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Identification and understanding of the influence of antecedents to strategic alignment in a business intelligence context.

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Abstract (English)

The effective information management in organizations is recognized as a critical factor in developing and maintaining competitive advantage, and, for this reason, companies are massively investing in business intelligence. Business Intelligence aims to improve strategic decision-making by enabling the data to be used more efficiently and to gain a better understanding of the organization and the competitive environment (Foley & Guillemette, 2010).

Main pillar of this work, BI alignment process is decisive for the successful implementation of any BI project. It is considered the first step to properly set up a winner BI plan, ensuring profitable longevity through continuous improvement, control and organization. Considering the large amount of different critical success factors to the alignment process in BI, past studies converge to what is called "major antecedents", i.e.: the most relevant of all the CSFs, i.e.: 1) BI governance; 2) Shared BI view; 3) Data-centric business culture; 4) Shared knowledge; 5) Flexible architecture in BI. Considering this fact, all other "smaller antecedents" won't be covered in this study.

Supported by qualitative methods, the present research in the form of case study was applied to a large Canadian financial institution's list of employees, who had implemented a business intelligence strategy for at least five years. The findings of this study can contribute to both Canadian academic and business environments, by identifying and understanding the influence of antecedents to this strategic alignment process in a Business Intelligence context.

Abstract (Français)

La gestion efficace de l'information dans les organisations est reconnue comme un facteur critique dans le développement et le maintien des avantages concurrentiels et, pour cette raison, les entreprises investissent massivement dans des systèmes BI. La Business Intelligence vise à améliorer la prise de décision stratégique en permettant une utilisation plus efficace des données et une meilleure compréhension de l'organisation et de l'environnement concurrentiel (Foley & Guillemette, 2010).

Principal pilier de ce travail, le processus d'alignement BI est décisif pour la mise en œuvre réussie de tout projet BI. Il est considéré comme la première étape pour bien mettre en place un plan BI gagnant, assurant une longévité rentable à travers de l'amélioration continue, le contrôle et l'organisation. En considérant la grande quantité de différents facteurs de succès critiques dans le processus d'alignement BI, les études antérieures convergent vers ce qu'on appelle les "antécédents majeurs", i.e. : les plus pertinents de tous les CSF: 1) La gouvernance BI; 2) Vision BI partagée; 3) Culture d'entreprise centrée vers les données; 4) Connaissances partagées; 5) Architecture flexible en BI. En fonction de ce fait, tous les autres "petits antécédents" ne seront pas couverts dans cette étude.

Appuyée par des méthodes qualitatives, la présente recherche sous forme d'étude de cas a été appliquée sur une liste des employés d'une grande institution financière Canadienne, qui avait mis en œuvre une stratégie BI depuis au moins cinq ans. Les résultats de cette étude peuvent contribuer à la fois aux milieux universitaires et commerciaux Canadiens, en identifiant et en comprenant l'influence des antécédents sur ce processus d'alignement stratégique dans un contexte de Business Intelligence.

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"Not all those who wander are lost" - J. R. R.Tolkien

Keywords

Strategic alignment, alignment process, business intelligence, business intelligence antecedents, BI governance, shared vision, data driven business culture, data-centric business culture, shared knowledge, flexible business intelligence architecture.

Chapter 1

Introduction

The effective management of information is a critical factor for any organization that wants to develop and/or maintain its competitive advantage, and business intelligence is key in this context.

The term BI can be used to refer to: 1) Relevant information and knowledge describing the business environment, the organization itself, and its situation in relation to its markets, customers, competitors, and economic issues; 2) An organized and systematic process by which organizations acquire, analyze, and disseminate information from both internal and external information sources significant for their business activities and for decision making (Lönnqvist & Pirttimäki, 2006). Business intelligence owes its high importance to information overload, offering more refined data, control methods and stocking. Business intelligence also improves the quality of the decision-making process (fact-based) and organizational agility, empowers functions to achieve strategic objectives, simplifies data sources and improves data quality (a single version of the truth) (Guillemette, 2016).

It is through the 3 following approaches: 1) Passive BI (reports); 2) Interactive BI (dashboard and OLAP), and/or 3) Proactive BI (forecasts); that BI enables aspects such as the increase of conquest,

retention and loyalty indexes, product quality improvement, manufacturing costs reduction, profitability improvement and greater control of the company (Friedman & Strange, 2004).; (Howson & Duncan, 2015).

Business intelligence implementation do not owe it success merely to the deployment of modern technologies. Even though companies nowadays have at their disposal an immense variety of BI solutions, many still struggle to implement their BI projects and do not get the expected results at the end. Numerous factors influence this context in both positive and negative ways, but one aspect is key and must have its influence scrutinized: BI Alignment.

Prior researches argue that alignment between business and information systems (IS) strategies enhances organizational performance (Chan, Sabherwal & Thatcher, 2006). Alignment leads to more focused and strategic use of IT which, in turn, leads to increased performance (Chan, Sabherwal & Thatcher, 2006).

Following the above-mentioned line of reasoning and supported by past studies, this work aims to develop a better understanding of this adaptation process in the context of BI projects, by focusing on the antecedents of strategic alignment in BI context. Our research identified 5 important factors that, when properly managed, should help to increase the degree of alignment between business intelligence strategy and business strategy. By doing so, organizations will be in a better position to increase their performance creating, per consequence, a virtuous cycle which will, in a sustainable way, differentiate one company from its competitors.

Our research is particularly relevant in a context where companies are increasingly investing money, as well as human effort from many organizational functions, in BI initiatives.

Chapter 2

Literature review

Before exploring the antecedents to strategic alignment, it is relevant to understand the concept of strategic alignment itself, which can be defined as the degree to which the mission, objectives, and plans contained in the business strategy are shared and supported by the IT strategy (Reich & Benbasat,1996). A high degree of alignment means that the organization is applying appropriate IT in given situations in a timely way, and that these actions stay congruent with the business strategy, goals, and needs of the organization and its users (Luftman & Brier, 1999).

It seems clear from the literature that there are at least two distinct conceptualizations of alignment. The first is alignment as an ongoing process, which requires specific IT management capabilities, encompasses specific actions and reactions and has discernable patterns over time. The second is alignment as an end state, which focuses on the antecedents, measures, and outcomes of alignment. In past studies, authors have seen the value of both streams and consider both alignment perspectives to be necessary (Chan & Reich, 2007).

In general, the process view of alignment has been underrepresented in research to date, given the widespread acknowledgement that alignment is an ongoing activity (Chan & Reich, 2007). Based on the above presented facts, our study is focused in identifying and understanding the influence of antecedents to strategic alignment in a business intelligence context.

Considering the large amount of different critical success factors to the alignment process, it is important to mention that past studies converge to what is called "major antecedents", i.e.: the most relevant of all the CSFs. By picking only the 5 most relevant ones, this study is focused in: 1) BI

governance; 2) Shared BI view; 3) Data-centric business culture; 4) Shared knowledge; and 5) Flexible architecture in BI. Being so, all other "smaller" antecedents will not be covered in this study. A case study research approach will be used since the phenomenon under study has not been studied to date.

The path taken to establish the 5 antecedents herein presented as being the "main ones", began with a research carried out in different sources of information, such as: ProQuest; Scopus; Ebscohost; Google Scholar.

Through careful selection, where we utilized 83 literary references that point to several critical success factors to BI alignment process, we focused our efforts in those whose relevance is considered indispensable in the analyzed context. Our research started establishing the broad view keywords to properly guide our path since the beginning, being them: Strategic alignment, alignment process, business intelligence, business intelligence antecedents, BI governance, shared vision, data driven business culture, data-centric business culture, shared knowledge, flexible business intelligence architecture.

2.1) BI alignment process (past research)

The BI alignment process has been previously studied, presenting its importance in a general context of the business arena. Business-IT Alignment, or BIA, can be defined as "applying information technology (IT) in an appropriate and timely way, in harmony with business strategies, goals and needs" (Luftman, 2000, p3.). The construct of Business-IT Alignment was formulated based on the alignment framework proposed by (Henderson & Venkatraman, 1993).

The endeavour of implementing a BI project passes through the necessity of having in place, a proper BI alignment process. On a research made by Li, 2010, in which he analyses the BI

alignment through business architecture, a comprehensive business architecture methodology was developed and presented, aiming to address and improve business and BI alignment. His research, based on the proposition that a comprehensive business architecture is required to enhance business, presents a peculiar contribution: The key contribution of his research demonstrates that the business can greatly benefit from the development of the business architecture that provides improved alignment with the BI processes (Li, 2010).

In a present scenario driven by fierce competition, the path to success of a company goes through the theme at hand. To increase the alignment level, an organization must be able to first identify, and then understand, the BIA enablers or antecedents. Only then will it be able to focus on the most critical items that can dramatically improve the BIA. An ability to recognize what causes BIA can reduce the risk of alignment management failure, which is mostly caused by an inefficient management of the organization's resources (Weiss & Anderson, 2004) and which in turn, wastes precious time and money from effort to resolve IT-related problems (Chan, 2002).

Previous studies reinforce the importance of the theme herein scrutinized. Business-Information Technology Alignment or BIA has been proven by many researchers to help organizations in a variety of ways, such as by maximizing the return on Information Technology (IT) investment (Charoensuk, Wongsurawat & Khang, 2014; Kashanchi & Toland, 2006).

In another interesting study by Luftman, the author reveals that it is possible to assess the degree or level of alignment to make it more tangible (Luftman, 2000). Thus, giving tangible form to this theme, the companies can focus on aspects that differentiate them, through continuous improvement, for example.

In a research where the authors aim to clarify "what are the antecedents of BIA as of today?" they point to the relevance of some themes that will be approached later in this work, such as: Shared

domain knowledge; communication between business and IT; and IT infrastructure flexibility (Charoensuk, Wongsurawat & Khang, 2014 p. 134.).

To conclude the relevance of this subject and showing the need to better understand the antecedents that impact the BI alignment process and how they do it, in terms of organizational performance/sustainability, its importance is evident to us. We found that Business-IT Alignment does have a positive relationship with organizational performance (Charoensuk, Wongsurawat & Khang, 2014). BI alignment process should help firms to ensure long-term sustainability in terms of BI projects deployed in any company (Gerow, Grover, Thatcher & Roth, 2014).

2.2) BI governance (Past research)

The theme herein studied is a relatively new and evolving discipline. It encompasses the people who are responsible for data quality, the policies and processes associated with collecting, managing, storing and reporting data; and the information technology systems and support that provide efficient infrastructure (Young & McConkey, 2012).

BI governance is not purely based on policy establishment, as popularly thought. Information systems, human factor, business procedures & politics also consist of functional parts, which implies the introduction of a proactive approach towards the adoption of BI governance, aiming the alignment of BI goals with the organization's strategy (Zaydi & Nasserddine, 2016). "Unfortunately, there is a huge cognitive gap between the view of a strategic initiative articulated in terms of business goals, processes, and performance on one hand, and an implementation of BI governance in terms of databases, networks, and computational processing." (Barone, Peyton, Rizzolo, Amyot, Mylopoulos & Badreddin, 2015, p.1).

To properly set up BI governance practices, Breur (2009) suggests that organizations progress through information about sources of non-quality and associated organizational costs, training and awareness throughout the organization in conjunction with supporting tools and technology, and alignment and accountabilities that make producing quality the default (Breur, 2009).

Studies herein utilized, presented a positive and crucial relation between BI governance and BI alignment process. For example, Yeoh, & Popovič, (2016) highlight the importance of having in place both steering committees and strategic vision: "Having such a project steering committee composed of a group of senior managers boosted the implementation process, leading to a standardized, business-aligned BI system." (Yeoh & Popovič, 2016, p.140). "Aligning the business case with the organizational vision requires that a strategic vision exists in the first place." (Yeoh & Popovič, 2016, p.140).

In another study, Charoensuk, Wongsurawat, & Khang (2014) present meaningful outcomes: "Results from the model's analysis show that five items were confirmed as BIA (Business-Information Technology Alignment) antecedents: shared domain knowledge; communication; planning sophistication; IT success; and IT management sophistication. Shared domain knowledge had the strongest relationship with BIA. The relationship between "planning sophistication" and "IT management sophistication"; and the relationship between "IT management sophistication" and BIA were moderated by organization size (Charoensuk, Wongsurawat & Khang, 2014).

To gain the benefits of BI systems, it is important to evaluate, assess, and improve factors that have an influence on BI success (Salmasi, Talebpour & Homayounvala, 2016), bringing with it a natural process of continuous improvement.

