTION

Innovation in its complexity adopts new social and organizational technologies as main components. The concept of "innovation" is defined as product and process technological innovation (PPT) in the 1992 and 1997 editions of the Oslo Manual, with technology being considered one of the steps leading to its implementation. Since the third edition of the manual in 2005, with the inclusion of the service sector, the term "technological" has been removed from the definitions of innovation as companies in the service sector could mistakenly interpret it as "using high-tech facilities and equipment" (OECD, 2005, p. 17). Even if the term "technological" is no longer part of the innovation concept, the interpretation makes it explicit that all

innovation, in essence, is already technological (OECD, 2005).

Innovation is commonly associated with computer elements (hardware and software) that have capabilities to generate, store, process, and distribute data in large volumes, called Big Data. Its use can contribute to the discovery of new opportunities in corporative technological innovation (Li, Zhang & Hu, 2017). Data based technological innovation proves to be a process of change in the environment and management in organizations, especially if used together with the competitive intelligence process.

Competitive intelligence has been practiced along with the other support functions in companies because it brings appreciated value to the decision-maker (Vuori, 2011). It is a vital



component of the planning and strategic management process, gathering data and information in a broad strategic vision context that allows the forecasting or projection of events in its competitive environment (Bose, 2008).

The context of the study involves the dynamics of technological innovations, those based on data (Big Data), and the need for efficient and safe use of the large volume of data generated in the environments of organizations. We also observed ethical components of safety and reliability when building business models (Wolfert, Ge, Verdouw & Bogaardt, 2017). The objective of this paper is to propose a framework for an integrated process of Big Data intelligence in organizations.

Previous studies discussed and highlighted Big Data and competitive intelligence approaches together, for example Hughes (2017); Calof, Richards and Santilli (2017); Rothberg and Erickson (2017); Vajjhala and Strang (2017); Erickson and Rothberg (2016); Shi, Lee and Whinston (2016); Wei et al. (2016); Bruneau and Frion (2015) and Erickson and Rothberg (2013).

Zhang et al. (2020) developed a bibliometric review about Big Data in business research and they suggested that researchers pay more attention to research topics such as decision making to leverage experience from the information management field to offer practitioners improvements in Big Data research and applications. Another suggestion is to make advancements in studies with Big Data relating to research and the field of business using interdisciplinary integration.

Our study brings innovation from a theoretical perspective by addressing an emerging theme as a new digital paradigm (Urbinati, Bogers, Chiesa & Frattini, 2019). In this paradigm, companies generate value by digitizing their services and products, and the consequent analysis of media contents becomes a key success factor in the Big Data environment (Jimenez-Marquez, Gonzalez-Carrasco, Lopez-Cuadrado & Ruiz-Mezcua, 2019). Hence, our study can spur analysts and researchers to develop tools that enable the capture, processing, and analysis of data, turning this data into actionable intelligence for decision-makers.

Organizations have different degrees of complexity, especially in relation to technological articulation and intensity.

Additionally, having plenty of databases does not necessarily fit into the "Big Data" concept.

The framework has been developed in two stages. In the first stage, we explored the literature in order to identify the framework's structuring theories. These are Big Data and competitive intelligence and their relationships with technological innovation and strategic management elements. These are widely used in research in the area, resulting in knowledge management, organizational performance management, marketing strategies, production strategies, organizational processes, decision making, and the organization's resources and capabilities. In the second stage, we propose a framework, its theoretical basis, as well as its application.

## 2. THEORETICAL BACKGROUND

### 2.1 2.1. Big Data

Information and communication technologies have provided, through evolution and application, huge impacts on society and the economy, especially in the last three decades. The changes provided by the adoption of these technologies are evident and continue to present opportunities and challenges, such as in the case of Big Data (Sonka, 2014).

Big Data has been described in different ways throughout its development and consolidation. The Apache Hadoop platform defined it in 2010 as "datasets which could not be captured, managed, and processed by general computers within an acceptable scope." (Chen, Mao & Liu, 2014, p. 173).

McKinsey & Company describes Big Data as the next frontier for innovation, competition, and productivity (Manyika et al., 2011). A comparative study by the International Data Corporation (IDC) describe it as "a new generation of technologies and architectures, designed to economically extract value from very large volumes of a wide variety of data, by enabling high-velocity capture, discovery, and/or analysis." (Gantz & Reinsel, 2011, p. 6).

Other authors have considered it to be "a set of techniques and technologies that require new forms of integration to uncover large hidden values from large datasets that are diverse, complex, and of a massive scale." (Hashem et al., 2015, p. 100).

From a managerial perspective, it is relevant to highlight that Big Data provides managers with access to information and generates subsidies to the ability of decision making (Sonka, 2014). The promise and value

of Big Data go far beyond what is known, and have limitations only in their capabilities and human resources.

According to the IDC definition, the characteristics of Big Data may be described by the 4Vs (volume, variety, velocity, and value) which are also used by Hashem et al. (2015), Sonka (2014), and Gomes and Braga (2017). The classification into five aspects to better understand the 4Vs is significant because of the large-scale data in the cloud. These are data sources, content format, data storage, data preparation, and data processing (Hashem et al., 2015).

Such characteristics and classification allow us to consider Big Data as an innovation, because it meets the definitions proposed by Freeman, Clark and Soete (1982), Senge (1997), and O'Sullivan and Dooley (2008). They introduce a new way of generating, processing, and making information available so it can be replicated infinitely at acceptable costs and can be exploited for both personal and organizational benefit to add value.

The advent of Big Data establishes itself as a development of technological innovation relating to other innovations such as cloud computing and the internet of things (IoT). With the first one, this is because the development of cloud computing offers solutions for the storage and processing of massive volume data sets. With IoT, this is because they are two interdependent technologies that must be developed together since the dissemination of IoT leverages the growth of data by categories and quantities, allowing the application and development of data (Chen, Mao & Liu, 2014).

We have added this relationship to artificial intelligence, as it also deals with increasing volume, velocity, and variety of data, allowing the delegation of hard recognition and learning patterns and other tasks to computer-based approaches (O'Leary, 2013).

We highlight that the context of Big Data and related technologies bring with them the uncertainties of security, or insecurity, on the part of the agents and especially individuals when they make their data available and maintain, in some way, some or all control over its use (Tene & Polonetsky, 2012).

Compliance with legal principles can be a detriment to competitiveness since it can generate a competitive advantage or disadvantage depending on the mode of use and attention to them. It can be detrimental if a company or institution does not accommodate

the legal environment that extends beyond the limits of a given territory.

## 2.2 Competitive Intelligence

The definition of competitive intelligence encompasses two vital concepts for the business environment. First is the meaning of "competitive", which refers to processes that involve competition between at least two agents. Second is the concept of "corporate intelligence", defined as an ability to predict possible changes in a future temporal universe and prepare for an intervention, a process in which the parties use the operating environment to collect data, information, or knowledge in decision making and then implement actions (Breakspear, 2013; Köseoglu, Ross & Okumus, 2016).

The competitive intelligence concept has been studied in the field of management in several areas of strategic administration, and it is common to use other names that sometimes cause confusion between the terms. The majority of them occur in relation to the distinction of the competitive intelligence business. Many use these terms as synonyms, linking business intelligence to the information technology companies and describing it as the set of tools that allow the generation of information in business environments such as data warehouses, data mining, CRM, and OLAP tools, among others (ABRAIC, 2012). Competitive intelligence refers to a broader process, encompassing the obtaining and processing of information that comes from networks maintained by competitive intelligence systems in which the business intelligence information is inserted (ABRAIC, 2012).

Considering competitive intelligence as a process and a product at the same time has its roots in the assumption that the more one understands the strengths and weaknesses of competitors, the better the conditions to formulate an effective strategy are. Competitive intelligence is, first, an analytical process of transforming disaggregated data into usable strategic knowledge about competitors' intentions, capabilities, performance, and positioning; and, second, a result of this process as a final product (Bernhardt, 1994).

The competitive intelligence process results in information that generates recommendations for future events, in addition to reports that justify past decisions in decision making (Gomes & Braga, 2017). In the search



for information in the competitive environment, companies may not find clear answers to develop their strategies. For the correct articulation of competitive intelligence activities, the United States Central Intelligence Agency (CIA) described a cyclical process of five interdependent phases: planning and direction, collection, processing, analysis, and production and dissemination (Bernhardt, 1994). Competitive intelligence is both a process and a product (intelligence) (Bernhardt, 1994). An effective competitive intelligence process, supported by the Society of Competitive Intelligence Professionals (SCIP), is executed in a continuous cycle, called the competitive intelligence cycle.

The cycle is a process in which information is collected, evaluated, analyzed, processed, and made available as intelligence for use in decision making, consisting of planning and direction, collection, analysis, dissemination, and feedback (Bose, 2008). This cycle is an update of Bernhardt's (1994) initial model, in which processing, analysis, and production are all grouped in phase three (analysis), phase four includes distribution, and finally, insertion of feedback is found in phase five. Previously, Bose (2008), Calof, and Dishman (2002) presented a five-phase model for competitive intelligence, in which the fifth phase consists of decision making. The difference between the models demonstrated by Calof and Dishman (2002) and Bose (2008) is only semantic if only phases one to four are considered. However, phase five differs, as Calof and Dishman (2002) defines phase five as

decision making, while Bose (2008), defines it as feedback. However, this difference can be mitigated by considering that the decision-making process results in feedback to the competitive intelligence system. In this way, it can be considered that both process are included in the same phase.

Besides the five-stage models proposed by Bernhardt (1994a), Calof and Dishman (2002), and Bose (2008), Fleisher (2004) and Brummer, Badenhorst, and Neuland (2006) presented a four-stage model. Moreover, De Pelsmacker et al. (2005) and Nasri (2011) have outlined processes with six stages: planning and focus, collection, analysis, communication, process/structure, and organizational awareness/culture.

Keiser's previous study (1987) presented a six-stage model, consisting of the definition of rivals, data that better define them, specific sources to be researched, classification of these sources and delimitation of a cooperation strategy in the information collection, blending and analysis of the information, and monitoring of the rivals according to the results coming from the information sources (Köseoglu, Ross & Okumus, 2016).

Köseoglu, Ross, and Okumus (2016) used contributions from Brummer, Badenhorst, and Neuland (2006) by inserting four elements to support the construction of the process in the planning and steering stage of the Bernhardt (1994) model. These include intelligence users and decision-makers, other users, data needs, and the key intelligence topics (KITs), developed by Herring (1999). We chose the

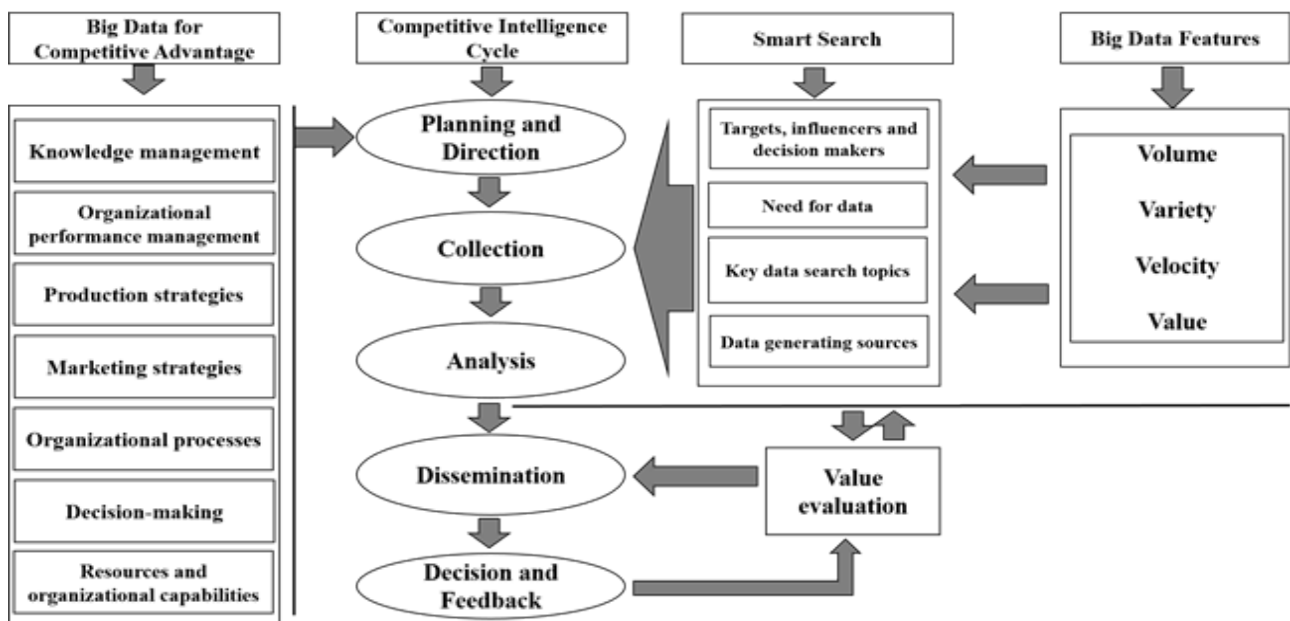


Figure 1 Big Data Intelligence Integrated Process (BDIIP).

model proposed by Köseoglu, Ross, and Okumus (2016) to serve as a reference for our framework proposal.

### 3. FRAMEWORK PROPOSAL

Our proposal is presented in two parts. The first, the Big Data Intelligence Integrated Process (BDIIP, Figure 1), is based on the competitive intelligence cycle of Bose (2008), however, in the fifth phase we also consider the decision-making suggested by Calof and Dishman (2002), the characteristics of Big Data (4Vs) of Chen, Mao and Liu (2014), and we include variables of Brummer, Badenhorst, and Neuland (2006) later adopted by Köseoglu, Ross and Okumus (2016). In the second part, we present the Big Data Intelligence Framework - BDIF (Figure 2), based on the theoretical interpretation of BDIIP.

Our framework is supported by five points of interest essential for its definition: 1) who are the actors that effectively are the potential targets, influencers, and/or decision-makers to define the profile and market positioning?, 2) what is the real need for data?, 3) definition of the key-topics for searching, 4) what are the main generating sources and which kinds of data should be mined from the ones available?, and 5) definition of a Big Data intelligent searching cycle from the key-elements of the competitive intelligence cycle, validated by the elements characterized as Big Data (4V).

Subsequently, each of these points will be contextualized. Additionally, the Big Data tools allow the analysis itself to identify the relevant descriptors in the information.

1) *Main potential targets, influencers, and/or decision-makers* and 2) *data needs*: first, as a characteristic of Big Data, the large volume of data is often presented in different ways for the same purpose. As such, redundancy and the noise level are problems that must be followed-up and minimized to improve data performance. Such characteristics are, for example, enhanced by the structure of data in relational databases and also by data generated via IoT (Chen, Mao & Liu, 2014; Hashem et al., 2015).

As well as prior knowledge of the types of data required, knowing the users, or clearly defining them, is a key-point in the search for the information needed for the intelligence process (Bose, 2008). This is fundamental for planning the process of collecting and analyzing data to convert them into useful information (Oliveira, 2013).

Within the competitive intelligence process, the users of the information need to be previously known and defined, as this is essentially an internal process.

In practice, we suggested using Big Data to identify the decision-makers, users, or influencers in a given business environment and what kind of information is used or

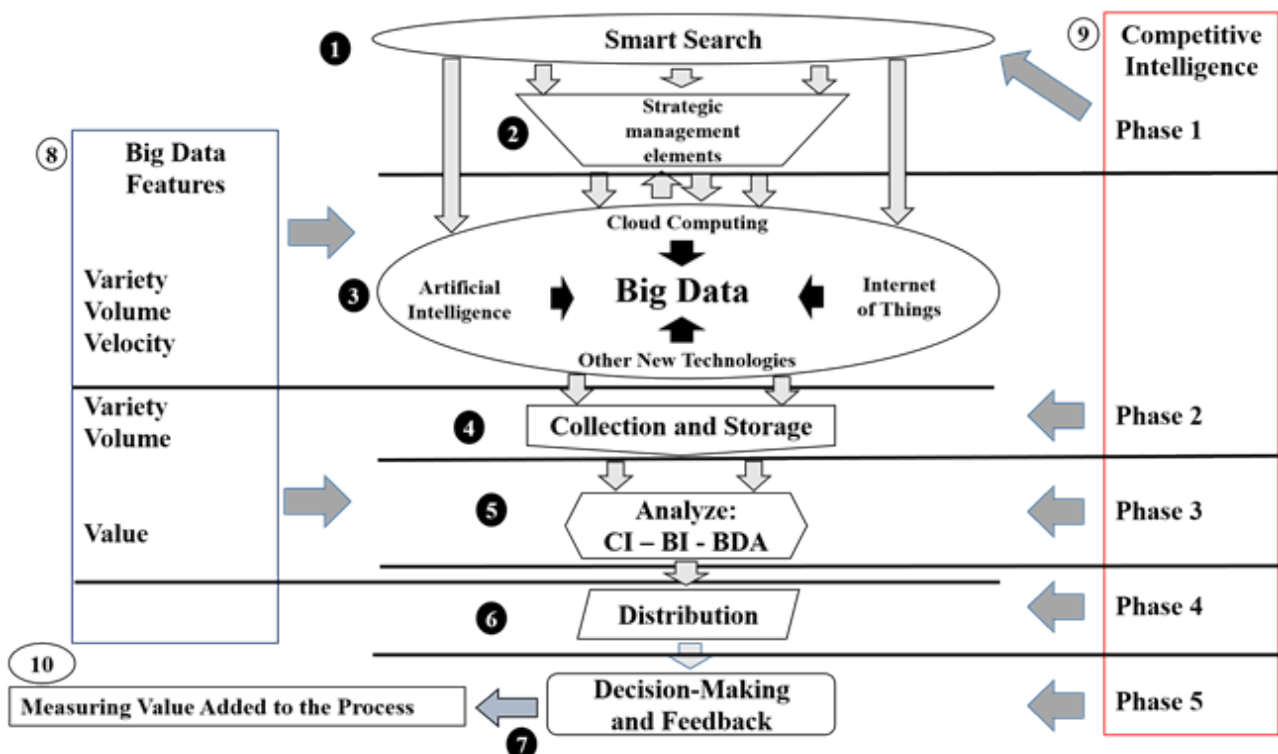


Figure 2 Big Data Intelligence Framework (BDIF).

disseminated by them, in the environment outside the organization.

3) *Definition of key topics for searching:* key intelligence topics (KITs) are used to improve the planning of competitive intelligence process activities. These topics have been previously defined by intelligence users and analysts, and segmented into three functional categories: strategic decisions and actions, early warning topics, and description of the main competitors in the business environment (Herring, 1999).

In the traditional competitive intelligence process, the identification of the topics related to the main competitors and market conditions is the last stage of the definition. However, in the process that we propose, it will be used as the main instrument to identify opportunities and risks in an environment and, from this information, start the generation of the intelligence process based on Big Data.

We suggest Big Data tools to monitor the market, reversing the definition of the main topic processes by the users for Big Data analysis, mainly using unstructured data. This includes, for example, data analysis or text mining.

4) *Generating sources and data availability:* data sources may be classified as social media, machine-generated, detection, transactional data, and IoT (Hashem et al., 2015). The different source availability provided by the Big Data environment allows a vast range of searches. However, unstructured data represents a great challenge, since in some cases this type of data does not undergo a prior evaluation as to its authenticity and validity. These are subject to a lack of veracity or credibility. This is unlike structured data from official or better-known databases, which may contain errors, distortions, or lack updates, yet is still in some way "certified" by the publishers.

We propose that operationalization in an autonomous way verifies the ethical and legal veracity and viability of the use of this data. That certifies or minimizes the choice of the bases since the ownership and privacy in the universe of Big Data represent a big challenge. However, many of these challenges have their origins in technical issues and are based on the legislation and organizational aspects that can be met by technical measures, a prerequisite that allows analysis without binding the user's identity (Jensen, 2013).

5) *Valuation of the Big Data intelligent searching cycle:* valuation occurs from the key-

elements of the competitive intelligence cycle, its final evaluation, and verification of the principles of collection, treatment, and distribution of data and information. By meeting ethical standards of privacy, use, and tenure rights, they consider the definition of competitive intelligence as a systematic and continuous business process to collect, ethically and legally, information about targets in the business environment (Shaker & Gembicki, 1999) and mainly disconnected from the association to corporate espionage. Ethical and moral conduct is a significant part of the strategic process (Köseoglu, Ross & Okumus, 2016) and also is essential to meet the ethical demands on the asymmetry of power concerning the domain of information between users and large corporations. The validation done by attributing values such as trust and transparency gives credibility to the use of the tool in the generation of knowledge and intelligence (Carbonell, 2016).

So far, the searching process integrates the concepts and principles of competitive intelligence and Big Data, particularly regarding the searching, processing, and transformation of data into actionable information. In certain aspects, it is similar to processes already used for obtaining and producing information. For this purpose, the tenet for using it takes into consideration the tasks of the process, integrated within a broader context, such as in laboratories, centers, or information production and distribution cores. In organizations, the Big Data Intelligence Integrated Process (BDIIP) may be used as an operationalization structure for data/information capturing, storing, processing, and distribution in intelligence operational centers.

It is not a closed-system process, but a cluster of processes with integrated operation platforms for adding value to available data and/or produced for specific analysis originating from several interfaces that possibly require analysis and operation with diverse resources and knowledge.

It is also an organic framework susceptible to inferences and interference according to the needs of the organization at a given time. The framework is based on the management area, defined as strategic management elements, and contextualized in knowledge management, organizational performance management, marketing strategies, production strategies, organizational processes, resources and

capabilities of the organization, and decision making.

Given their characteristics, we consider that the elements are not static as they can move to a multidisciplinary scope, adding other factors and subjects to meet a determined demand such as the price analysis of a given product, in a business environment, by the production or marketing strategic vision linked to explanatory or predictive statistical analysis.

The process explores the main characteristics of Big Data defined as the 4Vs presented and discussed by Chen, Mao and Liu (2014) and the elements of the competitive intelligence cycle proposed by Bose (2008) and Calof and Dishman (2002), which allowed the development of the Big Data Intelligence Framework (BDIF; Figure 2).

Our proposal has resulted in the construction of the Big Data Intelligence Integrated Process (BDIIP; Figure 1) considering the following fundamentals, as presented in Figure 2:

1) *Intelligent search*: contemplates phase 1 with planning and direction of the competitive intelligence cycle, according to Bose (2008). In this phase, the pre-phase elements were adapted from Köseoglu, Ross, and Okumus (2016) to the BDIIP (Figure 1). They consist of targets, influencers, decision-makers, data needs, key-topics of searching (Herring, 1999), and generating sources of data. In order to sustain and improve the decision-making process, it is necessary to fit it into a relevant strategic context for the business to be able to answer essential questions (Bernhardt, 1994; Oliveira, 2013).

That is the data search for effective planning in the Big Data universe, whereas the objectives are determined, and it is defined which methodology to seek. The integrated process differs from the competitive intelligence process as it can meet several demands simultaneously or one problem in several ways, while competitive intelligence focuses on one problem at a time. This stage of the framework does not contemplate Big Data that is only about definitions which may or may not be executed in large databases.

2) *Strategic elements of management*: these are also part of phase 1 of competitive intelligence. They consist of the disciplinary filter of the search process since the use of Big Data or its analysis can be an instrument for maintenance or generation of advantage. This filter should preferably be applied and integrated into the search engine so that the

results are objective and targeted. However, it can be applied manually *a posteriori*, which means the analyst applies the filter according to the interest or need after data collection. The definitions of strategic elements of management may be adapted accordingly to specific needs. The adoption of the term "strategic elements of management" is only a representation used to define this phase that does not restrict a broader use of content, practices, and processes in the management area that can lead to the development of a specific project, and can be replaced by emerging theories and new holistic proposals.