The backbone of BI is governance (Limaj, Bernroider & Choudrie, 2016). Effective governance in any BI initiatives entails controlling, directing, or strongly influencing actions and includes

establishing and enforcing related policies. Unfortunately, people often think of governance as a constraint. A solid governance structure actually promotes resourceful thinking within an organization. The most benefit out of effective governance is the alignment of the BI initiatives with the business priorities, collaboration of business leaders to arrive at the enterprise view and promotion of the BI accomplishments throughout the organization. More studies lead us to valuable findings: Corporations with higher levels of BI governance capability are more likely to maximize the contribution of their BI investments to firm value (Ali, Green & Robb, 2015), BI governance positively affects information collected and distributed to managers through various BI systems (Kubina, Koman & Kubinova, 2015) and data quality maintenance is supported by an appropriate BI governance structure, specifically the allocation of decision rights and procedures (Breur, 2009). Organizations that practice good BI governance have an opportunity to realize the dream of having successful BI initiatives in place (Ahmad, 2015), once it increases, for example, data quality, control & dissemination, all indispensable for the company that wants to differentiate.

The collection of works presented above should be considered enough to lead us in classifying BI Governance as a factor that needs to be in the spotlight when studying Business-BI alignment process.

2.3) Shared BI view (Past research)

Shared BI view, also stands out as an important player of the BI alignment process. Whether strategic, tactical or operational, dedicated to a single or multifaceted goal, the business intelligence vision defines the content of business intelligence projects and provides a guide for planning new application development projects (La Grouw, 2008). It would therefore guide the evolution of business intelligence over time and thus facilitate strategic alignment (Davenport & Quirk, 2006).

Past studies highlight the importance of having a shared BI view in dynamic environments. In a business organization, professionals involved in solving specific tasks either share the same data, and/or the activity of one professional depends on the activity of another business colleague. Therefore, it is necessary to find the quickest and most convenient method to access the shared resources, aiming to facilitate the structural data exchange between members of this organization, as well as having real-time shared information (Savulescu, Polkowski & Dutta, 2016).

Another fundamental factor arose from previous studies we utilized, emphasizing the importance of interrelations, through the involvement of people from different hierarchic positions and different departments. Specifically, top managers, a special staff in the intelligence unit and the general body of line managers in different functional areas, should all join in this important intelligence function (Gbosbal & Kim, 1986). Still in this context, another study also evidences these interrelations. The findings also contribute evidence on the importance of shared domain knowledge and the interrelations between senior business, IT executives, and operational-level managers for enhancing BI shared view (Elbashir, Collier, Sutton, Davern & Leech, 2013).

The need to deploy a system that leverages BI initiatives, is pointed as another important factor within the theme herein scrutinized. The organization must establish a comprehensive system to develop corporate intelligence, which should include the acquisition and circulation of information within the company (Gbosbal & Kim, 1986).

Keeping pace on the competitive advantage and profitability field and aiming/dreaming with a perfect cycle of constant and positive trend of sustainability, shared BI view has an intimate connection to BI alignment process, being per consequence a relevant part of this study. To help us further substantiate the importance of the topic here addressed, and before moving on to the next antecedent, (Elbashir, Collier, Sutton, Davern & Leech, 2013) confirm the crucial role of shared BI

view in translating organizational resources into capabilities that enhance the business value of BI (Elbashir, Collier, Sutton, Davern & Leech, 2013).

2.4) Data-centric business culture (Past research)

Guiding future actions based on reliable information becomes essential for those companies aiming to differentiate themselves. Information use is the key for managers operating amidst highly competitive environments (Popovič, Hackney, Coelho & Jaklič, 2014) .

Business intelligence and analytics (BI&A) has emerged as an important area of study for both practitioners and researchers, reflecting the magnitude and impact of data-related problems to be solved in contemporary business organizations (Chen, Chiang & Storey, 2012), and in this context, data-centric business culture presents its importance.

To work accurately, in addition to the importance of the human factor, process management, big data, as well as the data quality factor, the cultural dimension presents itself as a theme of major concern within the Business Intelligence field. The recognition of the role that organizational culture plays as a catalyst for the success or failure of business intelligence projects is critical to facilitating the accessibility and usage of information in the business (Howson, 2008). An analytical culture of decision making has also been associated with making better business decisions across the organization (Popovič, 2012,).

Providing data-centric decision support for organizational decision processes is a crucial but challenging task. Business intelligence and analytics (BI&A) equips analytics experts with the technological capabilities to support decision processes with reliable information and analytic insights, thus potentially raising the quality of managerial decision making. However, the very

nature of organizational decision processes imposes conflicting task requirements regarding adaptability and rigor (Kowalczyk & Buxmann, 2015).

Data-centric approaches such as big data and related approaches from business intelligence and analytics (BI&A) have recently attracted major attention due to their promises of huge improvements in organizational performance based on new business insights and improved decision making. Incorporating data-centric approaches into organizational decision processes is challenging, (Kowalczyk & Buxmann, 2014), and due to the close relation between data-centric business culture and BI alignment process, we will, herein analyze this relation.

2.5) Shared knowledge (Past research)

Shared knowledge is described as "an understanding and appreciation among IT and line managers for the technologies and processes that affect their mutual performance" (Reich & Benbasat, 2000, p.81-113).

To leverage the BI alignment process, and aiming to obtain competitive advantage, some details demand proper attention. Organizational knowledge, such as operational routines, skills, or know-how, is a key source of competitive advantage in a more dynamic and rapidly changing environment (Lee, 2001). A key to understanding the successes and failures of knowledge management (KM) within organizations is the identification of ''capabilities'' or ''resources'' that allow firms to recognize, create, transform, and distribute knowledge (Lee, Gon Kim & Kim, 2012). Both reasons strengthen our opportunity to stress the theme herein discussed. Besides, promoting shared knowledge is an important consideration for any business looking toward the future. Understanding the dynamics of knowledge-intensive organizations is a crucial first step in establishing a strong knowledge base for any organization (Bratianu, 2015).

The relation between shared knowledge and BI alignment process as well as the advantages of having it put in place are themes whose relevance has already been addressed. Shared knowledge is vital, as it enables operational managers to engage in partnerships and teams that enhance learning and knowledge discovery activities (Elbashir, Collier, Sutton, Davern & Leech, 2013). Shared knowledge affects the willingness, as well as the ability, of operational-level managers to use information received from various sources to propose and convert new ideas into practical plans about how to use IT to execute firm strategy (Cohen & Levinthal, 1990). Shared knowledge also facilitates cross-domain and cross-departmental communication and trust and respect between operational managers (Wagner & Weitzel, 2012).

With the strengths of having shared knowledge in a business environment already presented, it is worth mentioning that its absence has also been analyzed previously. A lack of shared knowledge between business and IT is argued to be one of the key challenges to achieving alignment (Chan & Reich, 2007).

One crucial role of shared knowledge, is translating organizational resources into capabilities that enhance the business value of BI (Elbashir, Collier, Sutton, Davern & Leech, 2013), reason that frames such antecedent as one of which special attention should be given.

2.6) Flexible architecture in BI (Past research)

BI architecture is defined as the system structure comprising software elements, their externally visible properties, and their relationships. The externally visible properties include service (processes), performance characteristics, and shared resource usages (Shariat & Hightower, 2007).

Integration of business intelligence and corporate strategic management has a direct impact on modern and flexible organizations. This integration helps decision makers to implement their

corporate strategies, adapt easily to changes in the environment, and gain competitive advantages (Alnoukari & Hanano, 2017) and here flexible architecture in BI presents itself as a big player on the alignment field.

Flexible architecture in BI offers multiple benefits, including: joint process harmonization, business strategy and information technology alignment, technological cost reduction, risk and redundancies reduction, customer services improvement and enhanced responsiveness (Vargas, Boza, Patel, Patel, Cuenca & Ortiz, 2016). In the era of big data, former and robust analytical concepts and utilities needs to adopt themselves to changed market circumstances ((Marín-Ortega, Dmitriyev, Abilov & Gómez, 2014) and having a flexible architecture in BI goes through it. Adding to that, Data warehouse is playing a more and more important role in company's decision making; it is the basis for a typical business intelligence solution (Li, Qian, & Ye, 2011).

Other studies also point to interesting facts. In successful BI, information technology and the business process and strategies must be aligned together, so enterprises can manage and benefit from their investments in BI by allocating BI resources, prioritizing projects, and minimizing the risk associated with BI implementations (Ranjan, 2008). Furthermore, successful BI provides the right information to the right people throughout the organization to improve strategic and tactical decisions (Li, Shue & Lee, 2008). In other words, when a BI system is successful, the company gains tangible benefits from their investments in it (Salmasi, Talebpour & Homayounvala, 2016) and having a flexible architecture in BI is key in this context.

In a study that explored the understanding of Critical Success Factors for implementing Business Intelligence systems, Yeoh & Popovič reveal and confirm the importance of flexibility in the context presented (Yeoh & Popovič, 2016, p.216).

Advocated by auditors and regulators, flexible architecture in BI can mitigate risk and improve performance. But flexible architecture in BI can just as easily lead to problems, slowing processes with unnecessary bureaucracy or overwhelming checks and balances. Managers can avoid these problems by understanding how to design and implement flexible architecture in BI that aligns with important factors within the settings that they operate, such as organizational structure, staff expectations, and technical innovations (Vargas, Boza, Patel, Patel, Cuenca & Ortiz, 2016).

To reinforce and carry on with the analysis of the important relation between flexible architecture in BI and BI alignment process, we agree that: Although big data analytics has reaped great business rewards, big data system design and integration still face challenges resulting from the demanding environment, including challenges involving variety, uncertainty, and complexity. These characteristics in big data systems demand flexible and agile integration architecture (Chen, Li & Wang, 2015) in this environment of constant change, flexible architecture in BI and BPM (business process management) are emerging as an ultimate solution for efficient and flexible integration or modification (Jung, Lee, Kim, Nam & Na) (Vol. 639, p. 039).

With the aid of the referred works above mentioned, we can notice the relevance of the theme, and agree that it is imperative for us to give proper attention to architecture in BI and its close relation to BI alignment process.

2.7) Business intelligence alignment process (Its relationship with the 5 antecedents)

Essential to the success of an enterprise, the BI alignment process is the first step to properly set up a winner BI plan, ensuring profitable longevity through continuous improvement, control and organization. Planning describes developing a program of action on how to carry out the business

strategy. It allows managers within different business units to set goals, design projects, and develop budgets to support corporate strategy. The business units create plans that target the achievement of the metrics established in step one. As such, plans describe how each business unit will contribute to the corporate performance objectives. This requires each business unit to maintain an enterprise wide focus during the planning process. Business units must work together in areas where there is overlapped to ensure that individual plans do not contradict (Ariyachandra & Frolick, 2008), and BI alignment has key role in this scenario.

2.8) BI governance as an antecedent of BI alignment process

Considered a factor of great importance in the Business Intelligence context, BI governance can be described as: the organizational capacity by the board, executive management and BI management to control the formulation and implementation of BI strategy and in this way, ensure the alignment of business and BI (Van Grembergen & Amelinckx, 2002)

Due to business intelligence ever-changing nature towards continuous improvement, BI governance is a relevant matter to keep BI related processes under control. Organizations invest in Business Intelligence systems to improve their performance, provide management information and support decision-making. In practice however, Business Intelligence can be ineffective. While Business Intelligence software enables company-wide reporting, problems are encountered in the fit between systems' provision and changing requirements of a growing number of users (Dekkers, Versendaal & Batenburg, 2007). The use of BI tools by businesses has grown rapidly and expected to play a vital role in supporting the decision makers at all levels of an organization. As these tools are becoming critical in the decision-making process, it has become not only an information technology concern but also a management concern. Without proper governance, it would be impractical to achieve the anticipated benefits that BI tools offer. Therefore, it is important to have

a BI governance framework, which is a subset of corporate governance. In addition, proper alignment between corporate governance and BI governance can support staff at different hierarchical levels and ensure optimal value (Grandhi & Chugh, 2013).

IT governance and its relation to strategic alignment is frequently forgotten and/or neglected. In the IT market, however, we seem to have forgotten to apply some of the most elementary business policies (Van Bon, 2008). A centralized BI approach and proper BI governance should be considered as essential components of all enterprise BI initiatives (Pugna & Boldeanu, 2013).