3) *Big Data universe and related technologies*: these include cloud computing, IoT, artificial intelligence, and other new technologies that emerge in this scenario. This phase covers the foundations of Big Data and all the complexity of the very definition of the term Big Data with its characteristics, classification, and challenges. This includes, for example, the adequacy of researchers and entities to follow data protection laws. In this stage of the framework, there are three characteristic elements of Big Data: volume, variety, and velocity defined by Hashem et al. (2015), Sonka (2014), and Gomes and Braga (2017). This is in addition to the classifications of data sources (social media, machine-generated, detection, transactional data, and sensorization) and format and content (structured, semi-structured and unstructured) (Hashem et al., 2015). The volume refers to the enormous amount of data generated in large databases and media almost instantly, allowing the use of data-mining to identify sources of intelligence generation. The dedicated data, such as sensor measurements (IoT) and the use of artificial intelligence, are in the early stages but with future potential for integrated use. Variety deals with different types of collected data that include video, image, text, audio, and structured or unstructured data. As a dimension of Big Data, it deals with the concept of data that expand into different formats. Velocity represents the ability to generate data in real-time and rapid dissemination (Hashem et al., 2015). The velocity has a significant impact on the performance of business innovation actions, as it is necessary to quickly integrate different types of data in a timely manner to generate efficiency and effectiveness in the process (Ghasemaghaei & Calic, 2020).

4) *Collection and storage*: we contemplate phase 2 of the competitive intelligence cycle



(BOSE, 2008) and the variety of characteristics and the volume of Big Data. This also meets the need for "data storage" classification and its tasks: documentation, guidance, graph, and value. These are forms of data preparation: cleaning, normalization, and transformation (Hashem et al., 2015).

5) *Analysis*: this contemplates phase 3 of competitive intelligence and the value characteristic of Big Data. It refers to the process of discovering the hidden values of large data sets with various types and fast generation (Hashem et al., 2015). Although the presence of volume and variety characteristics are inherent, the value designation begins to be reasoned on the quality of the data analysis. For this, they rely on the use of competitive intelligence analysis techniques, business intelligence, and Big Data analysis, as well as supporting tools for decision making. At this stage, the analyst's expertise improves the use of this tool and the generation of results. Depending on the project and, especially, the way the results are disseminated, this is the last stage of Big Data. The probability is that the information for decision making is passed on even if using data in a way that could not be considered Big Data conceptually, only data transmitting the information. The distribution of this information, in competitive intelligence publications, is approached as the idea of producing actionable intelligence, with the primary role of modeling and influencing strategic thinking by interlocution between analysts and management (Gilad, 2016).

6) *Distribution*: this contemplates phase 4 (distribution) of Bose's intelligence cycle (2008). It follows the same pattern of information distribution as competitive intelligence, which means information is disseminated directly to interest groups through publications, meetings, lectures, and field activities, among other traditional forms. However, an organization's intelligence department may also adhere to the use of platforms and applications to increase the interaction and use of information. Depending on the application architecture, it may or may not be considered Big Data.

7) *Decision*: the final phase of the competitive intelligence cycle. The information, once made available, may or may not be used in decision making. In this phase, the involvement of intelligence analysts with other organizations' members will be decisive in adding value to the competitive intelligence process as a whole, as well as in directing the

actions of the organization. All members' interactions can be measured through feedback, which will also serve as inputs for the re-start of the intelligence process.

8) *Description of Big Data Characteristics*: according to Hashem et al. (2015) and other previously cited authors.

9) *Description of the competitive intelligence cycle*: according to Bose (2008), Calof and Dishman (2002) and other previously cited authors.

10) *Validation or Valuation*: The final step of the framework measures the utility of the process for decision making. We consider "value" to be interpreted as "veracity" (Gomes & Braga, 2017), unlike the "v" value in Big Data. The process, understood as a cycle, has its beginning for a question-less purpose or analysis in which many factors and resources (human, financial, temporal, and technological) were committed for the benefit of the project. The final characteristic of the information generated should be measured by its capacity to enable better decision making. The higher the quality or veracity, the greater the value of the process. The metrics for this evaluation should be defined in each project in phase 1 of the competitive intelligence cycle. The returns may also be gauges of the quality of the actionable information developed by the organization's intelligence department.

#### 4. DISCUSSION

We understand that Big Data, through new technologies such as social media and IoT, enables organizations to develop innovative business models and products considering three dimensions for decision making and gaining advantages: creative use of technology and Big Data, unlocking innovation through collaboration and co-creation, and sustainability agendas (Nudurupati, Tebboune & Hardman, 2016).

Using Big Data together with the organization's capabilities and resources can lead to advantages in the business environment. The importance of human skills and intangible resources associated with learning and organizational culture creates a specific capacity for the corporation. Perhaps it is unlikely that Big Data alone can generate or maintain any advantage for the organization (Gupta & George, 2016).

Big Data can be considered a new element capable of producing competitive differentials, provided it is handled with intelligence and adequate tools, observing its characteristics of

velocity and variety. However, the generation of massive data volume, variety, and velocity does not guarantee the best decision-making or obtaining any advantage, and for this, it is necessary to extract its most fundamental characteristic in the process: the value generation. Big Data provides the opportunity to collect and integrate various datasets for the identification and extraction of information used to improve decision making (Ayankoya, Greyling & Calitz, 2016).

For organizational goals to be achieved, using Big Data is important to understand how each of its characteristics affect the results to allocate them in the best way. This is a key task to improve performance (Ghasemaghaei & Calic, 2020).

We highlight that the universe of Big Data associated with cloud computing, IoT, and artificial intelligence transforms management systems. However, having a large volume of data does not necessarily guarantee that you have the right information at the right time.

Big Data, combined with sophisticated business analysis tools, has the potential to provide companies with insights into customer and market behavior, enabling faster and more effective data-driven decision making (Kelly, 2014). Therefore, the introduction of competitive intelligence works as a strategic tool to manage and process raw information and turn it into useful information at the right time, targeting the decision-maker.

The adoption of intelligence in the Big Data strategic processes changes the environment because the adoption of competitive intelligence tools such as business intelligence and Big Data analytics streamlines actions, interpretation, and the consequent generation of information in the form of actionable intelligence.

Special attention should be given to the fact that the speed of changes, uncertainties, and complexity of competitive environments impose on analysts and decision-makers a pressure for assertiveness, reinforcing the importance of adopting competitive intelligence as a flexible and adaptable approach (Mohammadalian, Nazemi & Tarokh, 2013).

The developed framework considers the interactions of human resources and their capabilities for interpretation, analysis, and distribution of information in the form of intelligence. It was developed to be used in the core of organizational intelligence, which uses the business intelligence resources and

expertise of its researchers and analysts. This conception is justified because "big organizations have implemented Big Data adoption and development for business value creations through the result of Big Data analytics applications" (Adrian, Abdullah, Atan & Jusoh, 2016, p. 174). Organizations with different purposes and large corporations can help the members of the decision-making process with information without requiring an economic counterpart.

We understand that Big Data, associated with an intelligence process, is a source of some advantage. However, there is a need to combine people, tools, management, data-oriented culture development, and human skills to obtain this advantage (Kabir & Carayannis, 2013).

We also emphasize that by adopting advanced analysis technologies, organizations can make use of essential data for the development of innovative insights into products and services (Günther et al., 2017). We reinforce the adoption of new technologies as a process given the need to prepare data capture and processing architectures, as well as the time needed to generate databases that represent Big Data in its essence. However, as the framework allows for interaction and fragmentation, such fragments can be executed in the form of specific projects for information analysis and process execution sharing. The adoption of new technologies allows the use of partners to perform tasks that are beyond the physical and technical capacity of the organization. The framework grants interactions between companies and analyst partners for the production of information that can be disseminated in order to generate better results and extract value from the data and the process that allows better decision making.

## **5. FINAL CONSIDERATIONS, REMARKS, AND LIMITATIONS**

The huge development in technological innovations influences and transforms social and commercial relationships and significantly alters productive environments. This context served as a premise for our proposal. We started from one which, using large data sets (Big Data) together with the competitive intelligence process, can improve decision making and, consequently, maintain, or generate some advantage for organizations.

Our study brings contributions and innovations when considering the use of Big Data integrated into the theory of competitive

intelligence. It presents the ability to generate information for the decision-making process from the use of new technologies for data generation, storage, and integration. Our proposal of the Big Data Intelligence Framework (BDIF) demonstrates the capacity of data collection in the processing and distribution of information that can be used as a reference for the systematic construction of intelligence cores.

As limitations of the proposal, we recognize that an intelligence core alone may not be able to generate all the data to produce the necessary knowledge to be made available, as well as for the transmission of information. It is essential to build cooperative relationships through commercial or other partnerships.

For future research, we propose implementing BDIF for the formation of the intelligence core in organizations or other interest groups. Further, the continuity of tests with the practical and theoretical application of the Big Data Intelligence Integrated Process (BDIIP), developing targeted studies is possible.

We also highlight, in relation to the practical application, the possibility of developing integrated field tools to initialize the use of the framework and disseminate the content appropriately at the right time, as well as new studies for the proposition and realization of value. Finally, we considered that the generation of information for the intelligence process, with the ability to create a variety of advantages for the organization through technological innovations such as Big Data, starts from the premise that human capacity has to define the types of data, making the human capacity the defining factor of information quality (human perception of value). The whole process of generating knowledge is the result of an algorithmic reaction, or a succession of steps, including emotional components, that lead to a determined final result.

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# Competitive intelligence and absorptive capacity for enhancing innovation performance of SMEs

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**ABSTRACT** In dynamic and complex environments, it can be difficult for small and medium-sized enterprises (SMEs) to achieve business performance, innovate and survive, even though these actions are crucial for economic growth and competitiveness. Competitive intelligence (CI) appears as a strategic practice to help them. Although there are many theoretical studies that propose the relationship between CI and innovation, few studies have conducted empirical studies in the context of SMEs. The objective of this paper is to investigate how competitive intelligence enhances innovation performance in the context of a SME. Based on a literature review and empirical data from several interviews with managers of one SME, our findings allowed us to propose a framework showing the contribution of CI to innovation performance relying on absorptive capacity. Our findings also highlight that a prospector owner-manager can improve the results of CI in the SME and contribute to better innovation performance.

**KEYWORDS** Absorptive capacity, competitive intelligence, innovation performance, prospector owner-manager, SME

## 1. INTRODUCTION

Small and medium-sized enterprises (SMEs) are considered the primary source in creating jobs and economic wealth (Julien 1995; Olawale and Garwe 2010), employing more than 95% of the world's working population (Pellissier and Nenzhelele 2013). In Canada, SMEs account for 99.7% of total firms in terms of working population and contribute about 54% of Canada's GDP (Statistics Canada, 2016).

Despite the importance of SMEs in economic growth, significant obstacles impede their sustainability, leading in most cases to failure. To overcome challenges and survive, SMEs need to improve their innovation performance (Rujirawanich et al., 2011). Innovation requires research and development (R&D) (Baldwin and Hanel, 2003), which is a determinant of innovation (Raymond and St-Pierre, 2007). However, most SMEs do not

have sufficient resources to invest in R&D (Moilanen et al., 2014). Moreover, they are not qualified to benefit from government assistance programs for R&D (Institut de la Statistique Quebec, 2002). They are, more than ever, compelled to exploit external information (Amara and Landry, 2005; Davila et al., 2009) by adopting environmental analysis activities such as competitive intelligence (CI) (Guimaraes et al., 2016).

CI allows companies to gather information from customers, suppliers, competitors and technologies and thus build a strong foundation for the innovation process (Pacitto and Tordjman 1999; Tidd, et al., 2005). However, the literature shows that the effectiveness of CI in the context of SMEs depends on the company's owner-manager profiles and the absorptive capacity of the company. Indeed, the SME prospector owner-manager seems to contribute to more effective CI in acquiring and interpreting external

information (Baldwin and Gellatly, 2003). In addition, absorptive capacity allows the company to transform external information (Cohen and Levinthal, 1990) into knowledge, which in turn contributes to innovation performance (Bayarçelik et al., 2014). Although CI is useful for businesses, few studies have been devoted to SMEs (Priporas, 2019; Talaoui and Rabetino, 2017). More specifically, there are few empirical studies that have treated the relationship between CI and innovation (Calof and Sewdass, 2020; Hassani, 2020). However, to our knowledge, there is no framework that explains the role of CI in the innovation performance of SMEs in practice. This paper addresses this gap and proposes a framework for a better understanding on how CI contributes to innovation performance relying on absorptive capacity for better results. The proposed framework is based on empirical data and the published literature.

The first section presents a literature review on innovation performance and CI, as the concepts supporting this study. The following sections present methodology and results. In discussing the implications of the proposed framework, the paper proposes several propositions predicting the positive impact of CI and absorptive capacity on innovation performance.

## 2. LITERATURE REVIEW

### 2.1 Innovation

Innovation can be classified into four types: product innovation, process innovation, organizational innovation, and marketing innovation (OECD, 2008). Innovation is considered to be the engine of growth and development for SMEs (Raymond and St-Pierre, 2007). Empirical studies have shown that the most successful innovative SMEs in Canada, the United States and Europe generate strong growth (Baldwin, 1994) and are able to survive for long periods (Baldwin and Gellatly, 2003). Innovation performance is a critical requirement for business competitiveness (Baldwin and Gellatly, 2003; Song et al., 2015). It can be defined as a concept with two dimensions such as efficiency and effectiveness (Alegre et al., 2006). According to those authors, efficiency refers to the degree of effectiveness of innovation, and effectiveness refers to the use of resources in terms of the time and cost required to complete the innovation project. Similarly, Guimaraes et al.

(2016) emphasize that innovation performance represents the degree of effectiveness of the firm in implementing innovation, which in turn has a significant impact on the organization's performance.

To stimulate innovation, companies invest more and more in R&D. Large companies can cover the costs associated with R&D activities and spread the risks associated with innovation across their entire project portfolio (St-Pierre and Mathieu, 2003). They have access to resources to invest in equipment, marketing and technical work, which can lead to major innovations (Laforet, 2008). However, most SMEs do not have sufficient resources to invest in R&D (Moilanen et al., 2014). Therefore, to promote and conduct innovation better, organizations need to be proactive in identifying and exploiting opportunities. To do this, these organizations, and in particular SMEs, should have anticipatory approaches such as CI (Calof and Sewdass, 2020; Guimaraes et al., 2016). In addition, absorptive capacity is also pointed out as being crucial to convert the information collected into knowledge useful for the innovation process (Andreeva and Kianto, 2011, Cohen and Levinthal, 1990).

### 2.2 Competitive Intelligence

CI is an evolving concept (Brody, 2008). Its definition presents a challenge for both academics and practitioners writing in French (Jakobiak, 2006; Larivet, 2001) or in English (Brody, 2008; Smith et al., 2010). CI is an amalgam of disciplines covering economics, marketing, military theory, information science, and strategic management (Pellissier and Nenzhelele, 2013). In addition, CI is different from industrial espionage, which is both an illegal and unethical activity (Crane, 2005). CI is both a process and a product (Vedder et al., 1999). The Society of Competitive Intelligence Professionals (SCIP) defined CI as the systematic and ethical collection, analysis and management of external information that can affect the company's planning, decision-making and business operations. CI can also be defined as a product, which refers to intelligence information about competitors' activities from public and private sources, and its scope is the present and future behavior of competitors, suppliers, customers, technologies, acquisitions, markets, products and services, and the general business environment (Vedder et al., 1999). CI has been considered to be the



fourth factor for the survival of enterprises after capital, technology and talent (Bao, 2020). The main objective of CI is to provide an alert system for external turbulent events that may have an impact on the company's strategy and performance (Ngamkroekjoti and Speece, 2008). The three main sources of such environmental turbulence are: market, technologies and competitors' intensity (Jaworski and Kohli 1993; Ngamkroekjoti and Speece 2008). Many studies have highlighted that SMEs prefer to monitor sources in their immediate environment (Johnson and Kuehn, 1987; Ramangalahy, 2001). This environment consists of customers, competitors, and suppliers (Smith et al., 2010), and technologies (Bao, 2020; Calof and Sewdass, 2020; Jaworski et al., 1995). CI is essential for business because it not only provides a solid foundation for the innovation process (Pacitto and Tordjman, 1999; Tidd et al., 2005), but because its absence can also be considered a barrier (St-Pierre and Trépanier, 2013) or even a factor in the failure of innovation (Wycoff, 2003; Baldwin et al., 2000).

### **2.2.1 Customers' intelligence information and innovation performance**

Customer engagement enables enterprises to effectively enhance the success rate of radical innovation and incremental innovation (Wang and Xu, 2018). To innovate, enterprises must identify potential customer needs, and collect and analyze their demands, which can help generate new ideas for products and services (Bao, 2020). According to Bao (2020) and Kohli and Jaworski (1990), intelligence information from customers is essential for companies. Indeed, intelligence information increases the level of innovation performance (Bayarçelik et al., 2014) and helps the development activity of new products (Bayarçelik et al., 2014; Voss, 2012). More specifically, customers' intelligence information improves both radical innovation performance (Nguyen et al., 2015; Frambach et al., 2016) and incremental innovation (Laforet, 2008; Nguyen et al., 2015) in particular, in the early stages of the innovation life cycle (Laforet, 2008). A study by Tanev and Bailetti (2008) found a positive correlation between customer intelligence information and innovation in SMEs.

### **2.2.2 Competitor intelligence information and innovation performance**

Competitor analysis is the soul of CI (Bao, Xie, Li, 2003). CI helps enterprises analyze competitor strengths and weaknesses, predict their strategies, and evaluate their new products, especially their prices, costs, profits and development (Bao, 2020). Prior research advises companies to monitor competitors in order to develop a greater ability to accelerate product innovation activities (Lee and Wong, 2012; Laforet, 2008) and innovate in those areas where competitors are weak (Story et al., 2015). CI on competitors has an impact on different types of innovation in companies. It contributes to radical service innovation (Cheng and Krumwiede, 2012). In the same vein, Frambach et al. (2016) noted that intelligence information from competitors stimulates the exploitation of skills and leads to the development of radical innovation.

### **2.2.3 Suppliers' intelligence information and innovation performance**

Suppliers are a very important information source for helping firms' innovation performance (Dahlander and Gann, 2010). The participation of suppliers in the innovation process contributes to a potential source of sustainable competitive advantage (Bao, 2020). Suppliers often establish strategic partnerships with customers and competitors to implement technologies, processes or new products. To gather information from suppliers, the company can therefore conduct primary research (Slater et al., 2012). According to Carbonell and Rodríguez Escudero (2010), intelligence information from suppliers allows the product development team to understand the market dynamism and act faster, which can contribute to new-product performance. Zhang and Chen (2014) argue that intelligence information from suppliers helps companies to improve innovation performance. Nassimbeni and Battain (2003) highlight the fact that suppliers contribute to innovation in different forms, such as the provision of new product / process technologies, or the development of joint projects. Supplier intelligence information is also one source of innovation and has a positive effect on innovation performance (Bao, 2020).

### **2.2.4 Technologies intelligence information and innovation performance**

Several research results highlight the importance of technologies as a rich information source, which contributes to the emergence of innovative ideas. Information from technologies allows organizations to be more competitive (Duncan 1972; Souitaris 2001; Vedder et al., 1999).

The literature highlights multiple tools and technology platforms that can help companies gather information about their external environment. The internet, especially social media, are the sources of information most often mentioned in the literature (Roch & Mosconi, 2016). Teo and Chow (2001) argue that the internet helps companies gather quality market information and make more informed decisions. In the same vein, Afuah (2003) emphasizes that the internet improves the integration of innovation activities through the exchange of ideas with external actors, especially with customers. Social media, on the other hand, is at the same time a kind of source and a tool for gathering information about competitors' offers and customers' needs (Itani et al., 2017). Laforet (2008) notes that the companies, especially SMEs, that are more interested in technologies can achieve a high degree of novelty in their products, which helps innovation performance.

### **2.3 SME owner-manager and competitive intelligence**

Ramangalahy et al. (1997) found that, among several organizational factors, strategy is the factor that best explains CI. In the context of SMEs, the strategy is intimately linked to the profile of its owner-manager (Geraudel, 2008). In fact, the owner-manager has a relevant impact on the strategy and behavior of their company over time (Serrano-Bedia et al., 2016).

The literature has pointed out that the SME's owner-manager is concerned with the collection, analysis and dissemination of information (Ramangalahy, 2001). To perform in innovation, the owner-manager, among other responsibilities, develops new technologies and implements new processes, especially those that allow for the generation of new knowledge on the market (Baldwin and Gellatly, 2003). These processes may include, for example, how companies coordinate and disseminate information flows from their customers, competitors and suppliers to their

research and development teams and production units (Baldwin and Gellatly, 2003).

According to the strategy typology of Miles and Snow (1978), the prospector owner-manager, characterized by innovation, proactivity and risk-taking, significantly improves CI (Chandler and Jansen, 1992). Thomas et al. (1993) argue that proactive managers who analyze the external environment can detect disturbances and react before the emergence of threats. Similarly, the prospector owner-manager analyzes the external environment, selects promising opportunities and formulates strategies (Chandler and Jansen, 1992). Belley and Ramangalahy (1994) note that the prospector owner-manager contributes greatly to developing new activities (innovation) and to anticipating new needs and market demands (strategic planning). In addition, the effectiveness of CI is related to the prospector owner-manager in acquiring and interpreting external information, especially in SMEs (Baldwin and Gellatly, 2003).

### **2.4 Absorption capacity, competitive intelligence and innovation performance**

Cohen and Levinthal (1989, 1990) define absorptive capacity as a firm's ability "to recognize the value of new, external knowledge, assimilate it, and apply it for commercial ends." The literature shows that there is a link between absorptive capacity and innovation. Indeed, absorptive capacity contributes to improving innovative capacity (Cohen and Levinthal, 1990) and innovation performance within the firm (Andreeva and Kianto, 2011; Bayarçelik et al. 2014; Lichtenthaler, 2016).

Previous studies have highlighted that absorptive capacity has been viewed as a possible moderator of various determinants of innovation performance (Moilanen et al., 2014). Absorptive capacity helps managers understand the effect of CI on the organization performance (Najafi-Tavani et al., 2016). Bellamy et al. (2014) report that firms' absorptive capacity positively moderates the relationship between CI and its innovation performance. Wang et al. (2010) argue that to exploit the benefits of information gathered from suppliers, the ability to assimilate and transform this information is required. In the same vein, the results of the study by Guimaraes et al. (2016), which was conducted on 1000 companies representing a variety of

sizes and business sectors, shows that organizational absorptive capacity is positively related to CI practices and innovation performance. In the context of SMEs, Zobel (2017) points out that a high assimilation capacity allows a good understanding and dissemination of information coming from customers, competitors, suppliers and technologies. According to Pacitto and Tordjman (1999), it is useless to have a variety of information sources without being able to exploit emerging information.

### 3. METHODOLOGY

The purpose of this exploratory study is to investigate the contribution of absorptive capacity and CI to innovation performance. A qualitative research approach is appropriate for an exploratory study. A case study was conducted which involved close observation of the phenomenon of interest in a real-life context (Eisenhardt, 1989; Yin, 2017). In addition, a case study approach is recommended for investigating the topic of the contribution of CI to the innovation performance of SMEs, since it has been relatively unexplored. The case study and data collection were conducted within an SME located in Canada, referred to here as "Company A".

#### 3.1 Data Collection

Multiple data-collection methods, including semi-directed interviews, document analysis and non-participant observation, were used for triangulation (Miles and Huberman, 2005; Yin, 2017). Semi-structured interviews were conducted with a sample of seven members of Company A, including the Chief Executive Officer, and six managers and middle-managers representing management,

marketing departments, the development of new services, and systems engineering. The managers were selected using the non-probabilistic method of convenience.

Data was collected between November 2016 and March 2017. Before each interview, a list of topics was sent to the interviewees. Nine interviews in total, including three interviews with the Chief Executive Officer (CEO), were conducted in the field. The interviews were audio-recorded, with the authorization of the interviewee, and were transcribed verbatim. These interviews lasted between 60 and 90 minutes. In addition, we were non-participating free observers in Company A. Data was collected by note-taking in several activities, which mainly involved weekly meetings and strategic-planning workshops. Secondary data was collected from official documents and Company A's website.

For data analysis, we used a thematic analysis to refine the grouping of themes and thematic categories and subcategories (Saldaña, 2013). Table 1 describes the characteristics of the firm studied and the interviewees. Concerning the sampling unit, a medium-sized company was taken into consideration. This company offers professional, scientific and technical services, and develops design services for companies operating in the manufacturing sector.