2.9) Shared BI view as an antecedent of BI alignment process

With the fierce competition that companies face nowadays, the search for competitive differentials has become a matter of extreme importance. To keep the pace and/or to be able to differentiate from competitors, companies must pay attention to organizational innovations which, per consequence, leads to transformation. As one would expect, the transformation requires a significant investment in technology, the accumulation of massive stores of data and the formulation of companywide strategies for managing the data. But, at least as important, it also requires executives vocal, unswerving commitment and willingness to change the way employees think, work, and are treated (Davenport, 2006) and this drives our curiosity towards the necessity of better understanding what is shared BI view and its relation to strategic alignment in a BI context.

In companies that compete on analytics, senior executives make it clear-from the top down-that analytics is central to strategy (Davenport, 2006). However, having BI implemented means no guarantee of success. Many organizations that already have systems in place to collect data and gather information, often find themselves in a situation where they have no tools or roadmaps to put their vast data and information into use for strategic decision making. ((Ranjan, 2008). As promising as expanded use of BI may be, there is still the need for careful and balanced discussion

of the specific business and technical reconditions for capturing the business value of business intelligence, particularly in today's tight IT investment climate ((Williams & Williams, 2003)., 2003)

Having arrived at a point where many of the technical challenges and tradeoffs are at least well understood, attention has shifted toward expanding the ways in which BI can be used to deliver business value (Williams & Williams, 2003), which emphasizes the close relationship regarding the alignment between corporate strategy and shared BI view.

According to studies utilized as a reference in this work, CEO participation is lukewarm and strategic BI alignment remains the primary burden of the CIO (Kearns & Lederer, 2003). Participation of the CEO in BI planning helps to secure top management support (Kearns & Lederer, 2003) which is critical to BI alignment and is a dominant factor in explaining its use strategically (Kearns & Lederer, 2003).

Alignment processes that promote knowledge sharing are essential in determining BI profitability (Tallon, Kraemer & Gurbaxani, 2000). Indeed, identifying and cultivating these processes can improve profitability and result in a competitive organizational asset (Ferrier, Smith & Grimm, 1999). To achieve success, firms have had to realign not merely their BI strategy but also their business strategy and to maintain close alignment between the two" (Burns & Szeto, 2000).

More effective alignment between business and BI strategies has been found to occur where the strategy creation processes increased the dialogue between business and BI managers and the resultant strategies identified implementation responsibilities (Broadbent, & Weill, 1993), and this factor leads to understanding how having a shared BI can support the BI alignment process.

2.10) Data-centric business culture as an antecedent of BI alignment process

The popularity of big data and business analytics has increased tremendously in the last decade, and a key challenge for organizations lies in understanding how to leverage them to create business value (Vidgen, Shaw & Grant, 2017). Modern business intelligence means the development of the culture of work with big data (Globa, 2013). With the explosion of the digital universe, it is becoming increasingly important to understand how organizational decision making (i.e., the business-oriented perspective) is intertwined with an understanding of enterprise data assets (i.e., the data-oriented perspective) (Khatri, 2016).

Increasingly, corporations find themselves, operating in business environments filled with unpredictable, complex and continuous change. Driven by these competitive conditions, they look for a dynamic management of their business processes to maintain their processes performance. To be competitive, companies must respond quickly and nimbly to changing environment. One domain that has dominated the thinking of most managers from few years is organizational agility (Triaa, Gzara & Verjus, 2016),theme intimately connected to data-centric business issues.

The challenges faced by organizational managers seeking to become more data and information-driven, aim to create value (Vidgen, Shaw & Grant, 2017). In addition to that, several organizations need a clear data and analytics strategy, the right people to effect a data-driven cultural change and to consider data and information ethics when using data for competitive advantage. Further, becoming data-driven is not merely a technical issue and demands that organizations firstly organize their business analytics departments to comprise business analysts, data scientists, and IT personnel, and secondly align that business analytics capability with their business strategy to tackle the analytics challenge in a systemic and joined-up way (Vidgen, Shaw & Grant, 2017).

Business ecosystems can be complex and, faced with this data 'torrent' revolution, and organizations must quickly adapt to the new system dynamics and environment to survive. To deliver an effective business analytics strategy, all the elements or agents for change within the business ecosystem must interact, coevolve and mutually adapt to leverage and deliver analytics value (Vidgen, Shaw & Grant, 2017).

2.11) Shared knowledge as an antecedent of BI alignment process

A large body of literature indicates that organizations have largely failed to use their business intelligence investments effectively to exploit the wealth of data they capture in their ERP systems (Elbashir, Collier, Sutton, Davern & Leech, 2013). Also, recent technology research surveys show that operational and senior executives are generally dissatisfied with the information BI systems generate, and they still believe that their organizations are ''insight poor'' despite the rich data encapsulated in their ERP data warehouses (Elbashir, Collier, Sutton, Davern & Leech, 2013). Shared understanding between the CIO and TMT is a significant antecedent of IS strategic alignment (Preston & Karahanna, 2009).

In simple words, shared knowledge consists in understanding each other and "knowing the same thing", which in the end favors the alignment of action, and thus, the alignment of BI and business.

In a case study developed by (Elbashir, Collier, Sutton, Davern & Leech, 2013) regarding strategic alignment and BI assimilation, it is confirmed the important role of BI assimilation in translating organizational resources into capabilities that enhance the business value of BI ((Elbashir, Collier, Sutton, Davern & Leech, 2013) Once organizational absorptive capacity (i.e., the ability to gather, absorb, and strategically leverage new external information) is critical to establishing appropriate technology infrastructure and to assimilating Bl systems for organizational benefit ((Elbashir,

Collier & Sutton, 2011), business intelligence itself needs to be a form of knowledge management rather than an information provision function ((Marin & Poulter, 2004)., 2004).

The exposed facts enforce the weight of this peculiar antecedent, which if does not receive the proper attention, will have per consequence a negative impact during and/or after the BI alignment process. Due to its complexity and high importance related to the subjects herein studied, shared knowledge is considered a major antecedent to strategic alignment in a BI context. For this reason, this theme will be, likewise, scrutinized in this work.

2.12) Flexible architecture in BI as an antecedent of BI alignment process

Traditional information technology architectures are static and centralized. As such, they are not flexible enough for companies to quickly change their business functions to meet evolving business needs (Chiang, 2014). Although BI analytics has reaped great business rewards, BI system design and integration still face challenges resulting from the demanding environment, including challenges involving variety, uncertainty, and complexity. These characteristics in BI systems demand flexible and agile integration architectures (Chen, Li & Wang, 2015).

When building capabilities for business intelligence (BI), most enterprises focus on the elements that are visible to the business users: functionality in query/reporting tools and BI applications, training on these tools and applications, and the impact of BI on critical business processes. Far too little time is spent on "behind the scenes" or "hidden" aspects of BI: the critical underpinnings that ensure a robust implementation capable of delivering insight in a reliable, scalable and flexible manner (Friedman & Strange, 2004).

The architecture of the individual components, as well as the overall BI solution, can make or break a BI effort (Friedman & Strange, 2004). By taking those mentioned facts into consideration due to its strong connection to strategic alignment, is natural that flexible architecture in BI takes its prominence among the main antecedents.

2.13) Framework

Framework components
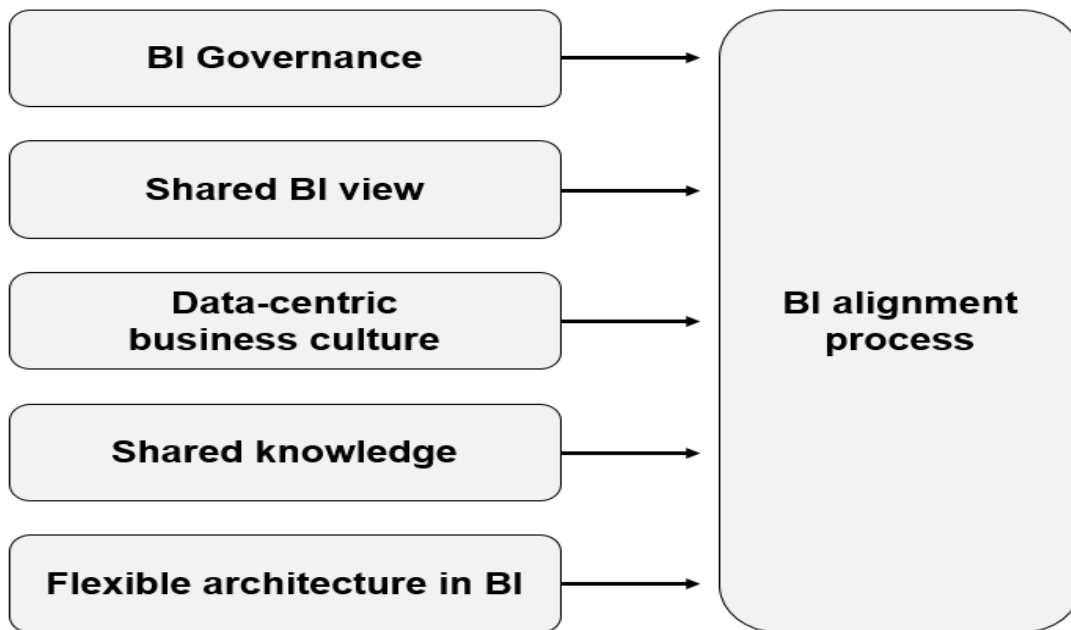
Chapter 3

3) Methodology

3.1) Case Study Methodological Approach

Supported by a qualitative methodology instead of a quantitative one, once they differ in terms where the first emphasizes words rather than quantification in the collection and analysis of data, and the second basically emphasizes the quantification, our research has an exploratory nature, resulting on a case study research. With the qualitative analysis, an approach to documents that points up the role of the investigator in the construction of the meaning of and in texts, is put in place, which offers more adherence to the aimed outcomes of our work. With the qualitative model, there is an emphasis on allowing categories to emerge out of data and on recognizing the significance for understanding the meaning of the context in which an item being analyzed appeared (Bryman, Bell, Mills & Yue, 2011). You would use the case study method because you wanted to understand a real-life phenomenon in depth, but such understanding encompassed important contextual conditions, because they were highly pertinent to your phenomenon of study (Yin & Davis, 2007).

The case study presented here, is part of a multiple-case study. In fact, our study represents the phase 2 of 2, from a research program that aims to examine how and under what conditions the implementation of business intelligence strategies generates added value as differentials for an organization. The multiple-case study purpose is centered in studying how alignment is achieved between BI strategies and organizational strategies, also checking the impact this alignment exerts on organizational performance. In brief, its goals consist in: 1) Empirically investigate the impact

of alignment between business intelligence strategies and organizational strategies on organizational performance; and 2) Identify antecedent conditions to strategic alignment and understand their influence over BI alignment process. Thus, the part herein analyzed and presented (part 2) focuses on identifying the antecedents to strategic alignment and understanding their influence in a business intelligence context, through the application of a case study. Case study is useful in the preliminary stages of an investigation since it provides hypotheses, which may be tested systematically with a larger number of cases (Abercrombie, Hill & Turner, 1984). When combined, the results of these two parts can help companies to improve the contribution of business intelligence within the organization.

This case study was based on a unit of analysis composed by a large Canadian financial institution and based on the interviews applied to 10 employees from that same company, who had implemented a business intelligence strategy for at least five years, considered by Gartner as sufficient for BI maturity to properly settle (Howson & Duncan, 2015).

To make it happen, our research director contacted the director of the BI department of a Canadian financial institution to solicit the participation of his company in this project. This person also identified and authorized other 9 key contributors within that organization, who are involved in the process of Strategic Business Intelligence alignment and could inform over the different key elements of the BI alignment process. These employees were briefed and agreed, through consent form, to participate. So, in the end, 10 interviews were conducted and given a "number" starting from 01 to number 10, lasting around one hour each. Past experiences have shown us that between 3 and 7 interviews are often sufficient for a subject of this nature (very factual and oriented around governance and management mechanisms) (Guillemette & Paré, 2012). To preserve

confidentiality, the employee's names who've participated in this study will not be presented.

The core of this research was centered in semi-structured face-to-face interviews with the organization's employees, aiming to capture as much informational details as possible about people's perceptions regarding strategic alignment drivers in BI context. For this phase, an interview guide was used (appendix 7.1). Interviews were conducted by professor Manon G. Guillemette, Ph.D., project Director and a research assistant, organized in 4 different parts:

Part 1: Demographics, aiming to understand factors such as the employee's hierarchic position at the company; general responsibilities & experience; and roles connected to BI matters. Ex.:

- What is your title in the organization?

- What are your general responsibilities?

- How long have you been in this job?

- What other positions did you hold?