## 4. RESULTS

### 4.1 Innovation in Company A

Company A has an innovation process called "development offering". This process aims to develop new technological solutions, new approaches and working methods to create added-value for customers. To generate new ideas, the CEO reported:

*Table 1* Characteristics of the company sample and interviewees. <sup>a</sup>According to North American Industry Classification System (SCIAN), (Canada, 2017). <sup>b</sup>According to Industry Canada (2019), a micro-company has less than 5 employees; a small company - between 6-99 employees; a medium company - 100-499 employees; and a large company - over 500 employees.

Company	Code	Sub-Sector <sup>a</sup>	Company Size <sup>b</sup>	Interviewee Positions	Code	Number of Interviewees
Company A	SCIAN 5414	Specialized design services	Medium	Owner-Manager	CEO	3
				Manager	1	1
				Manager	2	1
				Manager	3	1
				Manager	4	1
				Manager	5	1
				Manager	6	1

“Ideas are generated through different techniques. These techniques can be creative workshops that are organized around a service development project or specific meetings to discuss the emergence of a new technology or a work approach. The creativity workshops within Company A have led to several innovative projects. For example, operations support projects, cost reduction applications, and other projects associated with operational excellence and industrialization activities.”

#### **4.2 Competitive intelligence in Company A**

CI activity has been identified in Company A as "strategic monitoring". CI allows the company to develop a new vision, strategies and new projects. As Manager 1 explains:

“We have already done strategic monitoring; we reviewed the market trends before doing our strategic planning.”

The most prominent CI activity in Company A occurred when the concept of Industry 4.0 emerged. In this context, the CEO of the company mentioned:

“In doing the strategic monitoring, Industry 4.0 emerged. We retrieved this information to clarify our position in the market and develop a new project.”

In the same vein, Manager 2 reported that:

“Industry 4.0 is the result of reflection, monitoring, and especially customer needs analysis.”

The CEO plays an important role in the business of CI within Company A. Indeed, his presence at conferences, fairs and exhibitions, and local and international shows allows him to collect information on market dynamics and trends through exchanges with experts and CEOs of other companies. Manager 2 and Manager 4 emphasized:

“Our CEO often generates quality information and creative ideas.” (Manager 2)

“Our CEO is a visionary person, using his great ability to analyze the market, he manages to unlock crisis situations.” (Manager 4)

The primary data in our case-study shows that Company A uses CI to collect information

from multiple external sources. Manager 1 claimed:

“The activities organized by various professional and socio-economic associations allow the leaders of Company A to interact with the presidents, directors and managers of other organizations including competitors. These events promote the exchange and collection of strategic information.”

According to all managers interviewed, the most important source of useful information is the customers. Manager 2 pointed out:

“Some members of Company A are directly connected to their customers' factories, which allows them to collect information about the needs of these customers. In addition, Company A directors organize regular meetings with clients to evaluate projects and therefore to have feedback on their product and service development work.”

Collaboration with external partners, especially with suppliers, plays an important role in acquiring information. Manager 1 and the CEO mentioned:

“Our company has established partnerships with suppliers, which led to the deployment of a new technological solution.” (Manager 1)

“We are in constant contact with some suppliers to develop products and meet the needs of customers.” (CEO)

For monitoring the external environment's dynamics, Company A uses many technologies and platforms. Several managers talked about the importance of technology platforms in CI's business. For example, Manager 3 and Manager 5 argued:

“For gathering new information, our employees use the internet, especially digital media.” (Manager 3)

“In order to gather information, Company A uses the Internet, in particular professional networks, social media, blogs, forums and Google Alerts.” (Manager 5)

#### **4.3 Absorption capacity within Company A**

The CEO of Company A understands absorptive capacity as:



“Our ability to organize the work, to be able to deploy and execute the actions we must do to achieve our goal. It's the organizational capacity to execute the blueprint.”

Specifically, in the context of Industry 4.0, Manager 1 noted:

“Industry 4.0 is a novelty for our company. At first, the absorptive capacity is the capacity to self-learn, to define what this element is. Also, to conceptualize and define the situation. In a second step, formalize it and transfer it.”

An organization's absorptive capacity is based on its ability to gather, transform and exploit external knowledge. In Company A, the CEO pointed out:

“A good understanding of the market needs for innovation and our ability to assess the effect of technology solutions for customers and help our teams better identify, value and then gain external knowledge.”

For other managers, the valuation of external knowledge depends on its impact on the strategy and its effects on the company's outcome, whether related to an opportunity, a threat or new technology.

Regarding the transformation and exploitation of external knowledge, Company A relies on the varied skills of its employees. Indeed, most employees are highly qualified (about 90% of employees have engineering, Master's degrees or PhD training) combining knowledge and experience in several fields. Their skills allow for the transforming and exploiting of external knowledge in the form of concrete and competitive projects. Manager 2 emphasized:

“Experienced employees have been instrumental in using their previous knowledge, turning it into new knowledge, and then creating new and innovative projects.”

However, Company A has to improve their absorptive capacity through taking up some challenges. Indeed, most of the employees have technical skills but they miss management skills. The CEO, and Managing Director said:

“They want to develop more professional and technical experience but not in management.”

This challenge is more important in multidisciplinary activities. In fact, as Manager 1 pointed out:

“Most projects are multidisciplinary and informal, presenting a management challenge for the firm.”

This challenge is both intra-departmental and interdepartmental, which requires managers with technical and managerial skills.

## 5. DISCUSSION & IMPLICATION: PROPOSITIONS

The objective of this paper is to investigate how competitive intelligence can enhance innovation performance relying on absorptive capacity to reinforce the potential results in a SME context. This section presents a set of propositions and discusses some implications from these findings. These propositions are based on analyzed empirical data and the theoretical literature. To present our main findings and data results in Company A, we adopted a narrative perspective (Seixas et al., 2021). This allows us to discuss the implications of our results for CI and absorptive capacity in regard to its contribution to the innovation performance of Company A.

First, our findings suggest that despite a lack of resources, SMEs can practice CI, at least partially (Fleisher and Blenkhorn, 2001). However, this activity can remain incomplete, unsystematic and informal, which makes it inefficient (Bergeron 2000; Dishman and Calof, 2008) if the SMEs have no absorptive capacity or engagement by top management. At Company A, the CEO conducts brainstorming, imagination and ideation exercises with several top- and middle-managers to bring out innovative ideas.

According to McAdam and McClelland (2002), the expertise and imagination of CEOs are components of creative problem-solving. The strategic planning activities, held periodically by the CEO, aim to anticipate changes in Company A's external environment. In this sense, the literature reveals that a CEO with a proactive personality is able to understand market trends and therefore anticipate planned changes (Becherer and Maurer, 1999). Based on this understanding, the prospector-CEO enhancing CI activities in SMEs were observed and lead us to proposition 1 (P1).

**P1:** The prospector owner-manager seems to contribute to CI.

According to several managers in Company A, employees are directly connected to customers, allowing them to understand the needs and preferences of these customers (Kohli and Jaworski, 1990). Customer needs and preferences are the main ingredients for new ideas, products and services (Narver et al., 2004). The transformation and exploitation of customer insights into innovation rely heavily on the skills of the individuals at Company A. Coordination and communication with customers contributes to creating new knowledge and to increasing absorptive capacity, which in turn leads to innovation (Gatignon and Xuereb, 1997). In Company A, intelligence information, which means data and information gathered from customers analyzed in context by managers, contributes to innovation performance. The contextual knowledge and experience are related to absorptive capacity. These observations are related to the two following propositions:

**P2:** Intelligence information from customers enhances the innovation performance of SMEs.

**P1b:** Absorptive capacity enables improving information from customers and contributes to the innovation performance of SMEs.

Our findings revealed that Company A is more oriented towards improving their understanding of customer needs and preferences than to conducting competitor-monitoring. This orientation is in line with Groom and David (2001) who stated, "Small organizations with high revenues are more satisfied with current intelligence than small organizations with low revenues". However, literature suggests that excessive customer orientation can hamper the monitoring of changes in the external environment (Koberg et al., 1996), as was the case of Company A during a period before a CI strategy was implemented.

Company A would have taken full advantage of its innovation activities if its employees were collecting strategic information about competitors. Our findings show that a low intensity of information from competitors created a barrier for innovation and growth of the company. In addition, Company A identified several lost opportunities of innovation after implementing CI practices. According to Theodosiou et al. (2012), information from competitors is

relevant to help identify their objectives, strategies, activities, offers, resources, capabilities and competitive advantage. However, managers at Company A mentioned difficulties in collecting strategic information about their competitors. Based on our findings, information from competitors can enhance innovation performance, especially if supported by information analyses and absorptive capacity. This understanding translates to the following propositions:

**P3:** Intelligence information from competitors enhances the innovation performance of SMEs.

**P2b:** Absorptive capacity improves the use of competitor information and contributes to the innovation performance of SMEs.

As the OECD report (2008) points out, companies in most countries prefer to collaborate with customers and suppliers rather than with competitors and private R&D centres to protect their development model. Indeed, the study's results show that managers at Company A are more open to collaborate with suppliers, which allows them to collect information on customers and competitors. Collaboration with suppliers allows these managers to identify opportunities for developing new Industry 4.0 technological solutions and become a leader in this domain. Song and Thieme (2009) report that the participation of suppliers in CI activities has an impact on innovation performance. In addition, frequent exchanges between employees of Company A and their external environment including vendors strengthen their absorptive capacity, which in turn facilitates the transformation of information. Their relationships with suppliers serve to stimulate the exploitation of individual absorptive capacity, and thus enhance organizational absorptive capacity, which contributes to the success of innovation (Cohen and Levinthal, 1990). Our findings showed that Company A analyzes the information or the intelligence information from suppliers to help to improve innovation performance, and the contribution of the manager's absorption capacity was useful. These findings lead us to the following propositions:

**P4:** Intelligence information from suppliers enhances the innovation performance of SMEs.

**P3b:** Absorptive capacity improves the use of suppliers' information and contributes to the innovation performance of SMEs.

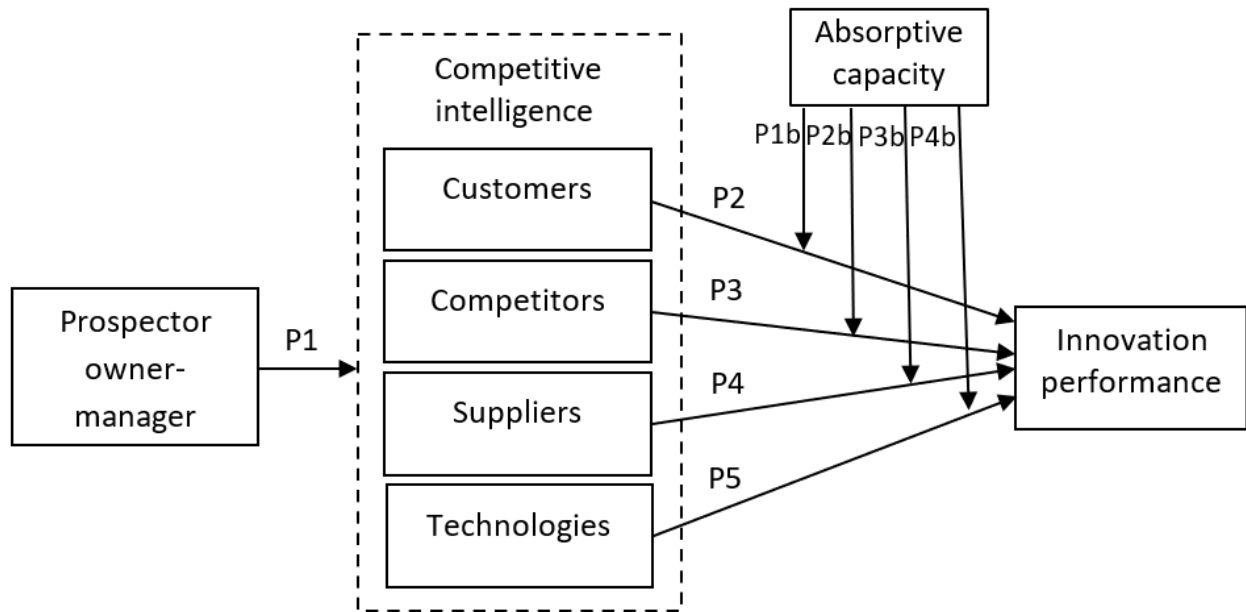


Figure 1 Framework showing the flow from competitive intelligence to innovation performance.

Our results suggest that Company A has focused on information technologies to identify future needs, which culminated in innovative projects and innovation performance. Findings reveal that these projects contributed to an increase of 15% in business revenues. This practice is in line with the literature that suggests that data and information from technologies allows firms to create new technical solutions and develop new products (Gatignon and Xuereb, 1997). Varied information technologies, including social media, blogs and forums, and Google Alerts, allowed the managers of Company A to monitor changes related to new technological trends. CI including information from technologies helped Company A make the shift to Industry 4.0 and become a leader in their region. Many studies have pointed out that technologies are considered an information source, which contributes to business competitiveness (Souitaris, 2001; Vedder et al., 1999). To better use these information sources, firms need individuals with prior knowledge in the field to take advantage by means of absorptive capacity (Cohen and Levinthal, 1990). Our findings show that Company A had some 100 engineers with technical training and experience in technological fields. These skills were crucial to transform technological information into innovative projects. These results are related to the following propositions:

**P5:** Intelligence information from technologies enhances the innovation performance of SMEs.

**P4b:** Absorptive capacity improves the use of technology information and contributes to the innovation performance of SMEs.

These propositions emerged from the data analysis and allowed us to propose a conceptual framework to illustrate how CI contributes to innovation performance (Figure 1). This theoretical framework is based on the understanding that CI comprises information collected from customers, competitors, suppliers and technologies. The capacity to analyze and integrate this information is represented by absorptive capacity that reinforces the potential of the innovation performance. Moreover, CI also benefits from the important contributions of the prospector owner-manager in the context of an SME.

## 6. CONCLUSIONS, LIMITATIONS AND FUTURE RESEARCH

This paper presents an exploratory case study that allowed a framework proposition showing how CI contributes to innovation performance and why absorptive capacity is important for better results. This framework fills a theoretical gap and is supported by empirical data collected during the case study. Our findings suggest three main contributions. First, CI requires a prospector owner-manager characterized by a profile of innovation, proactivity and risk-taking. This type of owner-manager analyzes the external environment and detects disturbances, which contributes to better results from the CI (North and Varvakis, 2016). Second, the findings have highlighted that the contribution of CI to the innovation

performance of SMEs is mainly based on the collection, analyzing and exploitation of information from customers, competitors, suppliers and technologies. More specifically, our case study shows that understanding customer needs and preferences allows companies to create innovative ideas, as proposed by Narver et al. (2004). However, we also understood that focusing more on clients without considering competitors strategies, activities, and objectives (Theodosiou et al., 2012) can lead to the loss of growth opportunities, and to the failure of the SMEs. Our findings also allowed us to understand that collaboration with suppliers is seen as an opportunity to gather information from customers, competitors, and the market as well as to develop new creative ideas, which aligns with previous studies (see Song and Thieme, 2009). The SME studied has invested and given particular importance to technologies, both as tools and information sources. These decisions seem to be relevant to enable them to be able to monitor the dynamic business environment, which allowed them to capture opportunities and develop new products. This same aspect was also pointed out by Gatignon and Xuereb (1997): even though the business environment has changed since this time, technologies have been constantly evolving and disrupting established practices in business. At this point, to face technological challenges and continue to innovate in SMEs, it is important in future research to investigate the ambidextrous organizational-learning habits to mitigate a lack of resources. Third, the findings show that the firm's absorptive capacity is essential to understanding the contribution of CI to innovation activities, as proposed by Najafi-Tavani, Sharifi and Najafi-Tavani (2016). In addition, Božič and Dimovski (2019) argue that absorptive capacity is essential for CI because it plays an important role in transforming data into rich information and knowledge. Although this is only an exploratory study, our findings can guide managers to make the best choices for CI practices, to develop competitive advantage and be more agile than their competitors are. SME CEOs and managers need to consider their managers' profiles, as well as their involvement in operations, for innovation performance within the firm.

This study proposes a framework, certain limitations, and several propositions that should be investigated in future research. As a limitation, the observation approach, whether systematic or electronic, may have an intrusion

effect of the observer (Beaugrand, 1988). Second, the results obtained are not generalizable because of the chosen research approach, as well as due to the variability existing between SMEs (Julien, 2005; Tidd et al., 2005). Third, given that there is no single way to innovate (Tidd et al., 2005), and that CI practices are heterogeneous, future research can test our propositions using a larger sample and survey in order to gain quantitative evidence regarding our conclusions. This will improve the understanding related to innovation performance in SMEs, as they are an important component of the economy of all countries.

Additionally, in current contexts of digital transformation, and Industry 4.0 where CI is needed (Ottonicar et al. 2018) including the assimilation capability (Hassani and Mosconi, 2018), it would be relevant that future research could investigate the role of analytics capability on innovation performance. In link with the own-manager, future research can also study the managers' ambidexterity, which it is important for intelligence-based activities (Bordeleau et al., 2020).

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# A framework for big data integration within the strategic management process based on a balanced scorecard methodology

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**ABSTRACT** The purpose of this research is to study the impact of big data initiatives on strategic management processes. While the majority of strategic management disciplines have had research dedicated to the use of strategic management theories to understand how big data affect organizational performance, the body of research on big data lacks academic work capable of examining how to integrate big data into the strategic management process. The main contributions of this work are: (1) it highlights the strategic use of big data; (2) it analyses the main frameworks/models proposed by scholars that support the use of big data as a strategic management tool, and outlines this research gap; and (3) it proposes a new framework that integrates big data within the strategic management process based on a balanced scorecard methodology.

**KEYWORDS** Balanced scorecard, big data, big data analytics, big data framework, business intelligence, strategic management, strategic management process

## 1. INTRODUCTION

Big data (BD) is considered a key corporate asset (Court, 2015; Polese, Troisi, Grimaldi, & Romeo, 2019). The decision-making process was redefined in order to incorporate the new strategic effect of BD concepts (Polese, Troisi, Grimaldi, & Romeo, 2019). BD has become a source for innovation (Soon, Lee & Boursier, 2016) and competitive advantage (Shan, Luo, Zhou & Wei, 2018) by transforming decision-making and leading to new strategic models (Davenport, 2014; Walls & Barnard, 2020). Moreover, strategic theorists raise the need to understand how BD influences functional decisions within organizations, in order to respond to new market innovated products and the new shape of digital markets (Mazzei, & Noble, 2020).

Two drivers were identified in the course of evaluating the decision-making process effectiveness using BD: the consideration of

data as a strategic asset, and the needed operational skills to implement a BD business-oriented model. Hence, big data analytics (BDA) is the main player in the decision-making processes (Polese, Troisi, Grimaldi, & Romeo, 2019). Furthermore, Bischof et al. (2016) argue that BD still represents, for a large number of companies, a tool that can enhance their reporting and monitoring capabilities. For a limited number of companies, BD represents an opportunity to create an innovative business model. In the latter case, BD is integrated within the company's structure, processes, infrastructure, technologies and mainly the corporate strategy (Bischof, Gabriel, Rabel, & Wilfinger, 2016; Mazzei & Noble, 2017).

However, although BD efforts were focused on infrastructure, tools and technologies, many researchers highlighted the need to tackle the strategic incorporation of BD technological

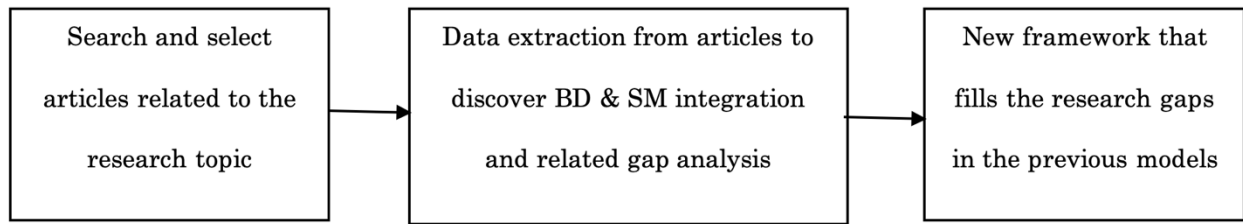


Figure 1 Steps for this study's semi-systematic literature.

developments and the link between BD and strategic management (SM) (Falsarella, Jannuzzi, & Sugahara, 2017; Mikalef, Pappas, Giannakos, Krogstie, Lekakos, 2016).

While BD technologies have been developing rapidly, academic research on the integration of BD with SM is still in its infancy (Al-Qirim, Rouibah, Serhani, Tarhini, Khalil, Maqableh, & Gergely, 2019; Mikalef, Pappas, Giannakos, Krogstie, Lekakos, 2016; Lin & Kunnathur, 2019; Shams, & Solima, 2019; Wang, Kung, & Byrd, 2018). Polese et al. (2019) argue that the strategic use of BD in the organization strategy can be implemented through the integration of related processes and technological architectures. Moreover, BD affects organizational culture; it converts firms to become data and evidence-based organizations (Braganza, Brooks, Nepelski, Ali & Moro, 2017).

Hence, considering the importance of SM to better understand the implications of BD in an organizational context, the lack of a SM framework that integrates BD to improve corporate strategy process, and the emerging role of BD as a tool for corporate innovation and transformation, the research question that guides this work is: how can BD be integrated within the SM process to guide organizations to improve their competitive advantage?

Thus, in light of this, the main goal of this study is to provide a framework that fills the research gaps in the previous models and integrates BD within the SM process.

This work is inspired by previous related studies tackling the strategic use of business intelligence (BI) and BD, including Alnoukari & Hanano (2017), Holmlund et al. (2020) and Wheelen & Hunger (2008).

The remainder of this paper is organized as follows. The next section looks at the fundamentals of BD and SM. Then a section discusses in details some of the latest academic research that highlights the use of BD with SM. Thereafter, the next section provides an overview of the frameworks/models that support the use of BD as a SM tool. Then, the paper proposes a framework named "BD-BSC"

that integrates BD within the SM process based on a balanced scorecard methodology. The final section ends this paper with some concluding remarks and future work.

## 2. RESEARCH METHOD

This study reviews literature on BD and SM processes, and analyses how BD tools and techniques can be integrated into the SM process. The research method adopted was a semi-systematic literature review, as this approach is suitable for emerging topics such as BD. The main purpose of the semi-systematic literature review is to provide an overview of the research area, as the research questions can be broad, the research strategy may or may not be systematic, and the analysis and evaluation phase can be quantitative or qualitative (Snyder, 2019). This study uses this approach to evaluate the literature on the use of BD with SM, to understand this topic in a comprehensive perspective, and to discover the research gaps on this topic. The three steps of our literature review are presented in Figure 1.

The first step was the definition of the research question as presented in Section 1. Based on the research question, the search and selection for articles was conducted based on the recent related studies' findings.

The second step was to conduct an in-depth reading and analysis of the papers to identify the contributions and the gaps for future research.

The third and last step was to suggest a new framework that fills the research gaps in the previous models and to provide a detailed description for each stage.

## 3. THEORETICAL BACKGROUND

### 3.1 Big Data

With the data explosion coming from clicks, sensors, and technological innovations, new fields become more and more necessary, especially in BD, and Internet of Things (IoT) (Alnoukari, 2020-a; Mazzei & Noble, 2020; Porter & Heppelmann, 2014; Shin, 2016).



Every person is currently considered a “data generator” and organizations become “information processors” (Mazzei & Noble, 2020). Bischof et al. (2016) argue that BD is a key technological component that can provide the basis for smart product. The key benefit of BD is that a high volume of very diverse data can be processed at a high speed (Bischof, Gabriel, Rabel, & Wilfinger, 2016). However, BD is currently generating more data than organizations are able to manage, store and analyze (Walls & Barnard, 2020).

Moving from 3 Vs into 5 Vs, and finally 7 Vs, our work updates the definition of Fosso Wamba et al. (2015) of BD to incorporate all of the 7 Vs as follows: “BD is a holistic approach to manage, process and analyze the 7 V’s (i.e., volume, variety, velocity, veracity, value, valence, and variability) in order to create actionable insights for sustained value delivery, measuring performance, establishing competitive advantages, and becoming a source of innovation.” (Alnoukari, 2020-b).

Mazzei & Noble (2020) argue that BD, with its capabilities in collecting, handling, analyzing and presenting huge amount of data, will be an evitable source for achieving and sustaining competitive advantages. However, BD can be seen as an extension to business intelligence and business analytics (Mazzei & Noble, 2020). Bischof et al. (2016) argue that BD is not a single technological set that can be bought off the shelf. It is a wide range of technological components that in combination can provide the 7Vs’ characteristics.

According to Sadovskyi et al. (2014), most scholars agree that BD enables organizations to create entirely new innovative products, and new business models. They also agree on the fact that BD helps achieving competitive advantages. Suoniemi et al. (2017) noted that BD technologies provide the ability to generate customer insight that was not previously possible. Furthermore, by analyzing fine-grained data and identifying the subtle trends and patterns in the individual customer behavior and attitudes, BD is able to provide firms with the ability to understand their customers individually, in real time, rather than segmenting them demographically. Moreover, Lin & Kunnathur (2019) argue that BD facilitates sensing by identifying market requirements and opportunities, then develops seizing by transforming these requirements and opportunities into innovative products and services, and finally supports reconfiguring by leading the organizational transformation into

BD-driven firms and reorganizing firm’s resources and competencies to maintain a competitive advantage over competitors.

The main constraint facing companies when applying BD analysis is the high volume of data collected from internal and external sources that can exceed the capacity of the company storage and tools (Polese, Troisi, Grimaldi, & Romeo, 2019).

BDA is defined as an innovative approach to deliver sustained value (Xie, Wu, Xiao & Hu; 2016), and enable competitive advantage by managing and analyzing the 5 Vs that are BD related dimensions (volume, variety, velocity, veracity, and value) (Fosso Wamba, Gunasekaran, Akter, Ren, Ji-fan, Dubey, & Childe, 2017). BDA allows firms to manage and analyze strategy through a data lens (Fosso Wamba, Gunasekaran, Akter, Ren, Ji-fan, Dubey, & Childe, 2017). Holmlund et al. (2020) argue that BDA are the approaches, tools, and methods that can help organizations to develop insights from BD initiatives in order to improve firms’ decision-making. Hence, BDA provides the organizations the ability to gain considerable value and competitive advantage. According to Walls & Barnard (2020), insights provided by BDA can improve the efficiency of the whole organization operations, as well as the strategy. From a marketing point of view, Saidali et al. (2019) argue that classical data analytics are unable to acquire valuable business insights. They propose combining BDA and classical marketing analytics in order to gain valuable and real time insights, thus improve the marketing decision-making process (Saidali, Rahich, Tabaa, & Medouri, 2019).

### 3.2 Strategic Management

A strategy is a fundamental framework through which an organization can maintain its continuity in the market, and maintain its adaptability to environment changes to gain competitive advantages (Fries, 2006; Porter, 1996; Teece, Pisano & Shuen, 1997). Traditionally, strategy can be seen as a coherent and integrative view for decision-making, or a long-term objective with action plans and priorities for the corporate resource allocation (Wells, 1998). It can also be seen as a response to external opportunities, threats, internal weaknesses and strengths. It can be also seen as a logical system that differentiates between managerial tasks at the different corporate levels: corporate, business and functional (Global Intelligence Alliance, 2004).

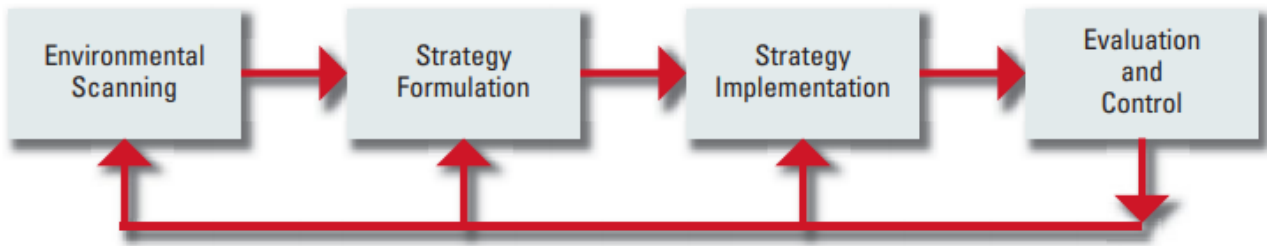


Figure 2 Basic elements of the strategic management process (Wheelen & Hunger, 2008).

Strategic management (SM) is a framework for decisions and actions that result in the formulation and implementation of plans to achieve a company’s objectives and setting long-term directions (Alnoukari, 2009; Kruger, 2010; Fries, 2006; Omalaja & Eruola, 2011). Porter (1996) summarizes the SM basic elements as a strategy process, a strategy content and a strategy context. These elements provide four essential steps for the SM process (Krishnakumar, 2015; Nedelea & Paun, 2009; Wheelen & Hunger, 2008) (Figure 2 & 3). Environmental scanning includes both internal and external scanning. Strategy formulation includes the corporate vision and mission, as well as the corporate objectives,

strategies and policies. Strategy implementation drives the strategy into action (Krishnakumar, 2015; Nedelea & Paun, 2009; Wheelen & Hunger, 2008). Finally, the strategy carry out an evaluation and control, which monitors actual performance against desired performance, and the needed corrective actions (Wheelen & Hunger, 2008; Wells, 1998).

Balanced scorecard is an important managerial tool that helps organizations to articulate their strategy into actionable initiatives and projects (Alnoukari & Hanano, 2017). In addition, it provides the roadmap for strategy implementation, execution, and monitoring and control (Olszak, 2014).

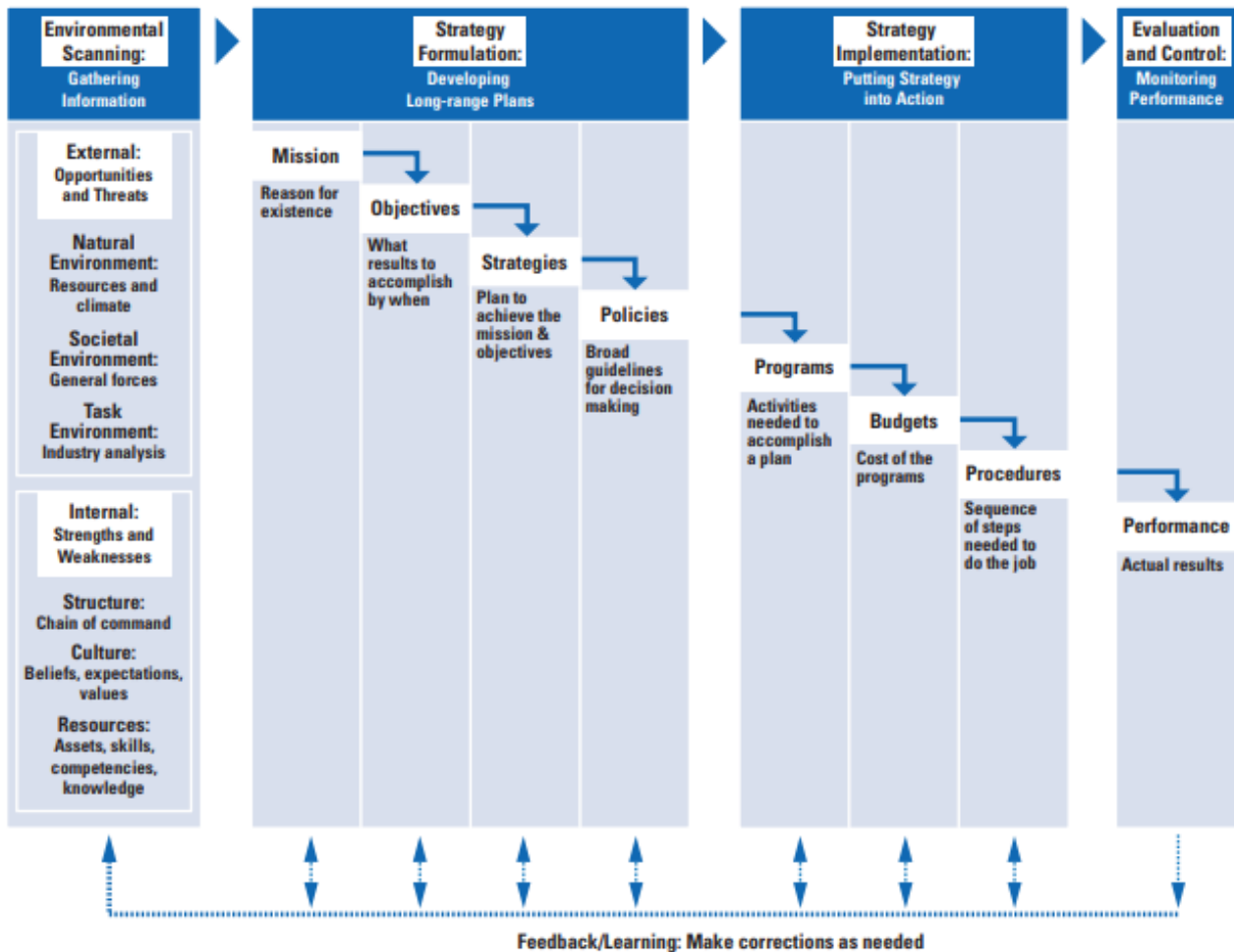


Figure 3 Strategic management model (Wheelen & Hunger, 2008).

Moreover, balanced scorecard helps top management indicating the right strategic decisions to be taken (Alnoukari & Hanano, 2017). According to Fries (2006), balanced scorecard translates corporate vision and strategy into action, information, and intelligence. Balanced scorecard considers that a corporation has four main perspectives (Kaplan, 2010): financial, customer, internal business process, and learning and growth. Financial measurements are the most important driving factors for top management to evaluate the company position in the market. Customer measurements including customer focus and satisfaction are used to evaluate the company image. Internal business process measurements allow managers to monitor and evaluate business processes and whether they cover all required and predefined customer needs. Employee learning and growth measurements are mainly used to evaluate the company commitment to its long-term strategy in terms of its human resources.

#### **4. THE USE OF BIG DATA WITH STRATEGIC MANAGEMENT**

There is a strong relationship between BD and SM (Şen, Körük, Serper, & Çalış Uslu, 2019). However, BD efforts are focused on infrastructure, tools and technologies (Mikalef, Pappas, Giannakos, Krogstie, Lekakos, 2016). According to Braganza et al. (2017), BD is more than a technology, and to be fully effective it should be incorporated into corporate strategy. Many researchers highlight the need to tackle the strategic incorporation of BD technological development, and the link between BD and SM theories (Mikalef, Pappas, Giannakos, Krogstie, Lekakos, 2016). Wang et al. (2018) address the lack of understanding the strategic implications of BD by examining the historical development, architectural design, and component functionalities of BD analytics.

New research confirms that BD will provide the opportunity to bring new theories and practices to organizational science and SM approaches. Furthermore, Mazzei, & Noble (2020) argue that strategy scholars need to comprehend and create new theoretical approaches in order to provide integration between corporate strategies and BD, and reshaping strategic decision-making. Mikalef et al. (2016) argue that decision makers do not have not enough thoughts on how BD strategy could be adopted and implemented to drive their business strategies.

Polese et al. (2019) argue that the strategic use of BD in organizational strategy can be implemented by the integration of related processes and technological architectures. However, according to Bischof et al. (2016), technology, alone, is not sufficient to achieve a strategic impact that leads to a significant strategic performance. Organizational adoption is an important factor to drive the use of BD across the entire organization (Bischof, Gabriel, Rabel, & Wilfinger, 2016). Walls & Barnard (2020) argue that BD in the lens of SM is the capability needed in order to gain organizational performance. They further argue that BDA capability is becoming a SM tool that leads an organization to incorporate innovation into business. Hence, it can be considered a business model for both innovation and a driver for innovativeness, and should be aligned with business strategy (Walls & Barnard, 2020). Lin & Kunnathur (2019) argue that organizational strategic orientation represents firms' strategic willingness and preparedness. Strategic orientation is divided into market, entrepreneurial, and technology orientations (Lin & Kunnathur, 2019). Strategic orientation is shaped by the firm's organizational culture, as it is rooted in the firm's beliefs and values. Strategic orientations contribute to organizational performance (Lin & Kunnathur, 2019). Strategic literature recognizes that business strategy should be aligned with the organizational culture, core values, systems and processes, and resources and capabilities (Barchiesi & Fronzetti Colladon, 2019).

#### **5. AN OVERVIEW OF THE FRAMEWORKS/MODELS THAT SUPPORT THE USE OF BIG DATA AS A STRATEGIC MANAGEMENT TOOL**

In the following sub-sections, the paper provides an up-to-date overview about the frameworks/models that support the use of BD as a SM tool. The frameworks/models are presented according to their publishing year.

##### **5.1 Strategic Framework for Customer Experience Insights**

Holmlund et al. (2020) built a strategic framework for customer experience (CX) management based on CX insights generated from BDA. Their framework is based on four stages including backtracking: CX and CX data, CX analytics, CX insights and CX actions.

The CX and CX data stage is based on the touchpoints within and outside the organization's control in the digital, physical and social realms. The CX data generated ranges from highly structured CX data that can be represented numerically to highly unstructured CX data that is typically contained in hard-to-count formats such as multimedia data. Furthermore, CX data can be categorized into solicited and unsolicited forms, according to the touchpoint interactions evaluation.

The CX analytics stage is based on BDA used to analyze and interpret CX data. The CX analytics stage has four levels of analysis: descriptive, inquisitive (or diagnostic), predictive, and prescriptive.

The CX insights stage is classified into attitudinal/psychographic, behavioral, and market insights. Attitudinal/psychographic insights provide knowledge about satisfaction, advocacy, and valuable efforts by organizations. Behavioral insights help organizations with the knowledge about the behavioral aspects and consequences of the CX. Market insights are extremely valuable as they are related to the knowledge about organizational performance in terms of the CX in relation to the marketplace.

The Holmlund et al. (2020) framework is developed for data-driven organizations, thus their CX actions stage is related to organizations' capabilities that could be accomplished using BDA-enabled CX insights. The dynamic system of CX actions is related to touchpoint monitoring, prioritization, adaptation, and journey design. According to Holmlund et al. (2020), touchpoint journey monitoring actions use CX insight to collect a set of touchpoint performance indicators. For example, Finning, a Caterpillar dealer, has transformed from a traditional repair service to a provider of support for customers' machines through predictive and prescriptive BDA. CX insights enable Finning to track a machine's location, prevent premature failure, prolong service life, minimize downtime, increase operator efficiency, reduce the cost of repair, and recommend solutions. Touchpoint journey prioritization uses CX insights to allocate/reallocate human, technical and monetary resources to direct the development and maintenance of any touchpoint without redesigning the whole journey each time. Touchpoint journey adaptation relies on CX insights to generate suggestions to develop touchpoints. For example, Spotify, a streaming

provider, created a personalized experience for each customer. Spotify capitalized on descriptive and predictive BDA to generate CX behavioral insights (i.e. knowledge on listening habits) and design highly personalized touchpoints. Spotify sent each customer a personalized email with information about their listening habits. These actions allowed Spotify to create personalized touchpoints in each customer's journey by generating custom playlists.

Touchpoint journey design uses CX insights to design potential journey offerings and distribute clear requirements across different organizational functions. For example, John Deere, an agricultural equipment manufacturer, capitalized on BDA and equipped its machines with sensors that allowed its customers to access and analyze their machine data, benchmarking it against other machines and combining it with historical data in real time and for free. Thus, John Deere introduced new touchpoint design that changed its customers' entire journey. Currently, the myJohnDeere.com platform is opened to suppliers, retailers, and software developers. John Deere transitioned from a manufacturing business model to a platform-centric model, and thus achieved innovation and revolutionized the agriculture industry.

## **5.2 A Framework for Business Process Data Management based on a Big Data Approach**

Hassani & Gahnouchi (2017) proposed a framework for business process data management based on a BD approach. It intends to combine the two perspectives of business processes and BD. The main goal of this framework is to ensure business process improvement using BD.

In order to achieve the combination of business processes and BD, this framework provides the following fundamental steps. First, it starts with process (re)design based on BDA by modeling processes to clearly describe the business scenario, then it carries out process configuration with BD generation tools in order to customize the process with external information systems. Once the process has been designed and configured, it is deployed during the process execution. Process analytics is required after the process execution to analyze process functionality.

### 5.3 Conceptual Research Framework

The conceptual research framework is based on the resource-based view and dynamic capability view SM theories, and management information system literature (Mikalef, Pappas, Giannakos, Krogstie, Lekakos, 2016). The proposed framework provides managers and decision-makers with the basis on how to increase business value and competitive performance using BD and business analytics.

According to Mikalef et al. (2016), the IT resources including infrastructure, human skills and knowledge, relational resources and data must be put into directed initiatives in order to get a competitive edge. Hence, the firm must have the IT competencies to transform individual IT resources into IT-enabled dynamic capabilities that include sensing, learning, coordinating, integrating and reconfiguring. IT competencies are the sources used to transform BD IT resources into competitive assets. Thus, the conceptual research framework can help determining the business value of BD.

### 5.4 The Marketing Mix Framework for Big Data Management

Fan et al. (2015) proposed the marketing mix framework that relies on marketing intelligence. This framework identifies the data sources, methods and applications related to marketing's most important perspectives: people, product, place, price, and promotion.

The proposed framework provides guidelines for organizations aiming to apply marketing intelligence to meet their strategic marketing goals. This framework is based on the five marketing mix perspectives. The data is collected from various sources, then converted into actionable marketing knowledge using a variety of analytics methods, and finally utilized to support marketing intelligence applications. The data in this framework is collected using various methods including demographics, social networks, customer review, clickstream, product characteristics, product category, promotional data, transactional data, location-based services, and surveys. The methods utilized in the proposed framework are based on data mining including association, classification, clustering and regression. Different applications are applied according to each of the five marketing mix perspectives, including customer segmentation and profiling, product ontology and reputation, promotional marketing analysis and

recommendation system, pricing strategy analysis and competitor analysis, and location-based advertising and community dynamic analysis. Product reputation management is a marketing intelligence tool that uses text-based reputation data from the web, in addition to the graphical images of products posted on the web. This tool is using an automated product ontology mining method that can build product ontologies based on textual descriptions of products extracted from social media. Then, these product ontologies can be used to support product reputation applications. Location-based advertising is an important marketing intelligence tool. It enables customers to get timely advertisements or product recommendations based on their current locations, and their future moves to other locations. Community dynamic analysis provides firms with the ability to predict their changing product preferences. As a result, firms can develop an effective marketing strategy based on the time and location dynamics of a group of their customers (Fan, Lau, & Zhao, 2015).

### 5.5 9S Framework

According to Lake & Drake (2014), the 9S framework (BD Wheel) helps firms and managers to understand the impact of BD on business. Furthermore, the 9S framework helps view the interplay between data and analytics from different technical and managerial strategic directions (Al-Qirim, Rouibah, Serhani, Tarhini, Khalil, Maqableh, & Gergely, 2019). Statistical thinking is at the center of the 9S wheel since it is the common perspective across all other aspects of BD. The remaining 8 Ss are strategy, structure, style, staff, synthesis, systems, sources, and security. Strategy and structure are tightly coupled to highlight the mutual impact of organizational structure on the organization's strategy (Al-Qirim, Rouibah, Serhani, Tarhini, Khalil, Maqableh, & Gergely, 2019).

### 5.6 Analytical Discussion

The Holmlund et al. (2020) strategic framework is based on CX insights generated from BDA. This framework includes four stages based on CX data: BD acquisition, BDA, BD insights and BD actions. Although the Holmlund et al. (2020) strategic framework was built for CX management, it can be applied to other types of applications as well. Hence, it can use any type of data including financial, talent and business process data. However,



Hassani & Gahnouchi's (2017) framework's intent is to analyze and improve business process functionality using BD. The Mikalef et al. (2020) framework's focus is to increase business value and competitive performance using BD and BDA. It highlights the mutual effects of IT competencies on organizational capabilities and business strategy. The Mikalef et al. (2016) framework helps determining the business value of BD. Fan et al. (2015) proposed a framework based on marketing mix and marketing intelligence. It can be considered a guideline for organizations aiming to apply marketing intelligence to meet their marketing strategic goals. This framework can be extended to use other types of data, and evaluate all their strategic goals including financial, talent and business processes. In the same vein, the 9S framework helps understanding the impact of BD on business. Moreover, it highlights the mutual impact of organizational structure on the organization's strategy (Al-Qirim, Rouibah, Serhani, Tarhini, Khalil, Maqableh, & Gergely, 2019).

Although all these frameworks support the use of BD as a SM tool, the main research gap in this domain is that they are unable to integrate BD within the SM process. This issue provides reason to suggest the BD-BSC framework that is described in the following section.

## 6. BD-BSC: A FRAMEWORK FOR INTEGRATING BIG DATA WITHIN THE STRATEGIC MANAGEMENT PROCESS

BD-BSC effectively integrates BD within the strategy development process. The main strategic themes are incorporated and improved in order to strengthen the organization's long-term success (Alnoukari & Hanano, 2017). This could be achieved when the strategic themes deliver greater values to customers at lower cost. When these themes are properly implemented, organizations could increase their profitability results. Therefore, strategic themes could be used to observe markets and competitors, and enable top management to continuously adjust their strategies when the environment changes (Alnoukari & Hanano, 2017).

The following sub-sections provide detailed description about our proposed BD-BSC framework (Figure 4). This framework is based on the SM model (Wheelen & Hunger, 2008) and BSC-BI framework (Alnoukari & Hanano, 2017). The BSC-BI framework was built to

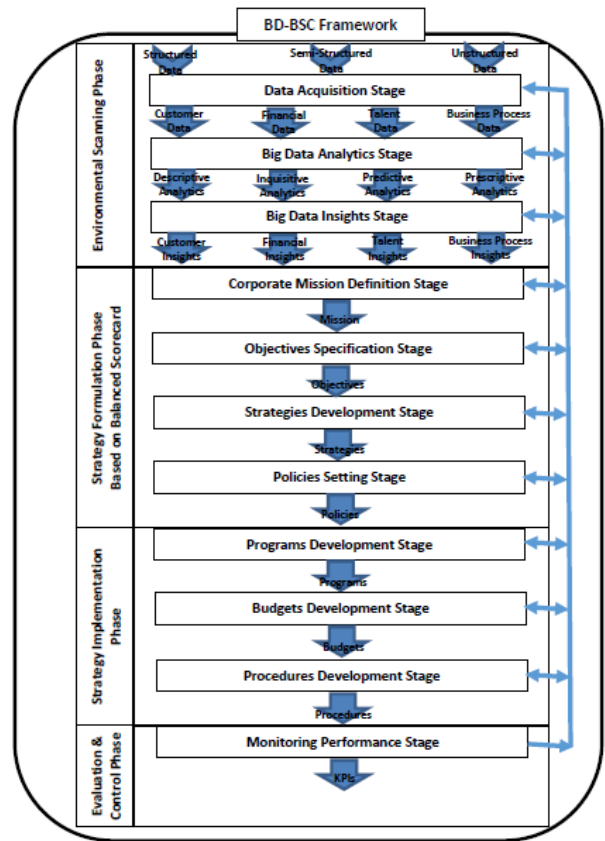


Figure 4 BD-BSC framework.

integrate business intelligence within the SM process (Alnoukari & Hanano, 2017). The BD-BSC framework follows the four main phases of the SM process: environmental scanning, strategy formulation, strategy implementation, and evaluation and control. The BD-BSC framework integrates the BD process's main stages including data acquisition, BD analytics and BD insights within the first phase to support environmental scanning and provide the four main inputs for balanced scorecard methodology, customer insights, financial insights, talent insights and business process insights. The BD-BSC framework includes a feedback/learning process. Arrows coming out of each stage of the framework take information to each of the previous stages. Framework users often must go back to revise or correct decisions made earlier (Wheelen & Hunger, 2008). For example, poor performance (as measured in evaluation and control) usually indicates that something has gone wrong with either strategy formulation or implementation. It could also mean that a key variable, such as a new competitor, was ignored during environmental scanning and assessment (Wheelen & Hunger, 2008).