- What is your role in BI? Has it changed in recent years? How? Why?

Part 2: Open exploration of research objectives, with the goal set up to understand how BI works in the company; describe who uses BI in the company, and for which purposes; BI's evolution, benefits & problems within the organization; aspects that link the antecedents to BI alignment process and the perception of the interviewees regarding these relations. Ex.:

- Describe what you do in business intelligence in your organization.

- How did the first BI projects arrive?

- Have there been any problems encountered?

- What were the benefits of BI for your organization?

- How does the business intelligence strategy create added value?

- What are the current issues with BI in your organization?

- What are the challenges?

- What is the current view of BI in your organization?

- Within your organization, how is the alignment between the BI and the business of

- the organization?

- How do you say that there is alignment?

- Is your BI-business alignment within your organization an important concept?

- How do you track the status of this alignment over time?

- What is the contribution of BI to organizational performance?

- Is it measured using objective indicators?

- What role does strategic alignment play in the performance of the organization?

Part 3: Exploration of the relevance of the 5 antecedents, where the interview is converged to a path that deeply examines aspects such as: Data-centric business culture; Shared BI view; BI Governance; Shared Knowledge; and Flexible architecture in BI. Ex.:

- Culture: How do you interpret this concept?

- How much importance do you have on maintaining BI-business alignment over time?

- How important is BI Governance to Organizational Performance?

- Shared knowledge How do you interpret this concept?

- How much importance do you give to shared knowledge in BI?

- Maturity of architecture: How do you interpret this concept

- Which of these factors do you think are the most significant? Why?

Part 4: End of interview: General acknowledgments.

3.2) Coding process

The 10 interviews were recorded transcribed and coded using a coding scheme (appendix 7.2), through NVIVO11 software. During the interviews, notes were taken by the above-mentioned professor and a research assistant, offering in the end a solid base from which we learned how the herein phenomenon manifests itself in the analyzed company.

To identify and understand the influence of antecedents to strategic alignment in a business intelligence context, aiming to construct a solid (theoretical) argumentation of the relations between the constructs, the developed coding & results flow (appendix 7.3), counts with 5 different phases, in a process of convergence and divergence, as follows below:

Coding & Results flow

Phase 1	Phase 2	Phase 3	Phase 4	Phase 5
Established the proper definitions for each one of the 5 antecedents	Definition of general key-words	Depurate main key-words (only main ones stayed)	Coding scheme	Results
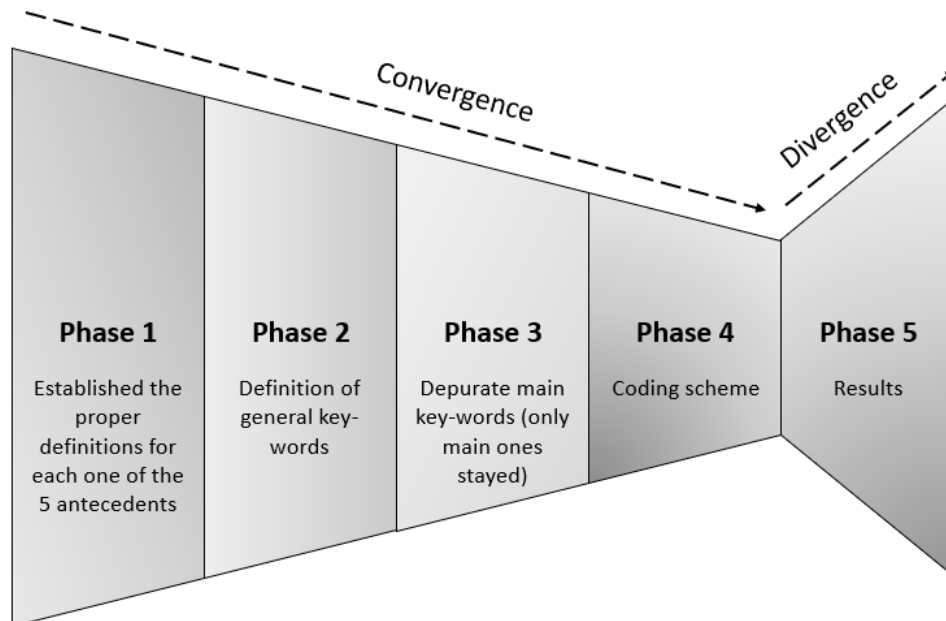
Phase 1: During this phase starts the convergence moment, where we found the proper concepts for each one of the 5 antecedents to be analyzed, based on 83 final bibliographic references. Here we established the conceptual foundations that will support us to arrive at the result of this work, enabling us to move forward in analyzing the 6 main nodes and each of their main "sub-nodes" related to our research, as follows:

a) BI Alignment Process: is the first step to properly set up a winner BI plan, ensuring profitable longevity through continuous improvement, control and organization.

b) BI Governance: is the organizational capacity by the board, executive management and BI management to control the formulation and implementation of BI strategy and in this way, ensure the alignment of business and BI. Organizations invest in Business Intelligence systems to improve their performance, provide management information and support decision-making.

c) Shared BI View: More effective alignment between business and BI strategies has been found to occur where the strategy creation processes increased the dialogue between business and BI managers and the resultant strategies identified implementation responsibilities.

d) Data-Centric Business Culture: The challenges faced by organizational managers seeking to become more data and information-driven, aim to create value

e) Shared Knowledge: Understanding each other and "knowing the same thing" favors the alignment of action, and thus the alignment of BI and business.

f) Flexible Architecture in BI: Traditional information technology architectures are static and centralized. As such, they are not flexible enough for companies to quickly change their business functions to meet evolving business needs.

Phase 2: Definition of general key-words. In this phase, we present the general keywords used since the beginning of searches and those specific keywords for each factor separately. The keywords exposed below were utilized with the goal to help us find articles in their specific field.

General keywords: Alignment process (Business Intelligence and Shared Cognition) / Alignment process (Business Intelligence and management Alignment) / Alignment process (Business Intelligence Readiness) / Alignment process (Business Intelligence Antecedents) / BI governance (BI Governance) / BI vision (Shared BI view) / Data-centric business culture (Data driven business) / Data-centric business culture (Data centric business) / Shared knowledge (Shared Knowledge) / BI flexible architecture (what is flexible architecture in business intelligence?).

Keywords for alignment process : Knowledge management systems; Self-efficacy; Social cognitive theory; Task technology fit / Corporate Performance Management, Process Management, Business Intelligence, Enterprise Application Integration, Data Warehousing / Business Performance Management, Critical Success Factors, Strategic alignment, Performance Management Framework / Business Intelligence readiness / Readiness Factors, Business Intelligence, Business Intelligence Success, Business Intelligence Readiness, intelligent systems, readiness model, success factor / Business Intelligence Antecedents.

Keywords for BI governance: Business Intelligence, Business Intelligence System, Organization of Business Intelligence, Business Intelligence Process, Business Intelligence Governance / BI governance, feasibility study, Monte Carlo method / Decision Making, Executive, Frameworks, Information Management, IT, ITIL, IT Governance, Management, Model Enhanced, Organization, Planning and Control, Strategic Alignment / Business Intelligence, BI, BI governance, BI tools,

Corporate governance, Goal alignment / Investors Security, Business Intelligence, Governance, Sarbanes-Oxley / Business Intelligence (BI), Business Intelligence Excellence Center (BIEC), Knowledge Management (KM), governance, collaborative technologies.

Keywords for shared BI view: Commerce; Decision Making, Organizational; Economic Competition; Organizational Innovation / Intelligence, Value analysis, Corporate strategy / Shared Business Intelligence view.

Keywords for Data-centric business culture: Analytics; Big data; Digital universe; Managerial decision making; Managerial work / Analytics; Delphi; Ecosystem; Management challenges; Value creation / Business Process; Business Process Management; Master change; Organizational agility / Data-oriented culture, business analytics.

Keywords for Shared knowledge: BI assimilation; BI business value; Business analytics; Business intelligence; Chief information officers; Shared knowledge; Strategic IT alignment; Top management team / Absorptive capacity; Business analytics; Business intelligence; Corporate performance management; Enterprise resource planning systems; Enterprise systems; Knowledge creation; Management accounting systems; Management control systems / Competitive intelligence; Competitive intelligence professionals; Data analysis; Evaluation; Information dissemination; Knowledge management; Library and information professionals; Personal communication; Skills; Technology use; Usage; Users / Chief information officer; IS leadership; IS strategic alignment; Matched-pair questionnaire surveys; Shared understanding; Strategic management of IT; Top management team / business intelligence, business analytics, BI business

value, BI assimilation, strategic IT alignment, top management team, chief information officers, shared knowledge / "shared knowledge" AND bi.

Keywords for flexible architecture in BI: What is flexible architecture in business intelligence? / Big data analytics; Collective intelligence; Model design; System integration / aspect-oriented software development; cloud computing; enterprise application integration; legacy integration; model driven development; service-oriented architecture.

Phase 3: Depurate main key-words (only main ones stayed). In this step, we filter the main previously raised keywords, focusing in only the most important for our purposes, I.E.: THOSE WHO comfortably adjust to the reality herein analyzed, having the following outcome:

a) Business intelligence alignment process: knowledge management systems; self-efficacy; corporate performance management, process management, business performance management; strategic alignment, business intelligence readiness.

b) Business intelligence governance: business intelligence process; business intelligence governance; decision making; it governance; planning and control; strategic alignment; corporate governance; business intelligence excellence center (BIEC), knowledge management (km).

c) Shared business intelligence view: decision making; organizational innovation; value analysis, corporate strategy.

d) Data-centric business culture: big data; analytics; management challenges; value creation; organizational agility / data-oriented culture.

e) Shared knowledge: bi business value; business analytics; strategic it alignment; top management team corporate performance management; enterprise resource planning systems; knowledge creation; data analysis; information dissemination; knowledge management; skills; usage.

f) Business intelligence flexible architecture: system integration; enterprise application integration; legacy integration; service-oriented architecture.

Phase 4: Coding scheme

The coding scheme presented below reflects the answers given by each of the interviewees about the 6 outstanding topics, deployed through the aid of NVivo11, exploding in several sub-themes that, in turn, also branch out in other sub-themes. We did not get attached merely to words in the beginning, giving a flexible aspect to our work's evolution.

Coding scheme

BI alignment process	BI readiness	Readiness & Top-down role / Sponsorship.
	Corporate performance management	Agility / Business Performance Management / Delivery managers / Human capital is risk nr.1 / Impatience fueling change / Long-term vision & Performance Management / Resistance to change.
	Self-efficacy	Better knowledge over business in present days / Efficience and its rewards / IT low knowledge avout the business in the past / IT low knowledge over the business / Low IT efficacy in the past.
	Strategic alignment	Alignment demand collaboration / Good BI alignment process / Governance & strategy / High level decisions / Properly aligned vision / Strategy deployment.
BI governance	Planning & control	A tombstone for BI governance / Audit / Control & credibility / Control & data dissemination / Control & self-evaluation / Diplomacy & pragmatism / Documentation issues / Governance & strategy / Governance for reference / Governance is nothing without deliverables / Transparency.
	Risk and data quality	Low-quality data / Operational risk 2010 / Quality control.
Data-centric business culture	Big data	Big data
	Data-centric culture	Data-centric culture
	Management challenges	Management challenges
	Organizational agility	Organizational agility
	Value analysis & Value creation	Value analysis & Value creation
Flexible architecture	Legacy - systems integration and modernisation	Legacy & big data / Legacy integration / Legacy problems
	Service oriented architecture	Architecture maturity / Consultants propose changes / Consultants propose solutions / Real time Business Intelligence / Realtime response necessity.
Shared BI view	Corporate strategy	Information access strategy / Reliable data-sources means creativity.
	Organizational innovation	An MS XL based past to modern present days / Continuos improvements / Itp-BI dark ages / New team built / Openess to change / Role definition / Teamwmork is part of the change.
Shared knowledge	Information dissemination	Autonomy & mobility / The importance of shared language.
	Strategic BI alignment	A quick alignment between IT and business / BI & IT strategic alignment.
	Usage & Data quality	Control methods to enhance usage / More efficacy for bigger adherence / The importance of adhesion / Types of users / Usage & ease of use.

All the coding process was made through listening and transcribing the interviews, where keywords and key themes were categorized according to their origin within the studied factors separately, where words and phrases connected to each subject were grouped in the end, giving us a full panorama of the studied phenomenon.