## 6.1 Environmental Scanning Phase

The environmental scanning phase includes both internal and external scanning (Global Intelligence Alliance, 2004). External scanning focuses on competitors, customers, and suppliers in addition to technology and political forces, whereas internal scanning focuses on the corporate structure, culture and resources (Global Intelligence Alliance, 2004). The main purpose of the environmental scanning phase is to identify the strategic factors (Wheelen & Hunger, 2008). The traditional way to conduct environmental scanning is through a SWOT analysis (Wheelen & Hunger, 2008). However, the BD-BSC framework uses BDA and BD insights to conduct environmental scanning based on the structured and unstructured data from the data acquisition stage.

In the following sub-sections, a detailed description is provided for the three BD-BSC environmental scanning stages: data acquisition, BD analytics, and BD insights.

### 6.1.1 Data Acquisition Stage

According to Jin & Kim (2018), BI's "raw data" has been expanded into "Big Data" due to advanced technology capability. BI focuses primarily on structured and internal enterprise data, overlooking valuable information embedded in unstructured and external data (Marín-Ortega, Dmitriyevb, Abilovb, & Gómezb, 2014). This could result in an incomplete view of the reality, and biased enterprise decision-making (Llave, 2018; Ram, Zhang, & Koronios, 2016; Marín-Ortega, Dmitriyevb, Abilovb, & Gómezb, 2014). Hence, the BD 3Vs definition tackles these concerns. The three Vs are volume, variety, and velocity. The main source of this exponentially increased data is coming from the unstructured data of social networks, blogs, text messages, videos and audio (Braganza, Brooks, Nepelski, Ali, & Moro, 2017). Variety refers to the different types of data that can be manipulated using BD technologies (Faroukhi, El Alaoui, Gahi, & Amine, 2020). Structured, semi-structured, and unstructured data types are currently included under BD processes (Faroukhi, El Alaoui, Gahi, & Amine, 2020). Unstructured data is the challenging key that allows BD to overcome the main deficiencies of the traditional methods.

Holmlund et al. (2020) employs solicited and unsolicited data for interaction evaluation. Answering a survey, writing an invited review, or participating in a feedback workshop are some kinds of solicited data. However,

customer feedback through emails, social media commands, or face-to-face interactions are examples of unsolicited data.

### 6.1.2 Big Data Analytics Stage

BDA can enhance the comprehension of business opportunities, and give better insight into customer behavior and services/products effectiveness (Fan, Lau, & Zhao, 2015; Polese, Troisi, Grimaldi, & Romeo, 2019). Fan et al. (2015) argue that analytical models based on single data sources may provide limited insights that consequently lead to biased business decisions. Using multiple and heterogeneous data sources can provide a holistic view of the business and leads to better decision-making. Furthermore, they argue that BDA supports marketing intelligence by providing the ability to monitor customer opinions toward a product, service, or company using social media mining techniques. Customer opinion mining is a key factor for strategic marketing decisions that can be based on multiple data sources including social media, transactions, surveys, and sensors, which can be applied to discover marketing intelligence. Ram et al. (2016) listed five main advantages when applying BDA: increasing data visibility, improving organizational performance, improving meeting customers' needs, revealing valuable insights, and revealing new business models, products and services.

BDA helps executive managers to plan an organization's short-term and long-term goals (Palem, 2014). BDA has been successfully used in many areas. Different analytics have achieved a great success including in usage-based insurance, predictive maintenance, epidemic outbreak detection, and sentiment analysis (Palem, 2014).

BDA adds additional characteristics to the conventional data analysis. These include innovated technologies and skills that enable organizations to use deep analytical capabilities, and integrate a wide range of data types from a large number of relatively unreliable data source in order to provide a meaningful and reliable source of business information (Sadovskiy, Engel, Heining, Böhm, & Krcmar, 2014).

The BDA stage in our BD-BSC framework has four levels of analysis: descriptive, inquisitive (or diagnostic), predictive, and prescriptive. Descriptive BDA is related to "What happened?" answers. These kinds of analytics help to further describe the situation

analysis. Typical examples include descriptive statistics using charts, cross tabulation, or clustering graphs. Inquisitive DBA is related to “Why did things happen?” answers. These kinds of analytics help validating research hypotheses, determining causation, and identifying variables to achieve desired results. Typical examples include statistical inference techniques or factor analysis. Predictive BDA is related to “What could happen?” answers (Waller & Fawcett, 2013). These kinds of analytics help predicting future trends. Typical examples include forecasting models, classification models, or neural networks. Prescriptive BDA is related to “What should happen?” answers. These kinds of analytics help providing quantifiable answers when solving a problem. Typical examples include optimizations modeling, queuing modeling, or simulations (Holmlund, Van Vaerenbergh, Ciuchita, Ravald, Sarantopoulos, Villarroel-Ordenes, & Zaki, 2020).

After generating BDA, the BD-BSC framework is able to generate different insights including market, behavioral and attitudinal insights.

### 6.1.3 Big Data Insights Stage

BD insights refer to the value and benefits gained from BD (Chen, Mao, & Liu, 2014). According to Holmlund et al. (2020), BD insights can be developed using BDA in order to improve a firm’s decision-making. Similarly, Walls & Barnard (2020) stated that insights provided by BDA could improve the efficiency of the organization’s full operations, as well as the strategy.

Due to its high importance, Value is one of the new Vs, most recently added to the BD definition (Erevelles et al., 2016). Wang et al. (2018) stated that the word “big” in BD does not only imply size, but rather the ability to produce insights, and manage complex types. Hence, BD insights close the knowledge and time gaps of the traditional methods.

Walls & Barnard (2020) highlight the need to structure and manage BD initiatives in order to have insights from data, and the ability to act quickly to achieve a positive impact on organizational performance.

Dubey et al. (2018) consider BDA capability to be one of the organizational capabilities that provides organizations with the ability to produce insights that enable the data-driven decision-making process by analyzing its huge data with non-traditional methods using BD tools and techniques. Moreover, Akter et al.

(2016) argue that BDA capability provides organizations with the ability to deliver insights using data management, technology, and talent capability to transform business for a competitive advantage and gain business value.

Polese et al. (2017) noted that BDA provides the ability to show behavioral insights about customers. These can be turned into strategic advantages (Şen, Körük, Serper, & Çalış Uslu, 2019). Moreover, Saidali et al. (2019) suggest combining BDA and classical marketing analytics in order to gain insights that are more valuable, and improve the marketing decision-making process. Furthermore, Suoniemi et al. (2017) argue that BD resources improve a firm’s ability to better innovate and optimize any marketing elements in the mix with BD predictive capability. Hence, firms have the ability to get more insights into customer behavior, and also have the ability to tailor person-, context- and location-specific offers, and more in real time. Holmlund et al. (2020) suggest a strategic framework for customer experience management based on customer experience insights generated from BDA. Holmlund et al. (2020) noted that the majority of organizations still face difficulties in generating relevant customer insights. They further argue that data and information cannot, themselves, provide customer insights. Holmlund et al. (2020) found that customer insights could be generated by data transformation through analysis and interpretation: values are gained through the ability to drive actions.

Holmlund et al. (2020) classified customer experience insights as attitudinal/psychographic, behavioral, and market insights. Attitudinal/psychographic insights provide knowledge about satisfaction, advocacy, and valuable efforts by organizations. Behavioral insights help organizations with the knowledge about the behavioral aspect and consequences of the customer experience. Market insights are extremely valuable as they are related to the knowledge about organizational performance in terms of the customer experience in relation to the marketplace.

In contrast, other scholars argued that it is difficult for organizations to understand how to leverage BD insights in order to create value (Erevelles, Fukawa, Swayne 2016; Walls & Barnard, 2020). Even though an organization may extract BD insights successfully, there is no guarantee that they are able to utilize these

insights effectively (Erevelles, Fukawa, Swayne 2016; Walls & Barnard, 2020).

The BD insights stage in our BD-BCS framework is considered the core engine to deliver the insights needed for balanced scorecard implementation. Customer insights (Holmlund, Van Vaerenbergh, Ciuchita, Ravald, Sarantopoulos, Villarroel-Ordenes, & Zaki, 2020), financial insights (Costa, Dantas, Santos, Medeiros, & Rebouças, 2018), talent insights (Nocker & Sena, 2019), and business process insights (Al-Qirim, Rouibah, Serhani, Tarhini, Khalil, Maqableh, & Gergely, 2019; Braganza, Brooks, Nepelski, Ali, and Moro, 2017; Hassani & Gahnouchi, 2017) are delivered in this stage. They are all considered inputs into the strategy formulation using a balanced scorecard in the next phase.

## 6.2 Strategy Formulation Phase

The strategy formulation phase includes defining the corporate mission, specifying achievable objectives, developing strategies and setting policy guidelines (Global Intelligence Alliance, 2004; Kaplan, 2010; Wheelen & Hunger, 2008). Firms with mission statements containing the customers served explicitly and technologies have significantly higher growth than those firms without such statements (Wheelen & Hunger, 2008). BD insights provided in the previous phase support corporations defining better mission statements. Fulfillment of the corporate mission could be achieved by developing corporate objectives (Kaplan, 2010; Wheelen & Hunger, 2008). Good corporate objectives should state what is to be accomplished and by when (Kaplan, 2010; Wheelen & Hunger, 2008). Quantified corporate objectives are better and could be measured in later phases. BDA and BD insights help organizations specify quantified corporate objectives. Corporation mission and objectives can be achieved by creating a comprehensive master plan or strategy (Kaplan, 2010; Wheelen & Hunger, 2008).

Three types of strategies should be developed to provide an overall strategic direction: corporate, business and functional strategies. A corporate strategy provides an overall direction for the company and management of its businesses (Wheelen & Hunger, 2008). Typically, the corporate strategy fits within the following three main categories: stability, growth and retrenchment (Wheelen & Hunger, 2008). The business strategy usually occurs at the business unit or

production level. The business strategy emphasizes the company's improvement in the competitive position of its products or services (Wheelen & Hunger, 2008). Business strategies may fit within two main categories, the competitive and cooperative strategies (Wheelen & Hunger, 2008). Business strategies provide companies with the ability to enhance their competitive advantages. Functional strategy is usually taken by a functional area to achieve business and corporate objectives by maximizing resource productivity (Wheelen & Hunger, 2008). Corporate, business and functional strategies form a hierarchy of strategy that complement and support one another. Functional strategies support business strategies, which in turn, support the corporate strategy or strategies. BDA and BD insights help organizations developing realistic corporate, business and functional strategies based on data mining and knowledge discovery algorithms. Policy is a decision-making guideline that links the strategy formulation and its implementation (Wheelen & Hunger, 2008).

The BD-BSC framework's strategy formulation phase is based on a balanced scorecard methodology. Using customer insights, financial insights, talent insights, and business process insights delivered from the previous phase, the BD-BSC framework supports organizations to formulate corporate missions, specify corporate objectives, develop strategies at all levels, and set policy guidelines for the implementation phase.

## 6.3 Strategy Implementation Phase

The strategy implementation phase is the process by which the strategies and policies are translated into actions, by developing programs, budgets and procedures (Global Intelligence Alliance, 2004; Kaplan, 2010; Wheelen & Hunger, 2008).

Strategy implementation may require overall changes in corporate culture, structure and management system (Wheelen & Hunger, 2008). The implementation phase is usually conducted by middle- and lower-level managers under the top management's review and guidance. Hence, the implementation phase may involve day-to-day decisions in resources allocation (Wheelen & Hunger, 2008). The programs provide all the needed activities and steps to accomplish the operational plans (Wheelen & Hunger, 2008). Budgets list the detailed cost of each program, and thus provide the basis to measure profit

performance (Wheelen & Hunger, 2008). Finally, procedures provide all the necessary details to conduct a particular task or job (Wheelen & Hunger, 2008).

The BD-BSC framework's strategy implementation phase translates corporate strategies and policies developed in the previous phase into programs, budgets and procedures, based on the balanced scorecard's four perspectives. Strategic plans are executed to provide the necessary implementation's activities.

#### 6.4 Evaluation and Control Phase

The evaluation and control process measures performance results and compares them with the desired performance (Global Intelligence Alliance, 2004; Kaplan, 2010; Wheelen & Hunger, 2008). Managers at all levels use the resulting performance measures to take corrective actions and resolve problems (Wheelen & Hunger, 2008). Based on performance results, management may need to adjust its strategy formulation and/or implementation (Wheelen & Hunger, 2008).

The BD-BSC framework's evaluation and control phase is based on Key Performance Indicators (KPIs) to make comparisons between desired and achieved performance measures. KPIs are used for the analysis of reaching goals and objectives (Alnoukari & Hanano, 2017). BDA contribute to SM as they measure the organization's performance. Balanced scorecard is used to indicate whether BDA match critical performance indicators.

### 7. CONCLUSIONS AND DIRECTIONS FOR FUTURE RESEARCH

Our goal with this paper was to signal the importance of BD integration within the SM process. Hence, we provided a comprehensive and integrative framework in which BD, BDA and BD insights are used through balanced scorecard lenses to support strategy formulation and implementation.

Throughout this paper, we emphasized that BDA and BD insights could provide the needed base for strategy development. Traditional methodologies were based on SWOT analysis and other strategic tools to provide clear environmental scanning. BDA and BD insights enhance the environmental scanning process, and provide accurate insights that help formulate better corporate strategies.

In terms of implications, we integrated the literature on BD, SM and balanced scorecard and highlighted how an organization could

apply these different technologies and methodologies to improve the development of corporate strategy. Research at the intersection of BD and SM is in its early development phase (e.g., Al-Qirim, Rouibah, Serhani, Tarhini, Khalil, Maqableh, & Gergely, 2019) and we hope that our integrative framework can help both practitioners and researchers reflect on the growing complexities of using BD within SM.

To conclude, we have outlined some avenues for future research in this area. We propose some opportunities for future studies in this promising research area. Future studies could focus on the implementation of a BD-BCS framework in different areas including telecommunication, banking and education. Other studies could tackle the use of other SM tools with BD.

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## Competitive intelligence approach for developing an e-tourism strategy post COVID-19

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**ABSTRACT** The COVID-19 pandemic has brought many fundamental changes in running a tourism business. Many countries need to reformulate their post-19 strategy so that the tourism sector will revive. This study aims to formulate a strategy for developing e-tourism by utilizing information technology. The method used is a competitive intelligence approach. This research takes samples from tourist destinations in Indonesia. The results of this study indicate that the right strategy can encourage the tourism industry to grow back in the post-COVID-19 period. The resulting strategy is based on campaign, content, community, cooperation, and competitiveness. These five basic strategies are implemented with an e-tourism model and a simple management pattern utilizing information technology. The results of this research can have implications for the formulation of e-tourism policies and produce recommendations for policymakers.

**KEYWORDS** Competitive intelligence, e-Tourism, post COVID-19

### 1. INTRODUCTION

The COVID-19 pandemic, which is still endemic, has forced the world to adapt to limited circumstances. This limitation can be seen from the closure of access and exit to countries with high rates of transmission. This majorly impacts countries with a lot of tourism potential, but decreasing foreign tourist arrivals. Measures to overcome the COVID-19 pandemic have been carried out by vaccination in several tourist destination countries. However, the level of tourist visits has not increased significantly. This can be seen from the World Tourism Organization report (UNWTO) which states that there has been a decrease of 74% in tourism globally. This decline occurred in all regions, including Asia Pacific (84%), Middle East and Africa (75%), Europe (70%), and even the Americas (69%)

(Calderwood & Soshkin, 2019). A specific example was in Portugal, where during 2019 tourism contributed 8.7% of GDP with an increase of 7.9% compared to the previous year, but in March 2020 it experienced a decline of 50% and even stopped completely since May 2020 (Camarinha et al., 2021). This also occurred in many European countries which are world tourist destinations (Salehnia et al., 2020).

This decreasing condition has various complex derivative problems such as decreased occupancy rates for hotel rooms, fewer bookings of travel tickets to tourist destinations, selling less merchandise, and increases in unemployment due to layoffs in the tourism business. This has a systematic impact and is very influential on the level of welfare. Although vaccination has been carried

out in tourist destination countries, it has not shown a significant increase in the level of tourist visits. In addition, in several tourist objects, there have been strict applications of health protocols, but this has not been able to encourage an increase in the number of tourists expected. The application of this health protocol actually increases the operational costs of a tourist attraction. Thus, it can be seen that the COVID-19 pandemic has had a systematic impact on the tourism industry.

Solutions to overcome these problems include integrating IT and business processes to address challenges in the tourism industry as a result of COVID-19 (Munas & Arun, 2021). IT and tourism integration that produces smart tourism with products such as AR (augmented reality) and VR (virtual reality) services are believed to be a solution to the challenges of tourism during the COVID-19 pandemic (Lee et al., 2020). In addition, another solution to this problem could be the use of a combination of service-oriented architecture (SOA) and artificial intelligence (AI), which can be created by SONIA, an integrated tourism system (Qomariyah et al., 2020). There is also a model that relies on inbound marketing strategies, for example, the Costa del Sol Planning & Tourism Board can produce a list of loyal and interested customers to come to their tourist attractions (Sánchez-Teba et al., 2020). There is also a solution that includes creating a framework for building tourism industry resilience consisting of a government response, technological innovation, local interests, and customer and employee confidence. This framework is believed to be able to create a resilient tourism industry in the world of the global economy (Sharma et al., 2021). These solutions have drawbacks when applied to a tourism industry that does not have an adequate business strategy. This study will discuss how to build a post-COVID-19 tourism development strategy that has competitiveness based on information technology. This strategy is built using a competitive intelligence approach.

This study aims to produce a strategy for developing e-tourism post-COVID-19. This strategy is produced with a competitive intelligence approach, using the variables of destination, community, promotion, and competitiveness by considering the strengths, weaknesses, opportunities available, and challenges that can threaten the sustainability of the tourism industry.

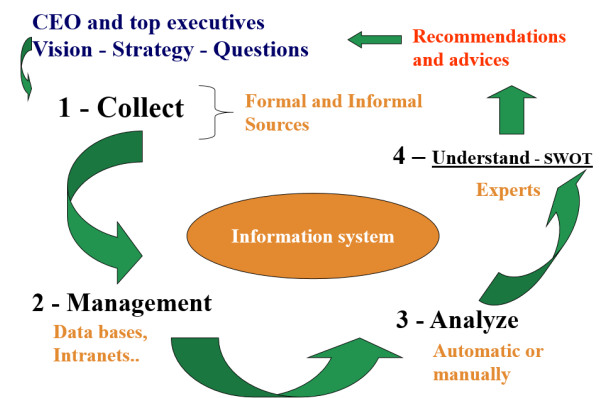


Figure 1 Competitive intelligence cycle.

## 2. METHOD

This study uses a competitive intelligence approach. This approach can be seen in Figure 1. Figure 1 describes the competitive intelligence approach in the form of a cycle which can be called the competitive intelligence cycle.

The steps in this cycle can be explained in the following steps.

### 2.1 Collection Strategy

The collection strategy utilizes a literature study. This helps to develop a strategy and formulate an implementation model that will be outlined below. This study is complemented by observations on the implementation of tourism, which were sampled in the city of Manado during the pandemic, late 2019 to mid-2021. As a medium-sized city, Manado tourism has boomed with an increase of 1000% in foreign tourists. The city of Manado is growing in tourism because it has beautiful landscapes that spoil the eyes. The condition of tourism in Manado, which had just begun to be commercialized, fell due to the pandemic. Tourist attractions closed and a prohibition on foreign and domestic visits was implemented.

### 2.2 Information Gathering

The analysis was carried out based on information obtained from formal and informal information. Formal information was obtained from journals on Google Scholar, Elsevier, Springerlink, ResearchGate, and IEEE concerning e-tourism and competitive intelligence. The study also used tourism publications from the city of Manado. Informal information was drawn from direct observations at tourist destinations, and from travelers, cultural communities, and MSMEs related to tourism with Manado City.

## 2.3 Evaluation and Analysis

The evaluation that was done went through validity and reliability testing and is deemed worthy of being analyzed in the next stage. This is to get intelligence so that it can be a basis for developing an e-tourism strategy in the post-COVID-19 era.

## 2.4 Presentation

The presentation was done by analyzing strength, weakness, opportunity, and threats with existing conditions so that we can get a strong opportunity strategy, a strategy of weakness opportunity, a strategy of strength threats, and strategies of weakness threats. Its application is also described in the workflow for the tourist life cycle and suppliers' processes. Using a mind map, the strategies obtained when implemented in e-tourism are also mapped.

## 3. RESULT AND DISCUSSION

The results of this study describe the strategy for developing e-tourism. Building a strategy begins by analyzing internal conditions (strengths and weaknesses) and external conditions (opportunities and threats). This internal condition is needed to find an appropriate strategy by utilizing existing strengths so that it can be superior in absolute and comparative terms while identifying weaknesses so that a strategy can be formulated to reduce losses that will arise. Analysis of external conditions is very useful for mapping opportunities that can be exploited so that they can achieve strong

competitiveness by paying attention to emerging threats. Mapping threats is very important to analyze the tourism industry. Internal and external conditions are shown in Table 1.

Table 1 explains that the internal factors in the form of high government support, the abundance of human resources as a driving force, policies and laws made to support tourism, and various tourism destinations are the strength of e-tourism. On the other hand, tourism management and lack of professionalism, coordination, and synchronization between related agencies, financial support and high use of ICT financing, and local tourist culture are still threats to the development of e-tourism. However, the opportunities created by the increasingly widespread use of the internet, the increasing trend of e-tourism, global programs that encourage the development of e-tourism, and the increasingly high growth of social media are supporting external factors. Threats arising from the ongoing COVID-19 pandemic, economic recession, competition for tourism between countries and even between regions, the uneven distribution of internet infrastructure, and the stability of security in tourist destination areas are external factors that need to be considered as well. These factors are used as the basis for formulating a development strategy for post-COVID-19 e-tourism.

The development strategy for post-COVID-19 e-tourism can be formulated based on the identification of internal and external factors. For this identification, the following strategies are developed.

Table 1 Identification of strength, weakness, opportunity, threats in e-tourism.

	Internal Factors		External Factors	
	Strength	Weakness	Opportunity	Threats
e-tourism helps make promotion more global	Poor management, especially e-tourism	High cost of using ICT mastery level	The increasing trend of tourism development	Increasing competition in world tourism
Government support for tourism is high	The level of mastery and professionalism in implementing e-tourism is still low	Coordination, integration, and synchronization between agencies in carrying out promotions through e-tourism have not yet been implemented	The development of ICT technology to support e-tourism is getting better	Internet network limitations
Human resources in large quantity			The growing number of internet users	Inflation and global recession
Supporting policies and laws for tourism			e-tourism in Indonesia is increasingly showing its stretch	Stability and security of tourist destination areas
Tourist destinations in the form of natural potential and high cultural diversity	e-readiness that hasn't materialized yet	Low financial support	some programs can be processed globally into support, especially in the application of e-tourism	Digital e-tourism security.
	The culture of local tourists who are still not aware of the sustainability of a tourist destination	The culture of local tourists who are still not aware of the sustainability of a tourist destination	The growth of social media increases tourism promotion with photo and video content from users	The ongoing COVID-19 pandemic
	Management of a tourist destination that does not yet have hygienic standards, especially in the face of a pandemic			



## **SO – Strategy**

- Develop a brand that is based on local wisdom uniquely and attractively, so that it is easily recognized and easily associated as a characteristic of Manado city tourism.
- Build a strong image of a tourist destination thereby increasing attractiveness. Building this image is done by offering tourist attractions that can stimulate the arrival of foreign tourists. In building this image, all tourism actors from upstream to downstream will collaborate to actively establish communication to develop the image that has been developed.
- Build synergy of e-tourism networks between tourism websites and communities.

## **ST – Strategy**

- Sustainable global promotion while building synergies between tourist destinations and surrounding areas. In this case, Manado City, which is the provincial capital as a hub, can increase or promote tourist destinations in other regencies/cities in North Sulawesi Province.
- Support from the government that encourages communities to build and support tourism activities in the city of Manado. This community is based on local wisdom, such as religious celebrations which are used as annual events, and tourist attractions organized by the government and supported by Manado City residents, such as e.g., Thanksgiving.
- Enforce law enforcement for lawbreakers who infiltrate internet sites.
- Conducting comparative studies with other tourist areas to increase the competitiveness of tourism in the city of Manado.
- Ensure the implementation of vaccinations primarily for tourism actors from upstream to downstream to be carried out carefully.

## **WO – Strategy**

- Encouraging and strengthening local tourism (community-based tourism, CBT) so that people can attract investors

and use the internet as a promotional medium (e-CBT).

- Collaborate with academic practitioners to increase e-readiness and enhance local tourism culture using various instruments such as village funds, village funds, CSR funds, and community service.
- Implementing standardization of management of tourism destination areas, especially regarding the implementation of hygienic levels that must be maintained.

## **WT – Strategy**

- Empowering the community with the development of CBT, to generate competitive local products to be promoted via the internet.
- Achieve a common vision, especially at the Culture and Tourism Office as a bridge with other agencies, to increase the competitiveness and professionalism of tourism, especially e-tourism in Manado City.
- Ensure that the health protocol is still implemented by deploying a COVID-19 task force to continue to advise and warn all tourism actors to comply with existing regulations until COVID-19 cases around the world become zero.

### **3.1 Strategy e-tourism (5C)**

The strategies that have been formulated can be developed for derivative strategies that are implemented in e-tourism, focusing on the 5Cs. In Figure 2 it can be seen that the resulting strategy can be in line with utilizing suppliers' processes. This shows that the 5C strategy can encourage demand, namely customers (users of tourism services) to grow so that they can move service providers to increase the supply of goods and services to ensure the best service is available.

The 5C strategy can be described in the following.

#### **3.1.1 Campaign / Promotion**

The campaign plays an important role in the promotion of a tourism destination, this involves branding tourist spots in order to strengthen the image for tourists who are interested in visiting the area. This can be done through various media to build brand awareness to help improve the destination's image globally. It is suggested to advertise on

the internet on well-known websites that have links to e-tourism sites that they wish to develop. When this attracts visitors to a tourism website, it can increase the number of hits on the developed site. Increasing the number of hits will help search engine optimization (SEO) so that the site will appear among the top in search keywords on the internet. The ranking obtained in search engines will be improved because the search engine search method will rank the sites that are referred to the most alongside the most relevant keywords desired by users.

### 3.1.2 Content

Content includes interactive and informative tourism destination information. With informative content, tourists who want to know a tourist destination can easily find out which places they want to visit. You can also update information on the online encyclopedia site so that users who want to find information about these keywords can be helped by their explanations there. Regular updates on the website further enhance the existing content. e-Community Base Tourism (e-CBT) can also be added here. Community lifestyles, local wisdom, promotion of local products belonging to the surrounding community, and handicrafts from small and medium enterprises owned by the community can be promoted through this tourism website. This existing content comprehensively raises all the potential that can be the main key to increasing local tourism. Interactively the use of 360 video technology, virtual reality, and

augmented reality can also be raised in content to sell a tourist destination. After all these things are discussed, the health protocol should still be applied regularly, in the form of interesting videos and infographics.

### 3.1.3 Community

Community can be built through blogs, social media, e-CBT, forums, or social travel sites. Maintaining these sites can be done by providing comments with various additional information or other things that can raise the image of a destination area. Regular publishing of an e-newsletter can provide additional information about a tourist spot. Word of mouth with the help of social media sites, blogs, vlogs, and podcasts will provide additional positive information that will increase the attractiveness of tourist areas. Meanwhile, developing e-CBT can develop local cultural events, such as festival activities that have taken root in local communities.

### 3.1.4 Cooperation

It is important to establish cooperative relationships with external tourism service providers, such as travel agents, hotels, resorts, dive operators, transportation, local governments and tourist destinations, and telecommunications operators (cellular or internet service providers). Universities can also provide various sources or activities that can support tourism, such as seminars or activities related to tourism. Local governments can work together to build

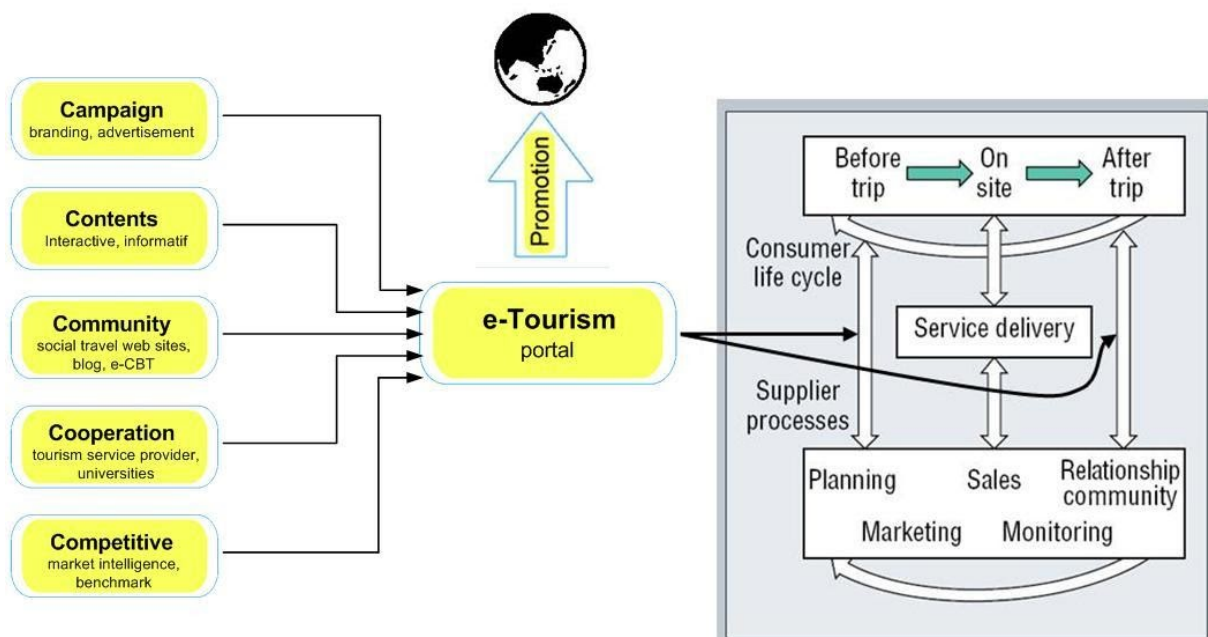


Figure 2 Implementing an e-tourism strategy in the tourist life cycle and suppliers' processes.

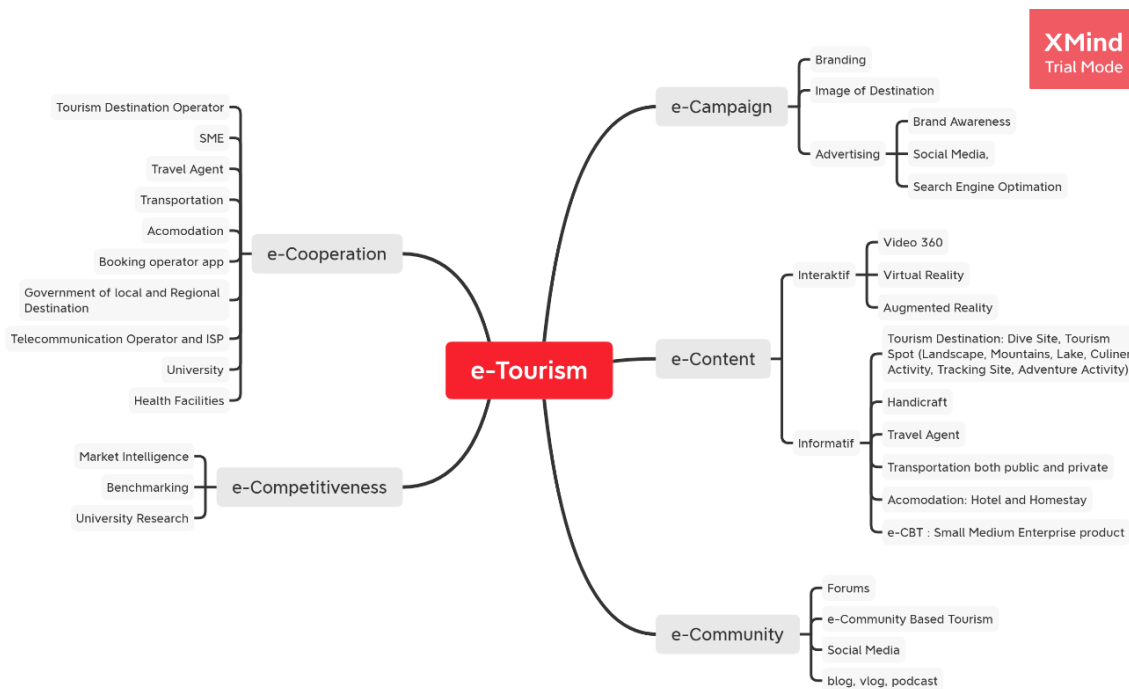


Figure 3 Mind map strategy e-tourism.

destination packages that have the same theme or different themes but are geographically close to each other. The cooperation should establish intense communication and interaction with health facilities in the area. This can help stop a pandemic and keep a tourism site hygienic. This is important to do because in this pandemic, many people are more aware of the implementation of health procedures.

### 3.1.5 Competitiveness

For competitiveness, it is key to know and understand the market by implementing various strategies obtained by benchmarking extensively with other tourism sites, or with annual reports of various tourist destinations in other countries. The state of the tourism market, especially e-tourism, can also be known by periodical reports from the United Nations Worlds Tourism Organization (UNWTO) website or the official websites of other organizations. Through this benchmarking, knowledge can be obtained to increase the competitiveness of the quality of local tourism products. This competitiveness can also be enhanced by industrial cooperation with universities to build or develop tourism products through joint research. The results of this research analysis will be input for decision makers, especially for marketing tourism products via the internet to make them more competitive.

## 3.2 Development

The development of an e-tourism strategy that has been formulated with content development is filled in interactively and informatively. This is done interactively with the use of technology and informative by utilizing information about e-tourism, especially regarding information on local tourism destinations. The idea of post-COVID-19 tourism content is better if a tourism organization has entered the new age of communication with its users, which is more flexible, complex, and is no longer entangled with existing bureaucracies (Camarinha et al., 2021). Digital tourism content must also be supported by an adequate education process so that it can achieve optimum results (Çınar, 2020). Tourism content is very important to build while adhering to post COVID-19 rules according to regulations set by local authorities and the COVID-19 pandemic guidelines (Islam, 2021). This is important to ensure visitors have adequate knowledge when visiting a tourist destination. Content must be built using available information technology in a friendly manner so that smart technology-based content is produced (Hamid et al., 2021) which makes visitors have a satisfying experience when visiting tourist destinations (Stankov & Gretzel, 2020). Smart tourism must be built on strong knowledge by paying attention to the development of science from the results of previous research (Shafiee et al., 2019). To be able to run this smart technology, it is very

important to have workers who have sufficient technological skills to run various e-tourism technologies used in the tourism industry (Carlisle et al., 2021). Smart technology can also be used to build smart ways of choosing tourist destinations (Ivars-Baidal et al., 2021) (Lee et al., 2020) by building measurement indicators precisely and quickly so that a new habit is built in planning tourism for potential visitors. This method can of course be done if smart tourism is built based on information technology which is used in smart e-tourism. It is necessary to establish clear boundaries (Stankov & Gretzel, 2021) to accurately explain the role of humans and the role of technology in presenting an e-tourism model that builds a comprehensive and strong tourism experience.

Communities in the development of e-tourism have an inseparable role. Community is a tourism product based on local culture, has its local wisdom, is unique, and is interesting to become a tourist object that is different from destinations in other parts of the world. Community-based ideas must pay attention to culture which is the fastest growing segment of the tourism industry (Vena-Oya et al., 2021). It is very important to build a community that pays attention to cultural symbols so that it does not conflict with local wisdom in the tourist destination area (Vinodan & Meera, 2020).

The e-tourism development strategy can have a positive impact by taking into account the growing trends in society, which have changed the process in the tourism industry (Okwemba & Nambiro, 2020). The tourism industry is expected to be more flexible in building business models, and provide faster change management so that it can adapt to ongoing trends. Through the e-tourism strategy that was developed previously, it can be a necessary driver, especially after COVID-19.

It is very important to transform the post-COVID-19 tourism business model so that a formula is found to answer the challenges of post-COVID tourism (Gretzel et al., 2020). This can be answered with the results of this research which suggest a strategy for dealing with the post-COVID-19 situation. The management model that existed before COVID-19 needs to be rearranged contextually according to post-COVID needs without leaving the basic principles of tourism industry management (Elida Mahriani, Purwanti Dyah Pramanik, 2020).

Various strategies have been put forward, it is very important to also pay attention to the competitiveness of the available tourism industry and put forward various ways to improve the competitiveness of the industry (Grančay, 2020). On the other hand, in a COVID-19 pandemic situation, many countries close their borders to foreign arrivals it will cause the flow of tourists from abroad to stop. Then, the way to adjust the tourism industry is to take advantage of domestic tourism (local tourists) (Woyo, 2021). An adequate strategy is needed to bring in domestic tourists. The strategy built into this research can be a good solution to overcome it. Various strategies that have been produced need to calculate the business value so that it can produce measurable economic value so that it can generate economic returns, especially in the tourism sector. This calculation is to see the extent to which the tourism industry is competitive from a business point of view (Michael et al., 2019). The strategy in this research has implications for tourism management based on intelligent information technology e-tourism, which is implemented in various tourist destinations based on this 5C strategy.

#### 4. CONCLUSION

The study concludes that the competitive intelligence approach can produce a development strategy for post-COVID-19 e-tourism. This is done by mapping the strengths and weaknesses in detail and identifying opportunities and threats in detail. Then a strategy is built that can be implemented easily in the post COVID-19 period. These strategies are in the form of campaigns, content, community, cooperation and competitiveness. The implication is that it can encourage an e-tourism-based industry to develop in the post-COVID-19 period.

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## La veille stratégique entre l'efficacité décisionnelle et l'optimisation de la gouvernance : Étude restreinte dans les organismes publics tunisiens

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**ABSTRACT (ENGLISH)** In this article, we highlight the role of strategic watch in a perspective of decision-making efficiency for a better optimization of governance, and this within the framework of a limited study on five (5) Tunisian public organisms. An exploratory study was carried out through five semi-structured interviews. The results revealed that the use of watch practices is essential for internal knowledge sharing, transparency and administrative openness. A new frame work that tends to improve the decision-making system. It also allows the decision-maker to move from a state of self-satisfaction to a situation of acceptance of his decision by his environment in a climate of optimal governance.

**KEYWORDS** Decision, efficiency, optimal governance, public organism, strategic watch

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**RÉSUMÉ (FRANÇAISE)** Dans cet article, nous valorisons le rôle de la veille stratégique dans une optique d'efficacité décisionnelle pour une meilleure optimisation de la gouvernance, et ce dans le cadre d'une étude restreinte sur cinq (5) organismes publics tunisiens. Une étude de type exploratoire a été menée à travers cinq entretiens semi-directifs. Les résultats ont révélé que l'utilisation des pratiques de veille est indispensable au partage interne de la connaissance, à la transparence et à l'ouverture administrative. Un nouveau cadre de travail qui tend vers une amélioration du système décisionnel. Elle permet également le passage du décideur d'un état d'autosatisfaction à une situation d'acceptation de sa décision par son environnement dans un climat de gouvernance optimale.

**MOTS CLÉS** Décision, efficacité, gouvernance optimale, organisme public, veille stratégique

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### 1. INTRODUCTION

La survie de toute organisation dépend de ses "choix" (Bérard, 2009), et la prise d'une décision est nécessaire aussi bien dans la sphère privée que dans la sphère publique, où le problème revêt une importance capitale dans la mesure où les décisions affectent directement la vie présente et future des citoyens. La prise de décision dans ce secteur

est donc étroitement liée aux valeurs qui régissent le service public et se situe au cœur de la notion d'intérêt général. Donc, l'enjeu paraît fondamental aujourd'hui dans la mesure où l'administration publique est interpellée par de nouveaux défis liés à la compétitivité et à l'opinion publique. Par suite, notre problématique est la suivante : "Dans quelle mesure les pratiques de la veille stratégique

utilisées dans l'organisation publique tunisienne peuvent améliorer l'efficacité de ses décisions et l'optimisation de sa gouvernance?".

De notre problématique principale se déclinent trois questions hypothétiques de recherche:

- Quelles sont les pratiques de la veille stratégique dans les organisations publiques tunisiennes ?

- Comment les organisations publiques tunisiennes élaborent-elles leurs décisions pour une optimisation de leur gouvernance ?

- Quels sont les impacts des pratiques de veille stratégique pour une efficacité de la décision et une optimisation de la gouvernance?

Pour répondre à ces questions nous avons choisi le paradigme interprétatif qui se base sur l'interprétation de la réalité organisationnelle pour comprendre l'objet de la connaissance étudiée. Sur la base de ce paradigme nous avons eu recours à une démarche qualitative de type inductive (Miles et Huberman, 2003) dont l'unité d'analyse est « une décision administrative efficace ».

Ce papier est scindé en trois parties : La première revient sur les soubassements théoriques en rapport avec notre problématique, la seconde est réservée au cadre pratique de la recherche, et enfin la troisième est destinée à la présentation et la discussion des résultats.

## **2. CADRE THEORIQUE : LA BONNE GOUVERNANCE ET L'EFFICACITE DE LA DECISION : APPORT DES PRATIQUES DE VEILLE STRATEGIQUE**

A travers les pratiques de la veille stratégique, nous évoquons précisément l'analyse et la compréhension de ce monde organisationnel. Cette première partie théorique traitera l'apport des pratiques de veille stratégique au niveau de la bonne gouvernance, et de l'efficacité décisionnelle dans le secteur public.

### **2.1 Les pratiques de veille stratégique dans le secteur public**

En se basant sur un processus de veille et une information stratégique à forte valeur ajoutée au profit de la pérennité de l'organisation, de sa performance et de ses compétences. Nous pouvons obtenir généralement une décision efficace et une bonne gouvernance. Par conséquent la qualité de l'information est associée à la notion de la veille.

### **2.1.1 La qualité de l'information**

Selon Bourzigui (2018), la qualité de l'information a une dimension cognitive et comportementale, elle mène à la couverture des différentes préoccupations des parties prenantes, un champ de gouvernance élargi au niveau des pratiques de veille stratégique. Dans ce cadre, la transparence administrative peut soutenir la bonne gouvernance, vu que l'administration ne peut plus continuer à se cacher derrière le secret administratif (Lasserre et al, 1987). Le partage de l'information au sein d'une administration ouverte permet aux parties prenantes de participer de façon indirecte à la prise de décision et par suite d'atteindre l'efficacité décisionnelle et l'optimisation de la gouvernance.

### **2.1.2 La notion de la veille**

La veille stratégique est une démarche ou processus cohérent qui peut mener à une aide à la prise de décision. Etudier cet outil décisionnel revient à s'arrêter sur l'objet de la veille comme étant un concept et un processus d'une part, et d'autre part, comme étant un soutien décisionnel.

La veille stratégique est une notion qui peut être analysée théoriquement à la fois en tant que concept (un outil de surveillance environnemental) et en tant que processus (un cycle continu d'opérations). En effet, dans un monde organisationnel caractérisé par l'incertitude et la turbulence où l'information et la connaissance représentent des avantages concurrentiels, l'administration qui pratique le processus de veille peut améliorer ses services et anticiper les changements pouvant impacter leur activités (Drevon et al, 2018 ; Chichti et al 2019).

## **2.2 L'efficacité décisionnelle et l'optimisation de la gouvernance**

En général, l'étude de l'efficacité de la prise de décision passe par l'analyse de l'optimisation de la gouvernance en plus de l'analyse de la relation entre le processus décisionnel (un ensemble de séances d'événements développés) et les facteurs qui peuvent impacter d'une façon déterminante son efficacité (Bérard, 2009).

### **2.2.1 Optimisation de la gouvernance**

L'organisation des pratiques de veille stratégique, fait partie de la gouvernance de l'administration publique. En d'autres termes

la gouvernance des données et informations collectées constitue le fondement empirique de la gouvernance optimale de cette administration. C'est-à-dire une sorte d'amélioration de la gestion des connaissances comme étant un résultat d'intelligence et source de nouvelles compétences d'anticipation et d'innovation (Chichti et al, 2019). Ainsi la cellule de veille est le fil conducteur transverse de la gouvernance du patrimoine organisationnel, y compris le patrimoine informationnel, et mérite donc d'être rattachée directement à la direction générale (au décideur). Par conséquent la finalité serait une optimisation de la décision par la bonne personne au bon moment (Madhar, 2016 ; Ayadi et al, 2019).

Généralement, cette gouvernance est définie comme partage du pouvoir entre différents acteurs. Une sorte de transparence informationnelle, d'équilibre et de contrôle (Bourzigui et al, 2018).

Vu sa situation économique difficile, l'Etat tunisien a développé ses organisations publiques vers la prise de la décision optimale en favorisant les pratiques de recherche de l'information pertinente pour une meilleure prise de décision (Chichi et al, 2019).

### 2.2.2 L'efficacité de la prise de décision

De ce fait, les définitions proposées à la "décision" peuvent être d'un ordre économique, philosophique et psychologique. La définition économique identifie la décision comme un choix, et une réponse à un problème. La définition philosophique fait de la décision un acte positif, volontaire ou un choix optimal et la définition psychologique traite la décision comme un jugement, ou un engagement de responsabilité personnelle. La science managériale traite la décision comme un comportement, et finalement la veille stratégique conceptualise la décision comme un "extrant" (Brouard, 2007, p.17).

Cependant la prise de décision peut être influencée par certains facteurs de natures différentes déterminées théoriquement : L'information, l'expérience du décideur et le contexte social.

**L'information :** L'information est un ensemble de données qui constituent l'essence de la veille stratégique et aide à choisir la bonne solution (Bergeron et al 2009). Elle permet une meilleure compréhension des contraintes

environnementales (Mason, 1984 ; Arnaud, 2016).

**L'expérience du décideur :** Certains auteurs annoncent la nécessité de la mobilisation de l'expérience et de l'intuition de la part du décideur pour être à la fois rapide et efficace (Klein et al, 2014). Plus profondément et selon Dane et Pratt (2007) l'intuition du décideur est un processus à part entière, qualifié de traitement de l'information disponible. En théorie du management stratégique, le rôle du décideur est conçu comme dynamique et changeant. C'est pourquoi la qualité du décideur consiste à aider le groupe et les organisations publiques à gérer la complexité croissante focalisée sur les changements environnementaux incessants (Maltais et al, 2007).

**Le contexte social :** Dans un contexte social, la décision n'est plus le fruit d'un calcul arithmétique, mais plutôt le résultat des forces institutionnelles. Ce qui fait que la décision ne se présente pas comme la plus satisfaisante au niveau économique, mais la plus acceptée au niveau de son contexte social (Olivier, 1997 ; Scott, 2014).

### 2.2.3 La bonne gouvernance : « The corporate governance »

La gouvernance est généralement le partage du pouvoir entre les différents acteurs de l'organisation et entre l'organisation et toutes les parties prenantes. Les maîtres mots de la gouvernance sont la transparence, le contrôle, l'équilibre ou encore la responsabilité. Une sorte de management démocratique et d'un système administratif de cadrage et de coordination interne et externe entre les acteurs (Aryal, 2020).

En théorie, la gouvernance a un impact positif sur la performance organisationnelle (Bourzigui et al, 2018), vu qu'elle a une incidence sur l'administration publique en modifiant l'environnement dans lequel le service public agit tout en introduisant de nouveaux concepts et de nouvelles méthodes (Brown, 2005).

### 2.3 Impacts des pratiques de veille stratégique : Efficacité décisionnelle et optimisation de la gouvernance

L'analyse de l'impact de ce système d'efficacité et d'optimisation nécessite l'étude de la veille

stratégique à la fois comme un soutien décisionnel et comme une source d'efficacité (Libaert, 2018).

### 2.3.1 La veille en tant que soutien décisionnel

La veille stratégique est un processus de soutien pour la prise de décision fondé sur trois perspectives : La réduction de l'incertitude, la détection des signaux faibles et la légitimation des décisions.