Follows below an example of how a sentence was associated to its respective code:

BI Governance => Planning & Control => Control & Credibility: "Quality control ... Imagine if there is a number that comes out and has not been cross-checked, the risk of its reputation is too great." (Interview nr. 09)

Phase 5: Results. Presents the outcome of all the process explained above. Here, each antecedent formed a cluster of their own, with the collection of words/sentences connected to them, gathered during the interviews.

4) Analysis

The analysis of a case study evidence is one of the least developed and most difficult aspect of doing study cases (Yin, 2009). During the analysis process, we triangulated the data obtained as bibliographical references, with the interviewers & interviewees' notes and perceptions over the analyzed phenomenon. Thus, many documents published openly or provided by the organization specifically to enrich the research were used to triangulate the information collected.

After creating clusters for each factor, we followed a standardized way to deep dive each of the analyzed antecedents to alignment process in a BI context, by applying the same "research questions" to all antecedents separately.

The applied strategy for our work relies on theoretical propositions. The first and most preferred strategy is to follow the theoretical propositions that led us to this case study. The original objectives and design of the case study were presumably based on such propositions, which in turn reflected a set of research questions, reviews of the literature, and new hypothesis or propositions (Yin, 2009).

While analyzing the outcome of the interviews, discrepancies between participants were managed in a way in which the same questionnaires were applied to them, in order to verify their comprehension around the proposition of this work. Even though they belong to different hierarchic positions in the analyzed company, they all worked directly with the focus theme of our research.

The documents incorporated in this work come from several sources. Here, we used the recorded interviews and its transcriptions, the notes made by the interviewers. We accessed the company's website for general information, as well as different bibliographic references. These documents combined, validated and complemented the perceptions of researchers about the identification and understanding of the influence of antecedents to strategic alignment in a business intelligence context.

The results obtained from this work will be the object of scrutiny by the following members of a composed jury: Olivier Caya PhD; and Daniel Chamberland-Tremblay PhD; both professors of the Business Intelligence Strategy Masters course at Sherbrooke University. Through the same results, it will be able to identify the indispensable elements to be managed aiming to ensure the success of the BI strategic alignment. In doing so, managers and academics will be able to better understand the factors that must be controlled, the importance of these factors, as well as their influence in a BI alignment context, a matter that has not been empirically studied until now.

From this part on we present the results of each specific antecedent, and, to properly address their relevance to strategic alignment in a business intelligence context, it was imperative to identify some aspects, as follows below.

4.1) Shared BI view (Analysis)

4.1.1) What is shared BI view at the Canadian financial institution herein analyzed?

Mentioned by 10 out of 10 respondents in this work, shared BI view presents its relevance through the necessity of increasing access to information, with the finality of improving agility and decision making, thus increasing the chances of reaching better results. To make it happen, BI and Business people had to work close and better understand each other's necessities.

The shared BI view was initially ignited by a top-down spark, CEO level, and driven by simplicity to make people aware of its importance. "It is the vision of the company that determines the IT vision, the BI vision and so forth." (interview 10). After a top-down kickoff, all the company stakeholders were involved, through the implementation of committees in different levels: Strategic, tactic and operational (sectorial), naturally making of it a bottom-up process as well.

Mutual collaboration was fundamental to have all the company committed, and to engage people, it was crucial to properly address the message to all. "Everything is in the message. Then the message must fit the culture, so that you have BI vision, then you just have to sell it." (interview 06).

4.1.2) What is the shared content?

The shared content arises from the needs of the different Business units inside the financial institution herein analyzed, all with the active participation of BI. The shared content consists of reliable data processed, transformed into valuable information and made available to those who need it at the right time. In a simple way, it`s having the right information at the needed time, where simplicity is key.

At the BI and organizational levels, its shared contents can be noticed, varying from enhanced data quality, mobile and more reliable analytics, all through better adapted tools (servers, database and newly developed tools), making it all more accessible to everyone. Important to mention that a shared and more "solidary" language between BI and Business was also referred, where its relevance is also perceived as a facilitator to the BI alignment process.

4.1.3) The view itself, what is it?

For many of the interviewees, BI view is considered the most important factor among the 5 antecedents herein scrutinized. "The most important? ...In my case, I think it's the vision. Knowing where we are going to, helps ourselves whenever in doubt." (interview 08).

The representation of the BI view itself converges to having a clear vision, with clear and well-defined objectives, all this aiming to allow more employees to have access to higher quality data. Having a central, unified and aligned vision can resume the core for this subject. Creating and having common language and understanding, is believed to lead the company to organizational agility. Still in this context, the BI view sometimes is understood as representing the same as the companies own vision. "To me, the BI view must be merged with the company's vision." (interview 04).

4.1.4) How is it shared?

This content is shared through an BI excellence center, through which the outputs are directed to the respective internal clients. As previously mentioned, deliverables are made based on client need and through common language.

Proactive initiatives, such as: "We're here to help you", also support the establishment of a better understanding and alignment between business and BI departments, and results in content being shared more effectively.

The work together spirit, greater collaboration and clear guidelines start from and are aligned to the company's own policy, having an initial top down kickoff (CEO level), with further involvement of all levels, bottom up style.

4.1.5) Why do respondents think that "it" is shared?

Facts that lead respondents to believe that the content is shared, are perceived in relationships that occur internally, all based on teamwork, mutual collaboration, clearer orientations, higher delivery capacity, greater credibility and common & more aligned BI view among all players involved.

4.1.6) How does the shared BI view influence alignment?

During the analysis of the shared BI view antecedent, we noticed positive effects over the influence of strategic alignment. It starts with the involvement and sponsorship of c-level executives, through a message requesting the collaboration of all (top down).

The objectives are formulated and transmitted, in a simple and coherent way, to all the players. The approximation between the BI and business areas, consequence of that BI shared view, is perceived, in the herein analyzed financial institution, through a present greater cohesion between those teams. More collaborative, and better understanding the domain of others, brought people to work on the same problem, aiming a joint solution. Information silos were dissolved, and communication was improved through a shared BI view.

Having a shared BI view also presents other positive effects, which can be noticed throughout a cascade of benefits. It's reflected on having data source unity, greater access to quality data at lower costs, on a faster and tailor-made way according to the client's needs.

At the end, shared BI view canalizes the company's efforts towards a virtuous cycle of constant improvement in the future. "Concerning the company's future, the priority is to go further through the proper application of analytics." (interview 03).

4.2) BI GOVERNANCE (Analysis)

4.2.1) What is BI governance at the Canadian financial institution herein analyzed?

Theme unanimously addressed by the respondents to our research, BI governance is a common concern from top management, across the company, passing through the BI and business departments. With involvement of top management, BI governance was implemented in the herein analyzed company in a top down manner. Such initiative is perceived as a necessary evil in the path towards performance improvements. "Governance is a necessary evil, representing the means, but not the final objective itself." (interview 04).

BI governance was deployed seeking to make good quality data possible, on a standardized way, and available for all. In this context, data quality control is a requirement to support decision-making. "It's more a control of the quality of information." (interview 01). Governance reputation is always at stake, and any mistake regarding good data can be costly for the company. "Imagine if there is a number coming out that has not been cross-checked, the risk to its reputation is too big." (interview 02).

In addition, and enriching the analysis over the scrutinized subject, BI governance is perceived as a synonym to business intelligence in the Canadian financial institution herein analyzed, being strongly linked to BI architecture and already incorporated to the organizational culture.

4.2.2) What is the governed content?

Centered in information management, one of the biggest challenges for BI governance is how to treat the high volume of data originated from numerous sources, having the concern of making it available to everyone, swiftly and with quality. "The big challenge will be dealing with higher data volumes." (interview 03). Thus, BI Governance has the role of quality information producer at the service of others in the company.

4.2.3) The governance itself, what is it?

As earlier discussed, BI governance is perceived as a necessary evil, which, if not properly deployed, can make things difficult for the company. BI governance is not understood as being a merely bureaucratic matter, on the contrary, itself represents the means applied to supporting organizational agility, at the service of all. If information doesn't reach it's public at the right time, with the proper quality, in the end it will all be a big waste of efforts. "Governance means nothing without delivery." (interview 06).

4.2.4) How is it governed?

Supported by a service-oriented architecture, BI governance controls and keeps different types of data in conformity, from its source, establishing who is responsible for what. The adopted governance model works over the concepts of prioritization of activities and deliverables, being based on the nature of internal customer demand and control. "We have made a governance

framework fully based on the type of data, the applicability of what the customer wants, and presenting the necessary controls for each task." (interview 02).

Through the rules of BI governance, which seek to maintain the balance between agility and rigor, the company can realize how things have changed for the better with all the necessity of control that this analyzed antecedent to BI alignment process stands for.

4.2.5) Why do respondents think that "it" is governed?

In a past marked by lack of governance, the information was confusing, often coming from different sources from which there was no control, consequently compromising its own credibility. "It was an information spaghetti." (interview 03).

It was through implementation and respect for strict control principles, that people could believe that things took a more organized form, positively crediting BI governance for it. "The same information was prepared by 25 people in 25 different teams. Today you can find it in one single place." (interview 03).

The analysis of BI governance in the studied company leads us to understand why respondents think that "it" is governed. The signals can be noticed, such as: Greater data flow; high access to information; teamwork; development of common language between business and BI; and greater general efficiency. When asked about what's controlled through BI governance, one of the interviewees responded: "What is controlled though BI Governance? Well, in fact everything." (interview 02).

4.2.6) How does the BI governance influence alignment?

In the analyzed company, strategy is canalized through the effects of good governance, and BI governance presents its influence in the alignment process in many ways, where we highlight: The standardization of working methods; access to quality data; information quality improvement; transversally in information usage; increase of understanding of information; and cost reduction due to better and homogeneous solutions. "Now we have about one hundred systems for 800 users. We literally put hundreds in the garbage." (interview 03).

Another strong aspect of influence of BI governance in alignment process, resides in the fact that its implementation and consequent respect for its own rules and controls impose the company to a virtuous cycle of continuous improvement. "Next year we will formalize a little more the way of working to ensure that we will continue being successful." (interview 03).

4.3) Data-centric business culture (Analysis)

4.3.1) What is data-centric business culture at the Canadian financial institution herein analyzed?

Theme of importance highlighted by all the respondents to this research, data-centric business culture can be understood, in the analyzed company, as being the culture of properly working with big volumes of data, aiming to create business value through agility, with a more transversal approach between internal departments, providing all with good analytics/information.

As the other herein analyzed antecedents to BI alignment process, data-centric business culture was leveraged by senior management, on a top down manner, leading the company to a cultural change. Considered a strategic priority, this change involved all the agents within the business ecosystem

to interact, in a joined-up way, towards business value creation. "People understood that to do BI, you had to be really close to the clients…, you had to be really close to the users." (interview 03).

This cultural change led to a greater attention given to data integration, aiming higher controls and quality of the information, being able to finally make information available to those of interest, at the proper moment. Transforming the company into data-centric and working with big data is not a simple task. "Nowadays a matter of major concern among the greatest challenges for companies is centered in dealing with high volumes of data." (interview 03).

At the heart of culture, data quality and agility are vital. "We must be agile and efficient, so then we can react as quickly as possible." (interview 09). In this context, two other antecedents outstand presenting their strong influence to having a data-centric business culture: BI governance and BI architecture. The first one, with the disposition to promote a unique and trustful source of information through its business intelligence excellence center, influences the standards and controls for data quality with rigor. "The notion of a single and official source is essential in BI." (interview 06). The second one oversees, taking the information to whom of interest at the needed moment. "The fact is that with good architecture we are on top, sharply understanding all business lines." (interview 06).

With its culture anchored on the demand of the company's different lines of business, the organization moves towards having important competitive differentials such as: higher collaboration between teams; the breaking of information silos; system standardization; business agility; efficacy gains; shared language; greater transparency & integrity; and mainly a more data-centric company towards decision making.

4.3.2) The culture itself, what is it?

Focused on business department needs, the culture is closely linked to aspects such as: managing big data; the necessity of more proximity and collaboration between employees; and generating both business agility & value. It acts adding more transversality to information inside the company, being supported by teamwork and common language, making use of good quality data, and oriented a better BI alignment process.

Frequently labeled as being "a collaborative culture" by the interviewees, this culture is designed to make information achieve its precise target, on an unambiguous way and at the needed moment. "If managers have the right information, at the right time, then they make the right decision. If they do not have the right information, or have it without quality, consequently they will make poor decisions." (interview 04).

4.3.3) Why do respondents think that "the business culture" is data-centric?