*La réduction de l'incertitude* : Généralement, pratiquer la veille est une sorte d'attention et de vigilance permanente et ponctuelle. Ce dispositif de veille constitué par une installation matérielle et personnelle de la démarche peut être mis en œuvre d'une façon manuelle (journaux, réseau humain), ou par mot clé dans des moteurs de recherche liés à des alertes sur internet, et en utilisant des logiciels de veille intelligente fondées sur un processus automatique. Ce processus aide à réduire l'incertitude causée par un manque d'informations (Daft et al, 2007). En particulier, des chercheurs ont annoncé le lien de corrélation entre le degré d'incertitude et les différentes pratiques de veille (Auster et Choo, 1994 ; Patora Wysocka, 2017).

*La détection des signaux faibles* : La veille stratégique est un processus d'aide à la détection des "signaux faibles". Ces derniers constituent les "micro-changements" qui se trouvent en "périphérie" de ce sur quoi le décideur est concentré (Shoemaker et al, 2013). Cet effort de détection fait partie de la détection de l'information de source humaine (El-Akrouchi, 2015). Elle permet ainsi de suivre les évolutions environnementales

(Lesca, 2011), une situation qui mène nécessairement à un enrichissement au niveau des connaissances de l'environnement de prise de décision.

*Légitimer la décision* : La veille stratégique est un processus qui permet de légitimer les décisions déjà prises. C'est-à-dire le décideur peut demander une information complémentaire pour légitimer sa décision (Feldman, 1981). Ainsi dans les régimes organisationnels bureaucratiques l'effort de collecte de l'information se focalise sur l'objectif de légitimer le "Décideur", une chance de soutien "en aval". Dans le secteur public, légitimer la décision administrative est une action quotidienne de l'agent public au titre de leader, généralement élu par voie démocratique. Cette interaction entre ce qui est du système politique et celui du système administratif (politico-administratif) est complexe même dans les régimes démocratiques (Maltais et al, 2007). En effet, dans l'organisation publique tunisienne les pratiques d'analyse sont focalisées sur la validation des actions administratives avec l'adaptation des choix selon les attentes de l'opinion publique. Une démarche humaine pour valoriser et mettre en œuvre ces choix au sein de l'administration.

### 2.3.2 La veille en tant que source d'efficacité

L'efficacité de la veille impacte positivement la performance de l'organisation. Depuis la fin du siècle dernier les études ont démontré que la mise en œuvre d'un processus de veille stratégique est un centre de profit et non un centre de coût (Roulet et al, 2015). Dans cet

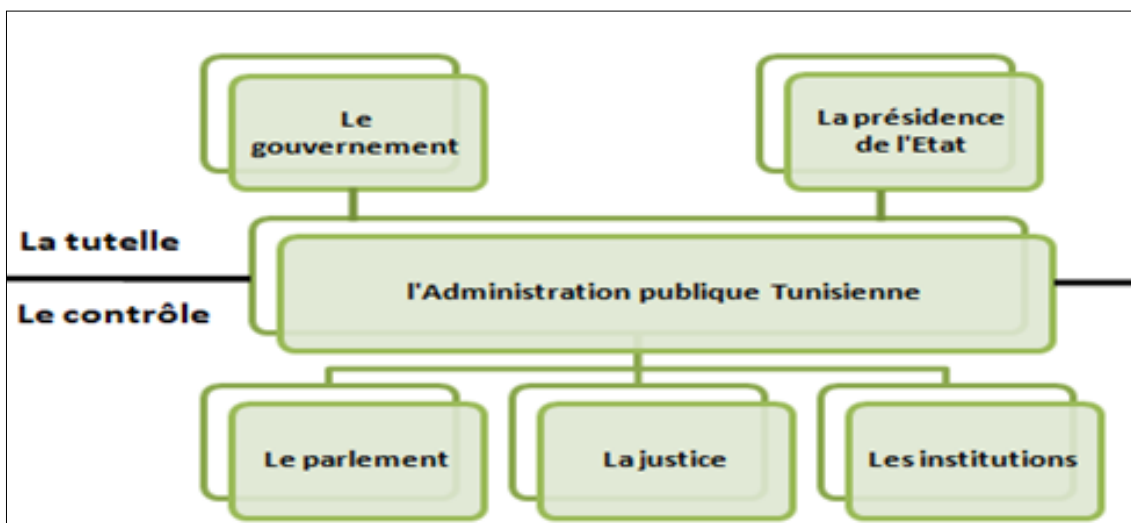


Figure 1 Positionnement hiérarchique de l'Administration publique tunisienne.

ordre d'idées, Cohen (2004) a annoncé le phénomène « *cause à effet* » entre la veille efficace et la qualité de la prise de décision.

Mesurer l'efficacité de la veille stratégique, c'est mesurer le degré d'atteindre les objectifs, c'est-à-dire comparer les résultats attendus avec les résultats réalisés (Roulet et al, 2015). L'objectif fondamental du processus de veille stratégique étant l'aide à la décision.

### 3. CADRE PRATIQUE DE LA RECHERCHE

L'Administration tunisienne : Un contexte spécifique de recherche

Dans l'objectif d'apporter une réponse à notre problématique, nous proposons d'explorer les pratiques de veille favorables à la prise de décision (pour la bonne gouvernance), et relatives au contexte administratif tunisien, et ce pour comprendre la relation entre le processus de veille stratégique et l'efficacité de la décision, vers une optimisation de la gouvernance dans un cadre administratif spécifique suite à une analyse qualitative et à travers cinq organismes publics choisis : Une agence nationale, un observatoire, une entreprise publique, et deux écoles nationales.

#### 3.1 Cadre de la recherche : L'organisation publique tunisienne

L'organisation publique tunisienne est un contexte particulier (Jaziri et al, 2018 ; Hizaoui, 2020). Elle est organisée, structurée, hiérarchisée et, contrôlée par des fonctions qui s'exercent dans un cadre juridique et constitutionnel (cf. Figure 1).

Elle fonctionne d'une part sous tutelle gouvernementale et présidentielle et d'autre part sous contrôle parlementaire, juridictionnel et institutionnel.

L'objet de ce travail de recherche est d'étudier le rôle de la veille stratégique entre l'efficacité décisionnelle et l'optimisation de la gouvernance dans un contexte d'organisation publique. En fait, l'administration est la concrétisation majeure de l'Etat, les fonctions de l'administration réalisent cet Etat, maintenir l'ordre, assurer la prestation des services, informer, prévoir et surtout préparer les décisions étatiques. Nous distinguons entre la décision gouvernementale (décision finale de l'orientation de l'action de l'Etat) et la décision administrative (la décision exécutoire de l'orientation finale).

Les manifestations entre le 17 décembre 2010 et le 14 janvier 2011 ont prouvé que le

corps administratif tunisien est en bonne santé. Le secret du succès des organisations publiques tunisiennes mérite d'être étudié, surtout en relation avec le thème de l'efficacité processuelle et décisionnelle.

#### 3.2 Cadre méthodologique : Approche qualitative exploratoire

Une approche qualitative exploratoire a été choisie. Cette étude est utile lorsqu'on veut comprendre un phénomène (El Wafi 2017). Notre objectif de départ était de comprendre, à partir du point de vue de certains agents publics, la relation entre le succès des pratiques de veille stratégique et l'optimisation de la gouvernance au sein de l'administration publique tunisienne. Nous avons interviewé cinq (5) agents publics responsables de veille stratégique ou d'un projet de mise en place de cette activité. Dans les recherches qualitatives, la proposition ne provient pas uniquement de la « *connaissance théorique* ». Ce qui explique les démarches suivantes :

Une démarche à deux temps : Les entretiens ont été menés en deux temps. Dans un premier temps nous avons procédé de manière informelle, libre, sans guide d'entretien préalable. Cette étape était importante puisqu'elle nous a permis d'apporter des éclaircissements sur la manière dont les individus traduisent le rôle de la veille stratégique, elle nous a facilité la formulation des questions, à partir de la revue de la littérature dans le guide d'entretien, qui a été utilisé en deuxième temps. La phase formelle est fondée sur une série de cinq entretiens semi-directifs. La durée moyenne de nos entretiens était de 55 mn et variait entre 45 et 75 mn.

Deux démarches d'analyses :

Une analyse thématique manuelle, selon Couvreur et al 2002(cité par El Wafi, 2017 p.93),c'est la méthode d'analyse la plus souvent utilisée en sciences de gestion. Pour étudier les différents thèmes nous avons retenu les portions de phrases, les phrases ou les groupes de phrases (Thietart et al 1999).

Une analyse lexico-métrique dans l'objectif de valider la communication interne des entretiens (Perret et al, 2012), nous avons opté pour un « *recours à un outil informatique* » (Miles et Huberman, 2003, p.88), par conséquent, à un logiciel d'analyse: « IRaMuTeQ » pour faire référence à une analyse métrique conduite sur le texte global de cinq entretiens (Ratinaud et al, 2009). Ce

texte a été formaté pour pouvoir être lu par le logiciel (IRaMuTeQ version 0.7 alpha 2). C'est-à-dire la suppression des numéros et des titres. L'analyse globale a été effectuée sur la base statistique et de nuage conceptuel.

#### 4. RESULTATS ET DISCUSSION

Cette section est consacrée à l'analyse des différents résultats et ensuite à la discussion multidimensionnelle de ces résultats.

##### 4.1 Principaux résultats

Dans ce cadre nous allons présenter les principaux résultats à travers une analyse thématique et manuelle de chaque entretien séparément et à travers une analyse lexicométrique du corpus qui englobe le texte de tous les entretiens.

###### 4.1.1 Analyse thématique des entretiens

Pour analyser les entretiens nous allons présenter nos résultats à travers la classification thématique des verbatim de chaque entretien, puis nous allons recourir à l'interprétation thématique manuelle. À partir du texte original de chaque entretien nous avons extrait des passages liés à notre problématique appelés « Verbatim ». Selon le dictionnaire français « internaute », un verbatim est un vocabulaire et expression utilisée par une population qui s'adresse à une entreprise, à l'occasion d'une enquête. Ces « verbatim » ont été catégorisés pour réduire le nombre d'informations (Wacheux, 1996) et pour permettre la classification des entretiens par thème (T).

*Les pratiques de la veille stratégique (VS) au sein de l'administration publique tunisienne :* Nos interlocuteurs ont mentionné que l'information environnementale est cruciale pour mettre en œuvre une activité de veille stratégique. Cette information est nécessairement pertinente dans un cadre administratif officiel, le champ d'application est vaste et couvre plusieurs rubriques d'interventions informationnelles : De l'opinion publique et de la vie quotidienne des tunisiens (la question politique, la réalité économique, la situation sociale ...).

Dans ce cadre de la nature multidimensionnelle du processus de VS, l'interlocuteur de l'organisation publique AX1 (directeur, 2 ans d'expérience, santé publique) a qualifié les pratiques de la VS comme étant une « *veille informationnelle* » puisque dans

son service « *les pratiques de veille stratégique sont fondées principalement sur la collecte des informations pertinentes* ». Face à cette estimation ouverte, l'interlocuteur de l'administration AX4 (directeur central, formateur) a réclamé que son service a thématiqué le champ d'activité de la veille stratégique après avoir « *convertir les rubriques de méthode d'analyse PESTEL en veille stratégique* » (veille politique, veille économique, veille sociétale, veille technologique, veille écologique et veille législative).

Cependant, l'interviewé relatif à l'administration AX5 (directeur, formateur) a limité l'activité de son service dans la pratique de la veille « *documentaire ou bibliothèque* ».

*La veille stratégique est un outil d'aide à la décision :* Au niveau administratif, selon nos interlocuteurs, la décision ne sera efficace que lorsqu'elle a été prise au bon moment, cette valeur est mesurée généralement par sa nature préventive et anticipative. Ainsi, il est important de signaler que la totalité des interlocuteurs ont accordé un intérêt majeur à la veille stratégique, en liaison avec le processus de prise de la décision administrative en tant que source d'efficacité décisionnelle.

L'interviewé E.Ax1 a insisté que grâce au processus de veille stratégique son administration peut « *prendre les décisions stratégiques efficaces au bon moment* ». L'interviewé E.Ax3, a été plus précis en disant que « *...la veille stratégique est un facteur essentiel d'aide à la décision...* ». Plus profondément et pour l'interviewé E.Ax4 la veille stratégique est un outil d'aide à la décision « *...très efficace puisqu'elle mène à soutenir la décision de qualité efficace, fondée sur des informations pertinentes... un outil efficace, à l'écoute de l'environnement et à la détection des signaux faibles chez les acteurs...* ».

Enfin, selon l'interviewé E.Ax5 pour prendre la bonne décision et être dans la bonne voie « *il faut instaurer la veille stratégique, comme outil efficace de soutien à la prise de décision au sein du secteur public* ».

*La veille stratégique est un facteur de succès de la gouvernance :* Au niveau de ce thème, nos interlocuteurs ont valorisé le rôle de la veille stratégique comme facteur de succès de la gouvernance. Pour l'interviewé E.Ax1, les pratiques de la veille stratégique sont « *Un facteur de succès de la gouvernance puisque les*



*résultats n'ont aucun sens s'ils sont mal exploités par l'administration* ».

De même l'interviewé E.Ax3 a qualifié ce rôle comme évident et a insisté que la veille stratégique est « *un facteur de succès de la gouvernance, elle est fondée sur la gestion en transparence, correctement et en toute clarté* ». En d'autres termes selon le même interlocuteur, la gouvernance est un « *système d'information* ». Ce dernier, a évoqué que la gouvernance se base sur un système d'information par l'introduction de la technologie informatique et de communication (TIC) c'est-à-dire cette intervention technologique est à la fois « *une dimension principale de la gouvernance* » et une voie prospective vers une situation meilleure à savoir la gouvernance électronique ou l'e-gouvernance.

De façon plus claire, l'interviewé E.Ax4 a considéré que la veille stratégique n'est pas seulement un facteur de succès de la gouvernance puisqu'elle permet « *la participation indirecte de l'environnement aux choix stratégiques et à la prise de décision* », mais elle permet en plus de « *détecter l'avis de l'opinion publique* ». L'interviewé E.Ax5 a été plus précis lorsqu'il a soutenu l'idée que la veille stratégique donne « *la chance à la participation et à rendre service d'une façon équitable et juste à temps* ». Il s'agit donc et selon cet agent public d'une question d'« *ouverture* » et de « *transparence* ».

Autrement dit, un contexte administratif dans un cadre de travail coopératif, ouvert et participatif, peut favoriser une participation indirecte des parties prenantes à la prise de la décision administrative efficace. Un environnement soutenu par un climat de stabilité gouvernance optimale.

*Le rôle de la veille stratégique dans les préoccupations des parties prenantes* : Dans ce cadre environnemental, la totalité des interlocuteurs ont reconnu le rôle à la fois important et déterminant de la veille stratégique dans les préoccupations des parties prenantes. Pour l'interviewé E.Ax1 le rôle est « *important* » c'est pourquoi les parties prenantes (les médecins par exemple) jouissent d'une priorité au niveau de la communication avec l'administration (AX1) ou au niveau de l'accès libre à l'information détenue par la cellule de veille.

L'interaction « *administration – citoyen* » est ouverte et offre selon l'interviewé E.Ax2 des réponses et des informations « *sans limites bureaucratiques* ». Ainsi, d'après cet agent

administratif « *l'interaction constitue un acte de gouvernance* » (En 2019 la cellule de veille a compté 188 milles interactions entre Ax1 et les citoyens). D'après l'interlocuteur relatif à l'administration Ax3, les parties prenantes peuvent à la fois influencer ou être influencées par « *l'activité de la cellule de veille* », plus précisément, et le plus important dans ce facteur que la situation stable n'est que « *la conséquence que ce monde extérieur fait partie de notre préoccupation* ». Grâce à cette stabilité et selon l'interviewé E.Ax4 on peut « *éviter le phénomène de conflit ou de résistance au sein de l'administration publique* » tunisienne.

*Les retombées de la veille stratégique sur le fonctionnement interne de l'administration publique* : Il est unanimement reconnu par nos interviewés que les pratiques de veille stratégique jouent un rôle dans le fonctionnement interne de l'administration publique. Pour l'interviewé E.Ax1, ce rôle consiste au « *partage total de toute sorte d'information de façon ponctuelle et à l'instant même, un partage qui se fait de façon automatique* ».

Pour l'interviewé E.Ax2, la veille stratégique « *a des retombées positives sur le fonctionnement de notre organisation et ce au niveau de la coordination, la collaboration et la coopération entre les différents services* ». Cet outil « *peut aider aux partages des connaissances et informations pertinentes* », il offre également « *un terrain favorable à la prise de décision collective au profit de l'administration interne de l'école* ». Ces retombées ont été qualifiées encore positivement puisque l'interviewé E.Ax5 a justifié cet aspect positif par « *l'amélioration de la coordination entre les différents départements aussi bien au niveau hiérarchique qu'au niveau horizontal* ». Une « *occasion* » pour le partage des « *connaissances* ».

La veille stratégique est une activité ponctuelle ou continue :

Nos interlocuteurs ont mentionné que la veille stratégique émane d'une volonté stratégique et que ce processus est une activité continue et non ponctuelle.

Pour l'interviewé E.Ax1 la veille stratégique est une « *activité quotidienne depuis des années ... une action continue* ». Dans une vision plus large l'interviewé E.Ax3 a reconnu que la veille stratégique est « *fondée sur une volonté stratégique ... elle fait partie de la politique interne de l'administration centrale ... cette activité devient un investissement important,*

un système d'information à part entier dans l'organisation publique». Plus précisément et pour les deux interviewés E.Ax4 et E.Ax5 la veille stratégique émane successivement de la « *volonté stratégique rattachée à la direction* » et dépend « *de la conviction des grands chefs* ».

#### 4.1.2 Analyse lexico-métrique : tentative de validation communicationnelle

##### Analyse statistique

La capture d'écran suivante de la façade du logiciel est le résultat de l'analyse lexico métrique (discours) qui additionne les 5 entretiens à la fois :

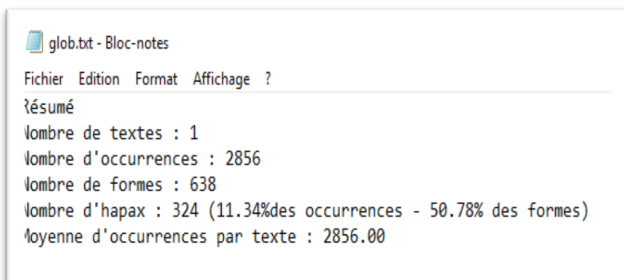


Figure 2 Résultat de l'analyse lexico métrique et statistique de la totalité des cinq entretiens.

Ces résultats distinguent 2856 occurrences (mots) dont 638 formes actives (mots les plus utilisés) 324 hapax (mot qui ne se répète qu'une seule fois dans l'un des 5 entretiens) et 1894 formes supplémentaires (des mots de liaison : le, la, de, et ...). Ainsi, notre tentative de validation de la communication interne des participants sera focalisée seulement sur la catégorie des formes actives. La forme active lemmatisée d'effectif maximum, est la forme « *veille* » avec 44 formes actives, puis viennent les formes « *stratégique* » de 41 formes, organisation de 26 formes, information de 23 formes et décision de 20 formes.

Cette hiérarchisation fréquentielle des formes actives est une caractéristique de tous les cinq entretiens. Un signe d'appartenance collective à l'objet d'étude et à la perception administrative cohérente de la problématique au sein de l'administration publique tunisienne. La liste suivante récapitule les valeurs de la communication interne des 5 entretiens successivement désignés face à la fréquence (F) de certaines formes actives (mots clés omniprésentes dans les cinq entretiens par fréquences différentes) :

Stratégique :	F = 41 (4+6+10+13+8)
Organisation :	F = 26 (8+7+6+3+2)
Information :	F = 23 (8+6+6+2+1)

Décision :	F = 20 (3+5+2+6+4)
Public :	F = 16 (4+2+2+6+2)
Aide / aider :	F = 13 (4+3+3+2+1)
Gouvernance :	F = 11 (1+1+5+3+1)
Interne :	F = 10 (2+1+3+3+1)
Environnement :	F = 10 (1+3+3+2+1)
Continuer :	F = 07 (1+1+1+1+3)

Suite à cette logique administrative mentionnée, notre tentative de validation communicationnelle est interne entre les participants. Cette tentative peut être supportée par l'idée collective que la veille au sein de l'organisation publique tunisienne est une source d'information continue pour comprendre l'environnement organisationnel, et pour améliorer le fonctionnement interne de l'administration publique dans le but d'aider les responsables à prendre des décisions dans un climat de gouvernance.

##### *Le nuage de mots (nuage conceptuel)*

Le nuage de mots ou « *Word Cloud* » est une représentation graphique des mots clés les plus utilisés dans un texte (discours). Ces mots se positionnent par nombre d'occurrences, ils s'affichent dans différentes tailles de caractères d'autant plus visibles. Ce nuage est le résultat d'une analyse lexicale, visualisée par un graphique structuré et par des mots pertinents qui permettent de synthétiser les principaux thèmes.

La figure suivante (cf Figure 3) est une sorte de réduit sémantique d'un texte dans lequel les concepts clés sont composés d'une unité de taille selon le poids de typographie utilisé lui permettant de faire ressortir leur importance dans le texte.

L'interprétation de ce graphique nous permet de constater l'ensemble conceptuel valorisé dans les cinq entretiens grâce à l'analyse métrique. C'est-à-dire pour comprendre le système de veille stratégique il suffit de valoriser les formes les plus visualisées selon leur tailles (veille stratégique, organisation, information, administration, décision, public, gouvernance, environnement ...). On peut imaginer la réponse collective suivante : *Le rôle de la veille stratégique est la collecte de l'information pertinente pour comprendre l'environnement organisationnel dans le but de prendre des décisions au sein de l'administration dans un cadre de gouvernance.*

De cette manière on propose de schématiser le modèle empirique selon la figure suivante (cf Figure 4).



naissance à une nouvelle conception de l'environnement du secteur public (Brown, 2005). Cette nouvelle vision environnementale doit être prise en compte par les grands chefs de l'administration publique. En effet, l'e-gouvernance à travers la veille stratégique mène à l'amélioration des services administratifs (Chichti et al, 2019).

**- Au niveau des préoccupations des parties prenantes :** Les interlocuteurs ont insisté sur la priorité de l'interaction avec les composants de l'environnement qui jouent un rôle déterminant de stabilité organisationnelle. Les travaux scientifiques reconnaissent que la veille stratégique donne un sens à l'environnement et une capacité administrative d'anticiper les crises et éviter le phénomène de résistance (Brouard, 2007 ; Arnaud, 2016 ; Bergeron et al, 2009 ; Lesca et al, 2011 et Drevon et al, 2018 ; Jaziri et al, 2018 ; Hizaoui, 2020).

*Dimension n° 3 : Impact sur les leviers de l'efficacité administrative*

**- Au niveau des retombées de la pratique de la veille stratégique sur le fonctionnement interne de l'administration publique :** Les agents administratifs interrogés ont insisté sur la dimension coopérative de ces retombées fondées sur la coordination et la collaboration entre les services administratifs. Cependant, par une vision plus large certains auteurs ont qualifié la veille stratégique par un centre de profit et non de coût, un moyen de création collective de sens et une amélioration de la communication interne, une nouvelle vision théorique introduisant l'innovation entraînée par l'idée de « l'implication » des agents publics à la prise de décision (Lesca, 2003 et Roulet et al, 2015 ; Aryal, 2020).

**- Au niveau de la réponse sur la question la veille stratégique est continue ou ponctuelle :** Les interviewés ont reconnu de façon unanime que cette activité doit être permanente, rattachée aux choix stratégiques, et doit faire partie de la politique interne de l'administration et même de la conviction des dirigeants.

La réponse semble plus profonde au niveau théorique vu que certains auteurs ont qualifié la pratique de la veille stratégique par un système de suivi multidimensionnel (Guechtouli et al, 2014 et Drevon et al, 2018).

En d'autres termes en management public nous devons reconnaître que la qualité du décideur joue un rôle important à aider l'organisation à gérer la complexité

environnementale, y compris (Maltais et al, 2007) à mettre en œuvre un processus de veille stratégique.