By taking care of data as a real asset, the analyzed company has grown a lot on its organizational side, but things have not always been like that. With a past marked by lack of centralization and data control, it was difficult to test the veracity of the information, since each department presented its numbers on a misaligned way. "It was an information spaghetti." (interview 03). In addition to that, the relational distance between departments was an obstacle to the whole process. "There was little cohesion in the past, so we had several departments working in isolation." (interview 02).

Today things have positively changed, and a data-centered business culture is perceptible. "Our culture has been transformed into what it is now, because business people who produce data every day are now aware that it must have quality." (interview 02). With the urgency to properly address its high volume of information, and with BI at the core of strategy, nowadays everyone utilizes

standardized services. With a properly deployed data-centric business culture, the company gains became more evident. "Our data represents, each time more, our added value." (interview 09).

4.3.4) How does the data-centric business culture influence alignment?

Beyond influencing and being influenced by both BI architecture and BI governance, data-centric business culture is also a determining facilitator agent for a good alignment. Its influences positively impact alignment, through the benefits that flourish from this very model of culture. Through greater quality of information, control, support to simplify systems and processes, mutual collaboration, access to data and flexibility, the company becomes more agile. "It is due to a lot of internal simplification & flexibility, that today we can now evolve faster." (interview 02).

In addition, we also highlight that this influence can be noticed in a more effective model of BI & business planning. By working close together, they developed a common language resulting in clearer guidelines for all.

4.4) Shared knowledge (Analysis)

4.4.1) What is Shared knowledge at the Canadian financial institution herein analyzed?

Subject of relevance for 8 out of 10 interviewees at the Canadian financial institution herein analyzed, shared knowledge is represented by mutual understanding, where everybody gets to "know the same thing".

With a knowledge-based hierarchy, shared knowledge culture presents as characteristics: It started with a top-down kickoff, just as the other antecedents herein analyzed did; It's know-how is based and emphasizes the culture of "those who know"; And, it rests on shared language.

When having its analysis compared to the other antecedents herein scrutinized, shared knowledge seems to present timid signs regarding general understanding, i.e., not 100% of employees know what it means and/or just do not attribute the same weight to this antecedent as they did for the previous ones, proving it not being as widespread as the others. Nevertheless, we will further on, deepen our analysis over this subject, highlighting why the majority interviewed gave it a higher attention.

4.4.2) What is the Shared content?

The shared content consists basically in data, information and analytics. "Among the antecedents, I think shared knowledge is key. Thanks to it, you can have something that will, in fact, be utilized." (Interview 05). Another notorious factor in this context is the shared accountability that is created between people and sectors.

4.4.3) The knowledge itself, what is it?

Knowledge refers to data that, enriched by business intelligence methodologies, is transformed into valuable information and then provided to those who need it at the right time, through a clear and agile structure, in a standardized way, granting quality insight as final outputs.

4.4.4) How is it Shared?

It is through the influence of both BI architecture providing agility, and BI governance providing a standard way of doing things, that that knowledge is shared through the company. In this context we highlight the development of a shared language, enabling all to have a uniform understanding. "It is certain that having shared knowledge will help the company. It will help to forge a common language, and then to have a common perception about things." (interview 05).

4.4.5) Why do respondents think that "knowledge" is shared?

With a past marked by all sorts of problems related to its own data, the company herein analyzed had to pay attention to the shared knowledge factor, and it was through working towards an indispensable normalization of data & processes, that it managed to reach important competitive differentials.

The development of common language, key point in this discussion, increased mutual understanding, and the current perception is that now everyone has access to information in an agile way, which positively contributes to the company.

4.4.6) How many respondents have mentioned this antecedent?

As previously informed, 8 in 10 interviewees have mentioned shared knowledge as a subject of relevance. The two remaining respondents have described this subject as presenting marginal/secondary role as an influent agent to the alignment process.

4.4.7) How does the shared knowledge influence alignment?

During the analysis of this antecedent we verified the importance and influence of shared knowledge over alignment. "Sharing knowledge is the most important aspect." (interview 04).

The culture of using data to improve decision making grows the strategy more understandable to all and creates a common language. It was due to the development of that specific language that aspects such as confidence between sectors, mutual collaboration and transparency levels have all raised.

Other factors of influence arise within this context, such as: Having a helpful business partner; A proper understanding of the client domain; Anticipating problems and consequently reducing time expenditure; and, The increase in the number of employees with higher expertise.

4.5) Flexible architecture in BI (Analysis)

4.5.1) What is flexible architecture in BI at the Canadian financial institution herein analyzed?

With its importance emphasized by all the interviewees, flexible architecture in BI plays a central role in the studied context due to the soaring necessity companies present in assertively addressing the evolving business needs, in a competitive environment marked by the growing demand of information, all with quality and agility.

As anteriorly mentioned, the architecture is considered a factor that can make or break the BI effort. Its implementation at the analyzed company was sponsored by c-level executives, top-down, with the goal to support delivery capacity through agility.

BI architecture also presents influences of BI governance. This can be noticed through the respect for principles and rigor established by an internal proper data-governance model, when the company was challenged to integrate its different data-warehouses, aiming to respond to the most diverse needs in a flexible way.

The consequences of properly setting the architecture can be noticed through data integration, higher access to information, higher data quality at source, and lower costs (fewer systems / standardization).

4.5.2) What is the architecture content?

The architecture is composed by all the structure that allows information to reach its destination, presenting both quality and agility through a service-oriented architecture model. BI Systems and data warehouses are examples of resources used for enabling a better decision-making process by company managers. "In our company, architecture is organized on a "layered pattern", composed by operational systems, primary warehouses, measurement control system, secondary warehouses, counter." (interview 08).

4.5.3) The architecture itself, what is it?

Built for dynamic and flexible purposes, the architecture responds for enabling BI to deliver insight in a reliable, scalable & flexible manner, by the means of a service-oriented architecture. "It is through architecture that delivery is made possible." (interview 06).

According to some interviewees, a flexible architecture supports the vision of the company, which envisions a BI so well integrated that the users do not even feel its existence.

4.5.4) How is it flexible?

The BI flexible architecture allows the financial Canadian institution herein analyzed to provide greater access to information to its employees, by taking advantage of informational agility that this flexibility generates.

Focused on internal customer needs and data management, architecture evolves daily in the analyzed company, serving customers of the most diverse departments, in a quick and transversal way.

In this context, flexibility presents its impact to strategy, as noticed: "The adherence to our new access to information strategies depends on the flexibility of our systems." (interview 06). In the end, it is all designed aiming to simplify things.

4.5.5) Why do respondents think that "architecture in BI" is flexible?

In the past, this financial Canadian institution presented several challenges related to the theme herein scrutinized. Problems arising from lack of structure, low quality data, inadequate tools, inaccurate analysis and informational silos were part of a scenario that urged for changes. "We had BI department that behaved on a sectorial way, where employees did not know what their peers were doing in the other teams." (interview 03). The changes in architecture concentrated efforts to the integration of informatics, information and architecture.

Focusing on business needs was the next step was understanding what the customer needed, and, by doing so, it was imperative to know how BI could help in that context. Providing a flexible architecture was the answer to that situation.

Aiming to respond to the most diverse needs in a flexible way, massive investments were made in systems, and in human resources capable of operating in a new competition scenario, where working with BI and good information (just in time) was a must.

Presently, having a clearer and aligned vision, better understanding between departments and employees, higher integration of systems and greater agility are evidences that today the herein analyzed company has a flexible architecture in BI. "A few years ago, having a service-oriented architecture was quite utopic. Nowadays, through architecture we do have SOA." (interview. 10).

4.5.6) How does the flexible architecture in bi influence alignment?

The influence of a flexible architecture in bi alignment is perceived through greater synergy between different areas. "Aligning BI projects is much simpler through unified architecture and common vision. If you have no unified vision, you will then have a bunch of systems that were developed differently, adding complexity to the whole process." (interview 05).

"People call BI architects to know what data to fetch, how to use it and how to optimize the process. So, they do IT. We know that they do IT, but at the same time they respect all our rules. When they respect all the principles of architecture then they end up having shared the same vision of the future as the BI department, so, they work in the same direction." (Interview 02).

4.6) Schema (Results)

To understand the influence that the antecedents have on BI alignment process, as well as the relationship that these antecedents have with each other, we offer below a schema which points out such relations in the researched company.
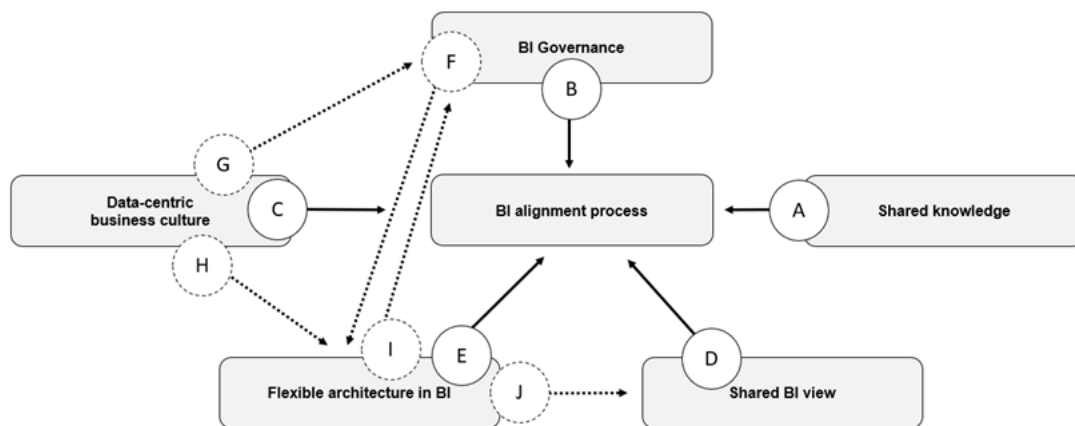
4.6.1) The 5 antecedents vs. BI alignment process (not necessarily presented in a ranked way of importance).

A) Starting with Shared Knowledge, its influence on the BI alignment process is apparent because it:

- Enables access to quality data;
- Fosters the relations between the BI and business areas;
- Helps to dissolve information silos were, and improves communication;
- data source unity, greater access to quality data at lower costs, on a faster and tailor-made way according to the client's needs;
- Involvement of C-level executives, through a message requesting the collaboration of all (top down).

B) In terms of BI governance, its influence over the BI alignment process is made apparent because it:

- Standardizes the working methods;
- Improves and enables access to quality data/information;
- Increases the understanding of information among users;
- Reduces costs due to better and homogeneous solutions;
- Creates rules and controls that imposes the company to a virtuous cycle of continuous improvement.

C) When the subject is Data-centric business culture, the influence over the BI alignment process is noticed because it:

- Provides more agility (informational and organizational);

- Developed a common language, which resulted in clearer guidelines for all.

D) For Shared BI view, its influence over the BI alignment process is perceived on the grounds that it:

- Creates a common language which raised levels of confidence, mutual collaboration and transparency between sectors;
- Grows the strategy more understandable to all.

E) When analyzing Flexible architecture in BI, its influence over the BI alignment process is perceived thanks to the:

- Greater synergy between different areas.

4.6.1) Antecedent vs. antecedent

In the relation between antecedents, according to the results of our research, the influences are evidenced as follows:

F) BI governance Vs. flexible architecture in BI

• Controls and keeps different types of data in conformity, with the support of a service-oriented architecture.

G) Data-centric business culture Vs. BI governance

• Promotes a unique and trustful source of information through its business intelligence excellence center, influencing the standards and controls for data quality with rigor.

H) Data-centric business culture Vs. flexible architecture in BI

• Makes information reach its public of interest at the needed moment.

I) Flexible architecture in BI Vs. BI governance

• Respects the principles and rigor established by an internal proper data-governance model.

J) Flexible architecture in BI Vs. shared BI view

• Aligns BI projects in a much simpler way, through a unified architecture and common vision.

Chapter 5

5) Discussion

In this section we present the academic and managerial contributions related to the previously unveiled results, showing also the limits and research avenues, as well as our conclusion.

5.1) Scientific contributions

This research was focused in the identification and understanding of the influence of antecedents to strategic alignment in a business intelligence context. Here, we consider that a proper comprehension of the above-mentioned antecedents is fundamental for both academic and business environments. We defend that, when properly managed, the antecedents can help increase the degree of alignment between BI strategy and business strategy.

Under the light of the large amount of different critical success factors to the BI alignment process, presented in the herein referred bibliography, we ended up focusing on the "5 major antecedents". Taking this fact into account, all other "smaller antecedents" were not covered in this study. Being so, the analyzed antecedents to strategic alignment in BI context were: 1) BI governance; 2) Shared BI view; 3) Data-centric business culture; 4) Shared knowledge; 5) Flexible architecture in BI.

Alignment leads to more focused and strategic use of IT which, in turn, leads to increased performance (Chan, Sabherwal & Thatcher, 2006). Relying in this fact, we present a framework, based on scientific and professional literature, having its results proven in an organizational environment, by putting all the 5 main antecedents to BI alignment process under scrutiny in a single case study, analyzing their connections with the BI alignment process as well as their relations between each other, something pioneer in the studied field.

5.2) Conceptual model validation

The case study allowed us to test our framework in different ways. Through the interview process, we were able to endorse our framework, as well as discover interesting details about how those 5 antecedents behave.

Initially, and for a clear alignment of ideas, we sought to understand the concept about each of the 5 antecedents according to the interviewees' perception. After that, and throughout the interview process, we could notice how each of these antecedents directly influence the BI alignment process in the analyzed company. In this context, we also verify how each of the 5 antecedents relate to each other.

5.3) Diagnosing the antecedents influence

The figure below illustrates the schema (Results), where we can observe how the 5 antecedents relate to and impact the BI alignment process, as well as the influence they exert on each other in the researched company.
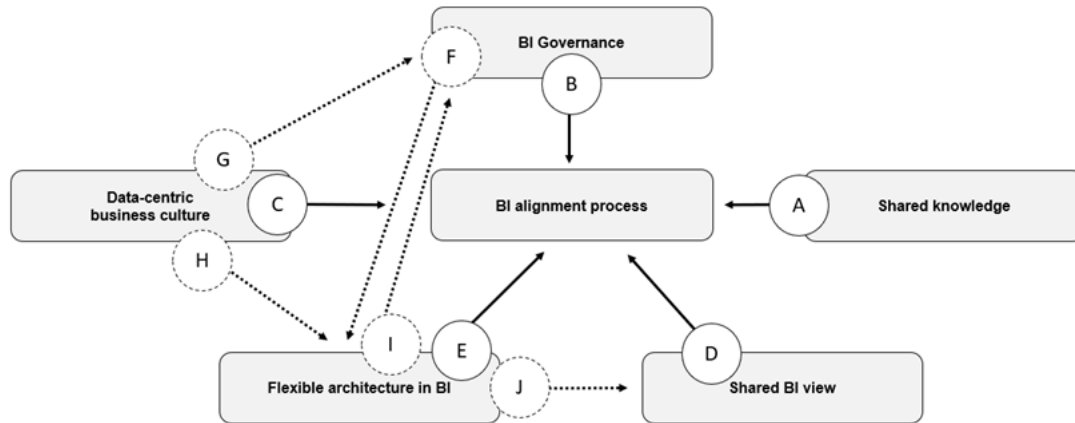
The results from our case study point to both the relevance of the developed framework and to its applicability. In this way, the framework presented here can be used to diagnose and understand of the influence of antecedents to strategic alignment in a business intelligence context.

First, when we analyzed each of the antecedents vs. BI alignment process at the Canadian financial institution, we noticed, in shared knowledge, an influence on the BI alignment process as far as it enables access to quality data; fosters the relations between the BI and business areas; helps to dissolve information silos and improves communication; creates data source unity; generates greater access to quality data at lower costs, on a faster and tailor-made way according to the client's needs. Also, we highlight that the involvement of c-level executives, through a message requesting the collaboration of all, was the trigger on a cultural change scenario (top down).

In terms of BI governance and its influence over the BI alignment process, its influence is apparent since it standardizes the working methods; improves and enables access to quality data/information; increases the understanding of information among users; reduces costs due to better and homogeneous solutions and creates rules and controls, leading to a virtuous cycle of continuous improvement.

When the subject is data-centric business culture, the influence over the BI alignment process is noticed since it provides more informational and organizational agility and it developed a common language, which resulted in clearer guidelines for all in the studied company.

For shared BI view, its influence over the BI alignment process is perceived through the developed common language between employees, which raised the levels of confidence, mutual collaboration and transparency throughout different sectors, growing the strategy more understandable to all.

When analyzing flexible architecture in BI, its influence over the BI alignment process is perceived thanks to the higher levels of synergy between different areas.

Second, when we checked the relationships antecedent vs. antecedent, with respect to the relation of BI governance vs. flexible architecture in BI, we could notice that through the support of a service-oriented architecture, it is possible to control and keep different types of data in conformity.

When we address the relationship between data-centric business culture vs. BI governance, we can note the promotion of a unique and trustful source of information through the company's business intelligence excellence center, influencing the standards and controls for data quality with rigor.

In terms of data-centric business culture vs. flexible architecture in BI, its influence can be seen when it makes information reach its public of interest at the needed moment.

While confronting flexible architecture in BI with both BI governance and shared BI view, we could observe that, in the first case, it respects the principles and rigor established by an internal proper data-governance model, while in the second case, it aligns BI projects in a much simpler way, through a unified architecture and common vision.

Regarding the general existing literature, we believe we have added value by identifying and understanding the influence of antecedents to strategic alignment in a business intelligence context, paving the way for future research that can help us to delve deeper into this topic related matters.

5.4) Managerial contributions

In a scenario of fierce competition, where companies are investing more and more their financial and human capital in matters related to BI, identifying and understanding the influence of antecedents to strategic alignment in a business intelligence context is something of essential necessity.

Currently, many organizations have implemented BI Systems or are in a process to implement them; billions of dollars are being spent to accomplish this task. However, we may hear or read about the breakdown of some implemented Business Intelligence Systems (Anjariny & Zeki, 2011).

Even though companies nowadays have at their disposal a diverse sort of BI solutions, many still strive to implement their BI projects and will not get the desired outcome. The managerial domain can benefit from this work, by translating and integrating our research findings into their strategic analysis, in respect of defining and understanding their own BI strategies.

Using the framework that we presented, managers can evaluate each antecedent and the influence over BI alignment process in their businesses, as well as comprehending the interactions between these 5 antecedents.

Through this case study research, it will also be possible to better understand why organizations with similar intelligence strategies can exhibit superior organizational performance by showing the role played by alignment with organizational strategy in creating competitive value.

Here, managers can too verify what are the factors to be taken into consideration, when aiming to promote and maintain BI alignment over time. A high degree of alignment means that the organization is applying appropriate IT in given situations in a timely way, and that these actions stay congruent with the business strategy, goals, and needs of the organization and its users (Luftman & Brier, 1999). Therefore, companies will be able to improve their BI management, ensuring the company a long-term sustainability.

5.5) Limits

Before any limitations of practical or methodological order, the greatest challenge found during our research was to select and keep focused in only in these 5 antecedents, among many others that, even though not with the same intensity, also impact the BI alignment process. In addition, many of the aspects addressed in each of the antecedents has an intangible nature and it's difficult to measure. This fact has imposed us the necessity to putting well-structured mechanisms in place, which allowed us to obtain conclusions that would properly reflect the information collected presenting a trustworthy photograph of the situation herein analyzed.

Through Nvivo11, a coding system designed for qualitative research purposes that require a deep level of analysis, working with text-based information, we were able to ensure that we were

correctly making the association between the occurrences of the collected facts to their respective antecedents.

Here, we presented the scenario of a Canadian financial institution as it is seen by its collaborators, where even taking all due precautions we know that we do not have the expertise of a cognitive sciences researcher to ascertain if the interviewees' speech was aligned with the values and creeds of each one individually.

We also know that the most exposed limit of our study, is centered in the fact that it considers the study in only one company, based on a small number of interviews. In order to obtain a saturation point, with respect to a deeper validation, we understand that the researched universe should be expanded.

Another limit of this study focuses on the choice of participants. Our research considered as its universe those professionals who more deeply knew about BI, leaving aside other impacted areas, i.e., products, sales and risk. This attribute, even giving us results of apparent validity of our framework, can be biased, since the research was applied on those who more deeply know BI. Even though we were aware of what this "controlled risk" represented, we are sure that, even with the given constraints, we selected the participants who, in an objective way, pointed to the validity of our proposed model.

Properly oriented to deploy a single case study, through an interview process with a qualitative approach, we utilized a list of 10 employees belonging to a Canadian financial institution.

Although satisfied with the results, there is still a need to further discuss and validate the research findings. Considering this fact, we highlight this limitation and recommend the use of a larger number of companies/employees in future works.

We expect that, with this thesis, we could contribute to the Canadian academic and business environments, by identifying and understanding the influence of antecedents to this strategic alignment process in a Business Intelligence context.

5.6) Research avenues

Our study constitutes a basis through which other new researches can arise, by using our thesis to deepen the general knowledge over the subject herein referred.

The central pillar of our research was focused on the interview of 10 employees from a Canadian financial institution, ranging from top to bottom of the hierarchical pyramid.

An interesting future study would be applying this same model to people who do not belong directly to the BI domain but end up benefiting from BI on a daily basis from its various forms of application. Thus, one could also evaluate the perceptions of other people belonging to other departments. In addition, increasing the sample, fact previously proposed, could also bring to light smaller details that can enrich the studied context, leading to a deeper understanding regarding the influence of antecedents to strategic alignment in a business intelligence context. In this way, it would be possible to add more to the development and propagation of best practices in this context.

The business intelligence alignment process from each company belonging to different verticals could vary. It would be interesting to apply this model to other companies clustered in several different verticals, so we could verify if there is a profile per industry type. Although Business Intelligence is seen as priority by many companies, the level of benefits achieved varies significantly between firms (Hawking & Sellitto, 2015).

Having adopted a qualitative study model that allowed us to understand the essence and depth of the theme, we would like to highlight the value of a quantitative study, not present in our work.

With benefits to both academic and business environments, another idea for the future could be the addition of a quantitative approach. In this one, researchers could likewise develop a way to verify the degree of influence of each antecedent to BI alignment process, and the impact generated in the relationship between these same antecedents. It would be intriguing to compare results from different companies having at our disposal information regarding other attributes such as vertical, company per size in terms of revenue and staff.

Another alternative as a future avenue, and which would attract much attention, would be the application of a longitudinal study in the herein analyzed company, using the same interviewees perceptions over time. With this type of research, researchers would be able to follow and measure the effects along a determined period, regarding the identification and understanding of the influence of antecedents to strategic alignment in the business intelligence context.

5.7) Conclusion

The efficient management of data is indispensable for any organization that aims to develop or maintain their competitive advantage, and here BI has an influential role. Business intelligence owes its high importance due to information overload, offering more refined data, control methods and stocking. BI also improves the quality of the decision-making process (fact-based) and organizational agility, empowers functions to achieve strategic objectives, simplifies data sources and improves data quality (a single version of the truth) (Guillemette, 2016).

Deploying BI modern technologies is not enough to reach success in the business environment. Even with an extensive list of BI solutions, many companies nowadays keep on presenting

difficulties in this field, not reaching their targeted results. According to previous studies, several factors influence this context, but one is key and deserved to be properly highlighted: BI alignment.

Through the selection of the 5 antecedents to BI alignment, i.e. those cited most frequently in the works herein used as our bibliographical references, we could scrutinize the main fundamental elements to be deployed, by addressing them an appropriate attention, in the direction of ensuring the success of a strategic alignment process. That said, the analyzed antecedents to strategic alignment in BI context were: 1) BI governance; 2) Shared BI view; 3) Data-centric business culture; 4) Shared knowledge; 5) Flexible architecture in BI.

Identifying and understanding the influence of antecedents to strategic alignment in a business intelligence context was a kickoff towards a better understanding within analyzed phenomenon, benefiting the theoretical and business environments respectively. We hope that, through this work, others can emerge and bring even more clarity to the theme in vogue.

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7) Annexes

7.1) Interview guide (disponible seulement en français)

Participant : _____   Date : _____

Canevas d'entrevue semi-dirigée

Titre : Étude des facteurs favorisant l'alignement stratégique en contexte d'intelligence d'affaires.

Introduction

- Présentation du projet de recherche
  - Objectifs :
    - *Identifier* des facteurs de succès favorisant l'émergence et le maintien d'un alignement stratégique à travers le temps.
    - Mieux comprendre *l'influence* de ces facteurs de succès sur l'émergence et le maintien d'un alignement stratégique à travers le temps.
- Faire signer formulaire de consentement à cette étape en 2 copies et en laisser une au participant.

1re partie de l'entrevue : les démographiques

1) Expérience
   - Quel est votre titre dans l'organisation?
   - Quelles sont vos responsabilités générales?
   - Depuis combien de temps occupez-vous ce poste?
   - Étiez-vous à l'emploi de la même organisation avant cela?
   - Quels autres postes avez-vous occupés?