## 5. CONCLUSION GENERALE

La veille stratégique est une activité permettant d'offrir une information pertinente à la bonne personne, et au bon moment. C'est un outil de surveillance de l'environnement organisationnel, qui permet au décideur d'être à l'écoute, et d'anticiper le phénomène de résistance ou de changement radical.

C'est à travers nos investigations de recherche dans notre contexte d'étude, en l'occurrence cet environnement des institutions publiques que nous avons décelé la pertinence de la problématique concernant le rôle des pratiques de veille stratégique dans les organisations publiques tunisiennes pour améliorer l'efficacité de leurs décisions et optimiser ainsi leurs gouvernances, et nous avons ainsi à travers cette étude cherché à donner des éléments de réponses à nos questionnements.

Au niveau du cadre théorique ce rôle paraît multidimensionnel, la veille stratégique cherche à la fois à rendre la décision administrative efficace en tant qu'outil d'aide à la décision, comme elle cherche encore à rendre la gouvernance optimale au sein de l'administration publique. En d'autres termes, le fait d'introduire la démarche de veille stratégique au niveau du processus traditionnel de prise de décision, le décideur sera mené de passer de la situation satisfaisante à la situation d'acceptabilité de la décision par son environnement. C'est-à-dire que le climat de la gouvernance administrative n'est plus un sentiment d'autosatisfaction, mais plutôt un résultat d'acceptation de la décision par son environnement administratif. Une situation qui peut entraîner la stabilité organisationnelle continue.

Dans ce cadre, suite à notre étude empirique focalisée sur la démarche qualitative et fondée sur l'analyse thématique manuelle en premier lieu et lexicométrique en second lieu, nous avons ciblé toutes les données collectées via cinq entretiens semi-directifs. Il est donc évident que l'information fournie depuis les pratiques de la veille stratégique est déterminante, non seulement au niveau de l'amélioration du partage interne de la connaissance, mais aussi au niveau du soutien des choix stratégiques, de l'administration publique, de sa stabilité environnementale, de

la bonne gouvernance et de l'efficacité décisionnelle.

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## Integrating science and technology metrics into a competitive technology intelligence methodology

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**ABSTRACT** For years, the appropriate interpretation and application of metrics have enabled scientists to assess science and technology dynamics. Consequently, diverse disciplines have emerged, such as bibliometrics, scientometrics and patentometrics, offering important theoretical and methodological contributions. However, the current accelerated technological advances require researchers to implement a superior approach to detect continuous changes in the external environment identifying opportunities and vulnerabilities to strengthen the decision-making process regarding R&D and innovation. In this context, competitive technology intelligence (CTI) offers a strategic approach based on a continuous cycle where information is transformed into an actionable result. This research provides a broader scope to science and technology metrics, incorporating them into a CTI global methodology of eight steps. Metrics add value throughout the entire CTI process, from project planning to decision-making stages, having the most significant role in the information analysis stage, mainly to process information from sources such as scientific documents, patents, and social networks. Particularly, this approach considers recent studies in CTI in which quantitative tools such as patentometrics and scientometrics were successfully used. This proposal can be applied to predict upcoming technologies, movements of competitors, disrupting activities, market changes, and future trends. Accordingly, this research adds value to the assessment of science and technology dynamics, aiming to improve the decision-making process of R&D and innovation.

**KEYWORDS** Competitive intelligence, competitive technology intelligence, patentometrics, science and technology metrics, scientometrics

### 1. INTRODUCTION

In a global world, technological advances embody new opportunities to be assessed by organizations. Good decision-making requires correctly identifying the technologies to implement, the products to develop and the standards to use. The new forms of collecting, storing, transforming, and processing data have made the information more accessible than ever. Information about the external environment enables leaders to manage their

businesses more effectively; however, information is not enough.

An adequate assessment of science and technology is fundamental to impact present and future R&D and innovation decisions; therefore, building metrics is essential to obtain accurate results. To facilitate science and technology understanding, diverse disciplines based on metrics analysis have emerged, including scientometrics, patentometrics, and altmetrics. They offer fundamental theoretical and methodological

contributions involving the use of traditional and non-traditional metrics.

Scientometrics is a discipline based on mathematical methods to quantify scientific research literature to reveal the process of scientific development (Qiu et al. 2017). It enables researchers to identify the actors and processes involved in scientific activities, such as authors, research groups, institutions, countries, and their scientific production, to determine the structure, relationships, and research dynamics (Michán L. 2013). Scientometrics deals with scientific information analysis mainly from scientific documents; on the other hand, patentometrics focuses on the analysis of patents. Patents protect inventions developed by companies, institutions, or individuals, and can be interpreted as indicators of invention, and it is possible to create scientific and technological scenarios of countries, industries, and research institutes by analyzing them.

Unlike scientific literature, patents have a legal framework that supports them, and the information they contain has a uniform structure, allowing the easy extraction of the information desired. Economic indicators have also been associated with patents, addressing connections between technology and trade. While traditional metrics focus on the data mining of scientific and technological outputs (e.g., scientific papers, patents), non-traditional metrics—also known as alternative metrics or altmetrics (Priem et al. 2012)—are oriented to measure scholarly activities on social networks, blogs, newspaper articles, and web sites, among others (European Union 2017). The consolidation between traditional and non-traditional metrics offers a complementary view to evaluate the dynamism of science and technology, which requires more than one single metric approach (Staudt et al. 2018).

Although metrics analyze different aspects of science and technology, they are not enough to continuously monitor the external environment to support strategic R&D and innovation decision-making. By systematically analyzing the external environment, organizations can increase their advantages (Luu, 2015), identify movements of competitors (Rothberg and Erickson 2017), and detect opportunities for growth (Zeid 2014), which represents a crucial factor to survive under the current and future industry global competition (Shaitura et al. 2018). In this context, CTI adds fundamental value since it involves a

continuous process based on collecting and analyzing external information transformed into a strategic result (Dou et al. 2019) to anticipate changes in the market and to identify relevant opportunities, supporting the decision-making process for innovation (Du Toit 2015, Rodriguez-Salvador and Lopez-Martinez 2000). Based on studies that apply CTI for science and technology assessment, a global methodology that incorporates metrics into a CTI process is proposed. First, a description of the general context of CTI is presented, then recent CTI studies are identified, and finally, a CTI methodology is proposed revealing the incorporation of metrics.

## 2. COMPETITIVE TECHNOLOGY INTELLIGENCE

R&D fosters knowledge aiming to provide answers to questions from different fields. For this activity to be enhanced, it is necessary to transform information into intelligence and provide conditions to facilitate a continuous flow of knowledge (Amidon Rogers, 1996). Therefore, it is crucial to analyze external data in a timely and proper way to develop business insights and become more competitive (Rodriguez-Salvador 2006, Zeid 2014).

Competitive intelligence emerges as an approach to support strategic decision-making. While Fitzpatrick and Burke (2003) define competitive intelligence as a process to collect and analyze external information to increase the advantages and position of an organization, Dou *et al.* (2019) define it as the ability of an organization to understand its environment effectively and drive strategies accordingly. This ability is sustained by the process of collection, analysis, and dissemination of actionable knowledge.

When competitive intelligence is applied to science and technology research, the term CTI arises. CTI pursues timely awareness of scientific and technological events to stay ahead, identifying collaboration prospects, technology knowledge landscapes, and in general, valuable findings to improve R&D and innovation processes (Rodriguez-Salvador et al. 2002). Achieving this involves a methodology which in general starts with a planning stage aligned to the main objectives of the study, continuing with the identification of information sources, aiming to identify the best alternatives to collect the most relevant information on science and technology from different sources, such as experts in the field,

documents, patents, and social networks. The next step consists of information collection, where the main goal is not to get the most significant amount of information but to get the most meaningful information possible. This information is processed and prepared for further analysis, where different techniques can be applied (e.g., scientometrics, patentometrics, road-mapping). Dissemination and decision-making comprised the last stages.

### 3. CTI METHODOLOGY

To understand the impacts of metrics on scientific and technological research, an in-depth analysis of studies that examine metrics and apply CTI for science and technology assessment was conducted.

Wilsdon et al. (2015) explored the effects of the growing use of metrics to evaluate research, proposing their responsible application and establishing that an appropriate research assessment should

include elements such as robustness, transparency, reflexivity, humility, and diversity. Staudt et al. (2018) proposed a set of text- and citation-based metrics to identify high-impact and transformative works. These metrics are categorized into seven types: radical-generative, radical-destructive, risky, multidisciplinary, wide impact, growing impact, and impact (overall).

Based on an analysis of the accuracy of 39 metrics, Bollen et al. (2009) showed that a multi-dimensional view is required to measure the impact of scientific research effectively. Finally, Cronin and Sugimoto (2014) emphasized that the web leads to new tools to assess scholar productivity, revealing behaviors and impact that were previously invisible, such as number of mentions, acknowledgments, endorsements, number of downloads, recommendations, blog posts, tweets, and a variety of other metrics that can be utilized.

Table 1 Recent studies using quantitative tools under an intelligence approach.

Title	Year	Authors	Journal
Analysis of the knowledge landscape of 3D bioprinting in Latin America	2019	Marisela Rodriguez-Salvador, Diego Villarreal-Garza, Mario Moisés Alvarez, Grissel Trujillo-de Santiago	International Journal of Bioprinting
Data analytics for better informed technology & engineering management.	2019	Alan L. Porter	IEEE Engineering Management Review
Discovering new 3D bioprinting applications: Analyzing the case of optical tissue phantoms.	2019	Luis Hernandez-Quintanar, Marisela Rodriguez-Salvador	International Journal of Bioprinting
Additive manufacturing in healthcare.	2018	Marisela Rodriguez-Salvador, Leonardo A. Garcia-Garcia	Foresight and STI Governance
Additive manufacturing knowledge incursion on orthopaedic devices: The case of hand orthoses	2018	Leonardo A. Garcia-Garcia, Marisela Rodriguez-Salvador	Proceedings of the 3rd International Conference on Progress in Additive Manufacturing (Pro-AM 2018), Singapore
An assessment of technology forecasting: Revisiting earlier analyses on dye-sensitized solar cells (DSSCs).	2018	Ying Huang, Alan L. Porter, Yi Zhang, Xiangpeng Lian, Ying Guo	Technological Forecasting and Social Change
Competition-driven figures of merit in technology roadmap planning.	2018	Ksenia Smirnova, Alessandro Golkar, Rob Vingerhoeds	2018 IEEE International Systems Engineering Symposium (ISSE)
Revealing emerging science and technology research for dentistry applications of 3D bioprinting.	2018	Marisela Rodriguez-Salvador, Laura Ruiz-Cantu	International Journal of Bioprinting
Uncovering 3D bioprinting research trends: A keyword network mapping analysis	2018	Leonardo A. Garcia-Garcia, Marisela Rodriguez-Salvador	International Journal of Bioprinting
Scientometric and patentometric analyses to determine the knowledge landscape in innovative technologies: The case of 3D bioprinting.	2017	Marisela Rodriguez-Salvador, Rosa Maria Rio-Belver, Gaizka Garechana-Anacabe	PLoS ONE
Technology roadmapping for competitive technical intelligence	2016	Yi Zhang, Douglas K.R. Robinson, Alan L. Porter, Donghua Zhu, Guangquan Zhang, Jie Lu	Technological Forecasting and Social Change
Topic analysis and forecasting for science, technology and innovation: Methodology and a case study focusing on big data research.	2016	Yi Zhang, Guangquan Zhang, Hongshu Chen, Alan Porter, Donghua Zhu, Jie Lu	Technological Forecasting and Social Change.

Despite the profuse research on metrics, few studies have explored metrics under a strategic view. Recent investigations incorporate scientometrics, patentometrics, and other quantitative tools into a CTI approach using data mining to make science and technology assessment more comprehensible, but they mainly address the analysis of secondary information, such as scientific documents and patents. As an example, Table 1 shows some recent efforts ranging from the analysis of specific fields to those focused on analytic tools. In the first group are new 3D bioprinting applications: optical tissue phantoms, emerging dentistry applications of 3D bioprinting, additive manufacturing for hand orthoses, technology forecasting on dye-sensitized solar cells (DSSCs), competition-driven figures of merit (automotive industry), 3D bioprinting in Latin America, keyword network mapping analysis on 3D bioprinting research, knowledge landscape of 3D bioprinting and forecasting on big data research. In these studies, scientific and technological trends were identified by analyzing documents and patents, including data mining of some of their elements, such as titles, keywords, authors, and affiliations. This revealed the dynamics of intellectual outputs in terms of metrics such as number, evolution, and impact of publications and/or patents by authors, journals, institutions, countries, and areas.

On the other hand, Table 1 also exhibits tools to facilitate analysis tasks, particularly data analytics for technology and engineering management and technology road-mapping for competitive technical intelligence where metrics combine qualitative and quantitative data and external actors are participating.

Approaches from Porter (2019), Rodriguez-Salvador and Ruiz-Cantu (2019), Hernandez-Quintanar and Rodriguez-Salvador (2019), Huang et al. (2018), Garcia-Garcia and Rodriguez-Salvador (2018a), Rodriguez-Salvador et al. (2017), and Zhang et al. (2016) were considered to develop a new CTI methodology where, unlike current studies, 1) primary and secondary information are considered, 2) quantitative and qualitative metrics are applied and 3) experts participate. This CTI eight-step methodology comprises interdependent phases, receiving continuous feedback.

1. **Project planning.** The main activities and scope of the CTI project are established, as well as participants, roles, resources, and internal policies. Metrics, in this stage, can be established according to specific key performance indicators depending on the objectives to accomplish.
2. **Identification of data sources.** This represents the input for further analysis. In this stage, metrics can facilitate the selection of the best information sources. There are two basic types of data sources: primary and secondary. The former is based on the insight of experts, where metrics contribute to identifying experts for feedback purposes, determining their presence in a field in terms of indicators such as the number of paper citations, the number of patents, the ranking of publications, areas of specialization, and network collaborations through affiliation analysis. Commonly, secondary sources include scientific and technical documents, as shown in the studies in Table 1; however, this approach also incorporates strategic information such as industry and market reports. Additionally, social networks, which are rapidly evolving, are considered. In this case, metrics can help identify the quality of sources in terms of features such as their completeness, impact, and prestige.
3. **Search strategy design.** Establishing a plan and a strategy to retrieve information is essential. This activity should be aligned to the study focus as well as to the characteristics of the specific data sources previously identified. Tools like Delphi studies, focus-groups, and interviews may be considered, each one with specific metrics. For secondary information, particularly from the internet and databases, it is essential to identify the most relevant terms to feed searching queries. For this aim, an in-depth literature review should be executed, not only from scientific publications, technical reports, and patents but also from industry and market reports, among others. Moreover, different queries should be designed to maximize the efficiency of further data collection.
4. **Data collection.** This focuses on the previous primary and secondary sources identified. Database management systems would be required to access and manipulate large sets of information. This stage also

includes normalization and preparation of the information to be processed and analyzed in the following step.

5. **Information analysis.** While traditional studies are typically focused on only on solving the questions “what?” and “how?” and on the analysis of scientific and technological documents, this stage aims to answer fundamental questions such as “what?” (to develop, incorporate, cancel, allocate), “how?” (human and material resources), “when?”, “where?”, “why?”, “with whom?” and involves industry and market reports in combination with expert views. Scientific literature can be evaluated using metrics such as the number of publications, the growth rate of publications, impact factor of journals, the number of citations, author affiliation, collaboration networks, countries- and institutions-predominance, and areas of specialization by journal, author, institution or country. On the other hand, patents can be analyzed based on metrics such as patent production, patent categorization according to the International Patent Classification (IPC), IPC distribution of inventors, assignees and/or countries, the number of patent families (PFs), patent distribution of assignees and patent legal status (assigned, granted or inactive). To analyze social networks and websites alternative metrics can be incorporated, considering statistics comprising the number of mentions, number of downloads of the documents, and social network interactions. For scientific papers and patents, specialized software, data mining, and algorithms for text mining can be used to apply co-occurrence analysis, and keyword or term clustering to determine behaviors by the output of authors, countries, institutions, journals, and areas. Industry and market reports can be analyzed in terms of well-known metrics such as market share, competitiveness level, consumer behavior, and distribution rate.

6. **Feedback from experts.** Recommendations from experts constitute a great asset. Compared with other studies where expert participation is scarce or does not exist, this research suggests their participation across the entire CTI process. In this case, metrics can be established to get an expert evaluation of results obtained, particularly for the analysis stage.

Interviews and questionnaires throughout the entire CTI process are suggested. Experts can also participate in Delphi studies and focus groups.

7. **Validation and delivery of final results.** It is crucial to zoom in to examine the accuracy of results obtained; validation should be developed from the initial to the final stages of the methodology. This stage represents the last verification to make final adjustments as needed. Results are then consolidated and prepared for their delivery through a report that can be communicated to the decision-maker and other stakeholders. This report should be aligned to the objectives previously established, adding value to the decision-making process. It is suggested that the content displays quantitative results; for example, figures that show the evolution of the industry, market, technology, product or process, emerging areas, readiness level, its performance, the predominance of areas, and position by authors, countries, companies, collaboration networks, market share, economic feasibility and distribution. Additionally, it is suggested to include qualitative results such as scenarios for industry, market, technology, product, or process. Furthermore, metrics can help to systematically monitor research activities at international, national, regional, and industry levels.

It is also fundamental that this report considers user preferences in terms of several aspects such as presentation style, content, and delivery time.

8. **Decision making.** This step represents the execution of results obtained, where decisions are taken by the people in charge of R&D and innovation. The result obtained previously is transformed into a specific action, and it is an input to decide what should be monitored constantly, which is also a differentiator of other approaches. It is imperative to stimulate debate and discussion, looking for competitive advantages.

#### 4. DISCUSSION

The methodology proposed in this paper promotes the integration of metrics through a CTI eight-step process. Like those of Table 1, current studies are mainly focused on a statistical analysis of secondary information,

principally through data mining of scientific and patent information applying techniques such as scientometrics and patentometrics. A gap still exists in the application of metrics under a strategic perspective, such as that of CTI, where primary and secondary information can be combined, and quantitative and qualitative metrics are integrated with the insight of experts. Such insight is required to support and validate metrics to ensure the production of reliable outcomes. Figure 1 illustrates how metrics could be integrated into the CTI methodology previously presented, where the principal contribution is for four steps. The second step is to identify the best information sources. The fifth step is where metrics acquire the most critical role of the CTI process, being possible to reveal strategic elements for R&D and innovation as early warnings, technology- and market-lifecycles, potential collaborators, technology impact and so on. The sixth step is where the insight of experts can help to refine results and broaden the scope of the study. And the seventh step involves validation and the elaboration of an

executive report, integrating the most relevant insights.

Through this CTI global methodology, we aim to fill the gap regarding the current use of metrics. This can be an essential guideline for assessing science and technology evolution supporting strategic planning for R&D and innovation initiatives in technology-based organizations. Leaders should set new directions toward strategic changes to achieve competitive advantages (Verlander 2012). This effort may represent an important alternative to give a better overview of science and technology, giving the possibility of detecting opportunities and threats on time to gain competitive advantages through R&D and innovation.

## 5. CONCLUSIONS

In a globalized world where competition is becoming more complex, professionals should adapt, change, and develop competitive advantages by assessing the evolution of science and technology research. Metrics analysis represents a strong contribution for the research activities to be more

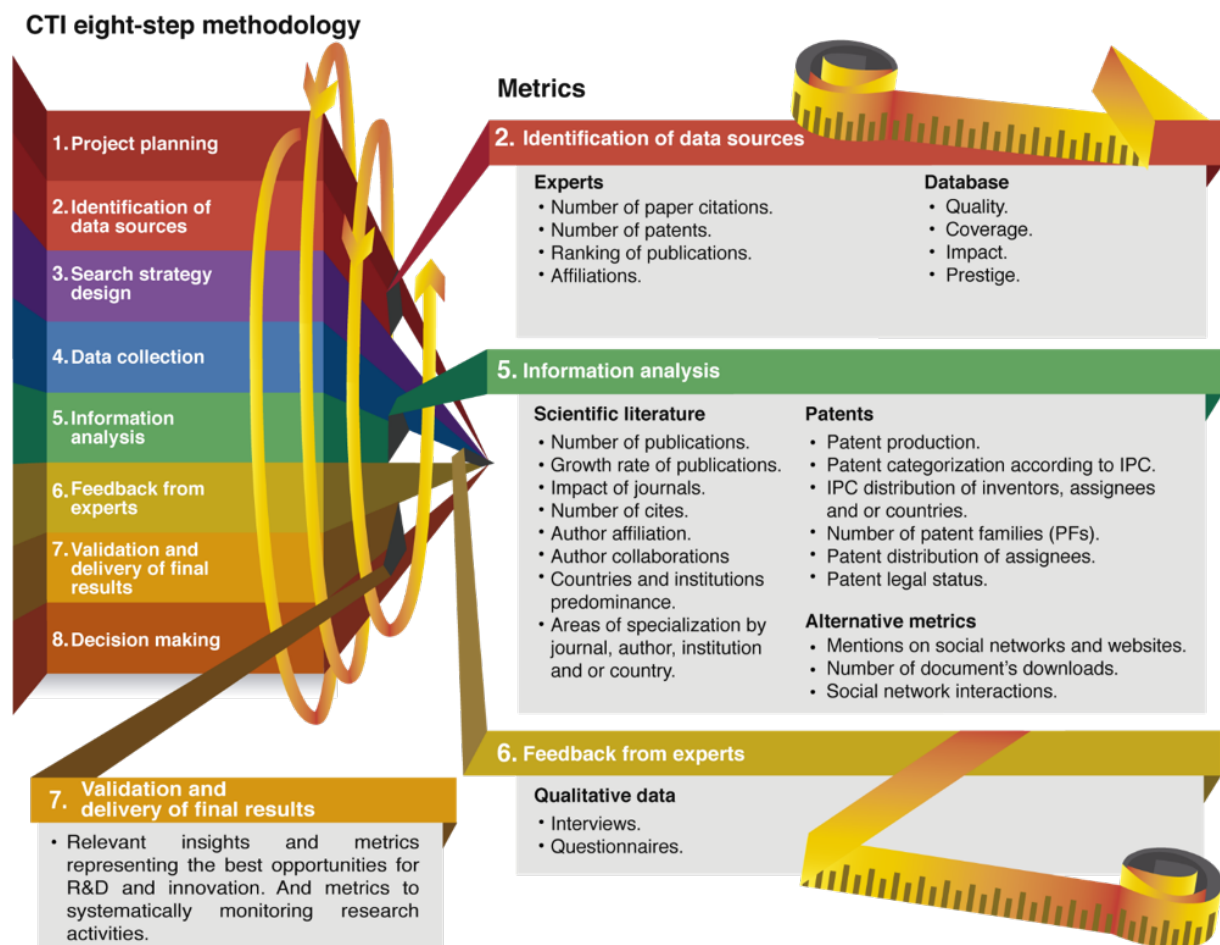


Figure 1 Competitive technology intelligence (CTI) eight-step methodology incorporating metrics.



understandable. However, they do not offer a complete solution to anticipate and detect continuous changes in the external environment as CTI does. While current research focuses mainly on analyzing secondary information through quantitative metrics, this proposal goes further by considering 1) primary and secondary information, 2) quantitative and qualitative metrics, and 3) insight of experts into a CTI eight-step methodology, with an emphasis on the stages of identification of data sources, information analysis, feedback from experts, and validation and delivery of final results.

The proposed methodology can be applied to disclose the dynamics of an industry, market, and a scientific and technological field, predicting new technologies, movements of competitors, disrupting activities, market changes, and future trends. Moreover, this approach can enable the early detection of scientific and technological opportunities or threats by monitoring the competitive environment continuously and supporting the strategic planning of R&D and innovation.

Finally, it is relevant to state that the implementation of this global approach requires identifying specific metrics to incorporate according to the objectives to pursue, the industry, and the project context. Furthermore, novel metrics and automation processes to interpret information are continuously emerging. Consequently, it is crucial to keep abreast and include them in future research.

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## CONFLICT OF INTEREST

The authors declare that they do not have any conflicts of interest.

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