2) Quel est votre rôle dans l'IA?
   - A-t-il changé au cours des dernières années? Comment? Pourquoi?

2e partie de l'entrevue : exploration ouverte des objectifs de recherche

3) Décrivez-moi ce que vous faites en intelligence d'affaires au sein de votre organisation.
   - Outils de présentation
   - Architecture
   - Secteurs touchés et type d'IA

4) Comment sont arrivés les premiers projets d'IA?
   - Comment cela a-t-il évolué?
   - Quels ont été les déclencheurs?
   - Y a-t-il eu des problèmes particuliers rencontrés?

5) Quels ont été les bénéfices obtenus par l'IA pour votre organisation?
   - En quoi est-ce que la stratégie d'intelligence d'affaires crée une valeur ajoutée pour votre l'organisation ?
       - Coûts, humains, partage de l'information, intégration des processus, croissance, compétitivité, etc.

6) Quels sont les problèmes actuels que vous vivez avec l'IA au sein de votre organisation?
   - Quels sont les défis?
       - Technologiques
       - Architectures
       - Humains
       - Gouvernance
       - Culture
       - Vision partagée
       - Intégration dans les processus d'affaires

7) Quelle est la vision actuelle de l'IA au sein de votre organisation?
   - Est-ce une vision formalisée?
   - Est-ce une vision partagée par tous?
   - Comment la diffusez-vous auprès des employés?

8) Au sein de votre organisation, comment y a-t-il un alignement entre l'IA et les affaires de l'organisation? (au besoin définir le concept d'alignement)
   - Comment vous y prenez-vous?
   - Qu'est-ce qui facilite ce processus?
   - Qu'est-ce qui lui nuit?
   - Comment faites-vous pour dire qu'il y a alignement?
       - Qu'il est fort? Adéquat? Ou au contraire faible et à améliorer?

9) Est-ce que, au sein de votre organisation, l'alignement IA-business est un concept important?
   - Est-ce quelque chose dont on parle? Est-ce quelque chose qui oriente la prise de décision?
   - Comment cela se vit-il au sein de l'organisation
       - Lors des exercices de planification annuelle?
       - À quelle échelle?
           - Organisation
           - Lignes d'affaires
           - Individus
       - Au quotidien?

10) Comment suivez-vous l'état de cet alignement à travers le temps?

11) Quelle est la contribution de l'IA à la performance organisationnelle?
- Sur quelle base vous appuyez-vous pour dire que l'IA a amélioré (ou non) la performance organisationnelle?
  - Est-ce mesuré à l'aide d'indicateurs objectifs?
  - Est-ce davantage dans la perception?

12) Quel est le rôle joué par l'alignement stratégique dans la performance de l'organisation?

3e partie de l'entrevue : exploration de la pertinence des 5 facteurs

Introduction
Nous avons identifié différents facteurs que nous pensons reliés à l'alignement stratégie IA-business dans l'organisation et qui peuvent contribuer à faire de l'IA un succès.

Pour chacun, nous souhaitons voir avec vous votre perception de l'effet positif/négatif/neutre de chacun de ces facteurs sur l'alignement stratégique IA-business. L'idée est de dire, pour chacun, si ça aide à faire en sorte que l'IA au sein de l'organisation répond toujours bien aux besoins d'affaires et appui la stratégie ou la mise en œuvre de la stratégie d'affaires au sein de l'organisation

(Pour chacun des thèmes, réajuster la compréhension de sa signification par le participant au besoin. Pour la gouvernance, être particulièrement vigilant à la « gouvernance IA » générale vs des concepts plus précis comme « BICC » ou « gouvernance de données ». Suivre le participant dans son interprétation, mais être bien sûr de clarifier. Ensuite, amener le participant à considérer les autres éléments de gouvernance. S'assurer que le participant ne confond pas gouvernance avec gestion.)

Concept	Questions
Culture	Comment interprétez-vous ce concept?
	Quelle importance accordez-vous à la culture d'IA? - Sur l'émergence d'un alignement IA-business - Sur le maintien d'un alignement IA-business à travers le temps - Sur le succès de l'IA - Sur la performance organisationnelle
Vision	Comment interprétez-vous ce concept?
	Quelle importance accordez-vous à la vision IA? - Sur l'émergence d'un alignement IA-business - Sur le maintien d'un alignement IA-business à travers le temps - Sur le succès de l'IA - Sur la performance organisationnelle

Concept	Questions
Gouvernance	Comment interprétez-vous ce concept?
	Quelle importance accordez-vous à la gouvernance IA? - Sur l'émergence d'un alignement IA-business - Sur le maintien d'un alignement IA-business à travers le temps - Sur le succès de l'IA - Sur la performance organisationnelle
Connaissances partagées	Comment interprétez-vous ce concept?
	Quelle importance accordez-vous aux connaissances partagées en IA? - Sur l'émergence d'un alignement IA-business - Sur le maintien d'un alignement IA-business à travers le temps - Sur le succès de l'IA - Sur la performance organisationnelle
Maturité de l'architecture	Comment interprétez-vous ce concept
	Quelle importance accordez-vous à la maturité de l'architecture de l'IA? - Sur l'émergence d'un alignement IA-business - Sur le maintien d'un alignement IA-business à travers le temps - Sur le succès de l'IA - Sur la performance organisationnelle

13) Parmi ces facteurs, lesquels vous semblent les plus significatifs ? Pourquoi ?

14) Y a-t-il des facteurs importants (positifs ou négatifs) qui manquent pour expliquer
- l'émergence d'un alignement IA-business
- le maintien d'un alignement IA-business à travers le temps
- le succès de l'IA
- la performance organisationnelle

Fin de l'entrevue

- Remercier chaleureusement le participant.
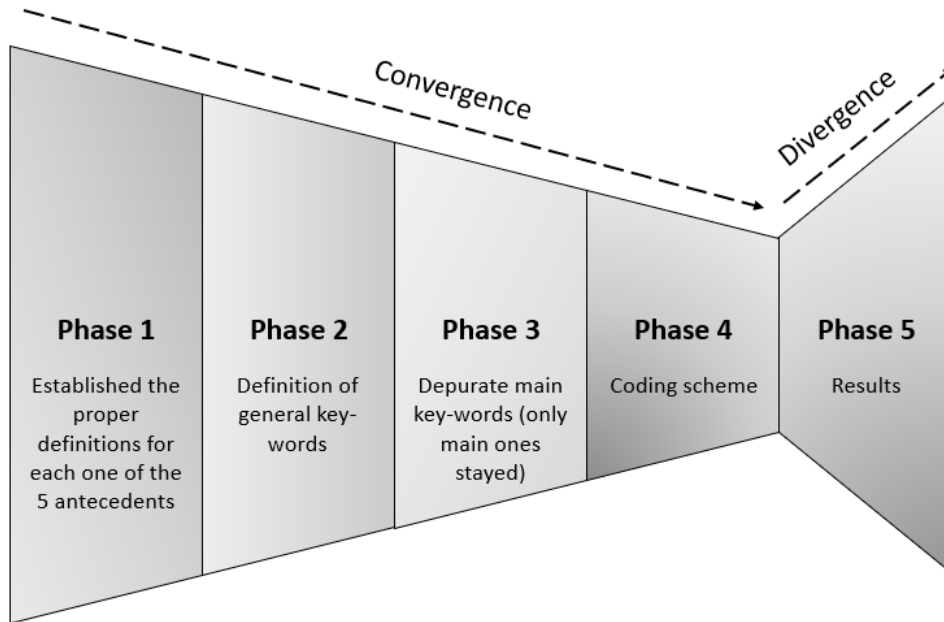- Lui demander s'il souhaite être personnellement tenu au courant des conclusions de l'étude.
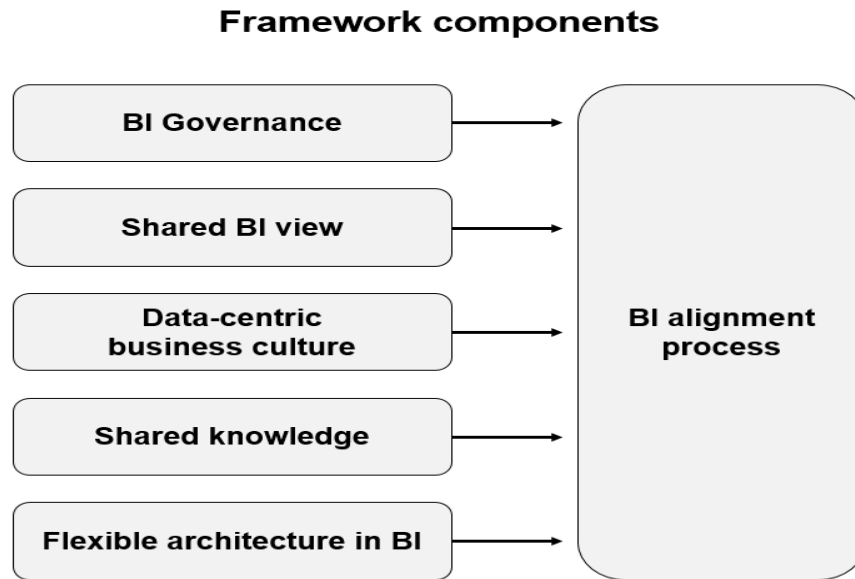
7.2) Complete coding scheme

Coding scheme

BI alignment process	BI readiness	Readiness & Top-down role / Sponsorship.
	Corporate performance management	Agility / Business Performance Management / Delivery managers / Human capital is risk nr.1 / Impatience fueling change / Long-term vision & Performance Management / Resistance to change.
	Self-efficacy	Better knowledge over business in present days / Efficiency and its rewards / IT low knowledge avout the business in the past / IT low knowledge over the business / Low IT efficacy in the past.
	Strategic alignment	Alignment demand collaboration / Good BI alignment process / Governance & strategy / High level decisions / Properly aligned vision / Strategy deployment.
BI governance	Planning & control	A tombstone for BI governance / Audit / Control & credibility / Control & data dissemination / Control & self-evaluation / Diplomacy & pragmatism / Documentation issues / Governance & strategy / Governance for reference / Governance is nothing without deliverables / Transparency.
	Risk and data quality	Low-quality data / Operational risk 2010 / Quality control.
Data-centric business culture	Big data	Big data
	Data-centric culture	Data-centric culture
	Management challenges	Management challenges
	Organizational agility	Organizational agility
	Value analysis & Value creation	Value analysis & Value creation
Flexible architecture	Legacy - systems integration and modernisation	Legacy & big data / Legacy integration / Legacy problems
	Service oriented architecture	Architecture maturity / Consultants propose changes / Consultants propose solutions / Real time Business Intelligence / Realtime response necessity.
Shared BI view	Corporate strategy	Information access strategy / Reliable data-sources means creativity.
	Organizational innovation	An MS XL based past to modern present days / Continuos improvements / Itp-BI dark ages / New team built / Openess to change / Role definition / Teamwmork is part of the change.
Shared knowledge	Information dissemination	Autonomy & mobility / The importance of shared language.
	Strategic BI alignment	A quick alignment between IT and business / BI & IT strategic alignment.
	Usage & Data quality	Control methods to enhance usage / More efficacy for bigger adherence / The importance of adhesion / Types of users / Usage & ease of use.

7.3) Coding & Results flow

Coding & Results flow

Phase 1

Established the proper definitions for each one of the 5 antecedents

Phase 2

Definition of general key-words

Phase 3

Depurate main key-words (only main ones stayed)

Phase 4

Coding scheme

Phase 5

Results

Convergence

Divergence

7.4) Framework components

Framework components

```
┌──────────────────────┐
│   BI Governance      │ ──────►  ┌──────────────────┐
└──────────────────────┘          │                  │
                                  │                  │
┌──────────────────────┐          │                  │
│   Shared BI view     │ ──────►  │                  │
└──────────────────────┘          │                  │
                                  │   BI alignment   │
┌──────────────────────┐          │   process        │
│   Data-centric       │ ──────►  │                  │
│   business culture   │          │                  │
└──────────────────────┘          │                  │
                                  │                  │
┌──────────────────────┐          │                  │
│   Shared knowledge   │ ──────►  │                  │
└──────────────────────┘          │                  │
                                  │                  │
┌──────────────────────┐          │                  │
│ Flexible architecture│ ──────►  └──────────────────┘
│ in BI                │
└──────────────────────┘
```

7.5) Schema (Results)