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Strategy implementation: Identification of explanatory variables for successful business analytics implementation in organizations

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<p>In the contemporary era where the value of data is being compared to oil, it is no wonder that executives are actively pursuing to extract value from data with business analytics to gain competitive advantage. Despite accelerating investments into business analytics, there lacks a unified model for executives to rely on during the implementation process, hence explaining the large variance partially amongst organizations' ROIs. This thesis, therefore, addresses the void by proposing a conceptual model for business analytics implementation (CMBAI) for executives to utilize when implementing business analytics.</p> <p>To address the void rightfully, initially, I identify an organizational model framework that holistically considers the multidimensional internal environment of an organization when implementing a strategy. This is followed by the identification of business analytics conformities associated with each variable under the chosen organizational model framework, creating a rudimentary CMBAI. The CMBAI is finally developed and consolidated by cross-referencing it against a case study in accordance to abductive research methodology.</p> <p>The revised CMBAI model is framed around the McKinsey 7S Framework (M7S), thus addressing comprehensively the variables related to strategy implementation. The model identifies three overarching themes that influence the success of reaping the benefits of business analytics: (1) leadership- structured manner of communication in both strategical and operational level synchronized with a leadership style that both ease organizational adoption of business analytics and promotes active insight generation to occur among employees; (2) organizational BA competency- ensuring competency in both system level through business analytic tools and human level through multiple level skill development; and (3) ownership facilitation- enablement of an appropriate structure and culture that promote to self-initiatively take actions based on insights gathered. Moreover, research indicates the entangled nature of M7S variables requires business analytics implementors to take a holistic approach to implementation in contrast to focusing only on a handful of elements related to business analytics.</p> <p>The research contributes to the existing theory by unifying the vast scope of business analytics literature under a single research and provides an in-depth analysis of the success factors when applying business analytics. Despite consolidation of CMBAI for becoming a universal model requires further similar studies to be conducted, this thesis provides a solid foundation for a holistic business analytics implementation model to emerge.</p>		
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<p>Siinä missä nyky-yhteiskunnassa rinnastetaan öljyn arvoa dataan, on täysin luonnollista, että yritysjohtajat pyrkivät aktiivisesti hyödyntämään dataa luodakseen kilpailuetua kilpailijoihinsa nähden. Huolimatta kasvavista sijoituksesta liiketoiminta-analytiikkaan, yrityksiltä puuttuu yhteinen malli liiketoiminta-analytiikan täytäntöönpanoon, joka osin selittää yritysten välisen suurehkon hajonnan liiketoiminta-analytiikan sijoitetun pääoman tuottoprosentteissa. Tämä diplomityö pyrkii vastaamaan edellä mainittuun tarpeeseen ehdottamalla käsitteellisen mallin liiketoiminta-analytiikan täytäntöönpanoon (KMLAT).</p> <p>Vastatakseen tarpeeseen oikeudenmukaisesti, pyrin alussa tunnistamaan viitekehyksen, joka ottaa organisaation moniulotteisen sisäisen ympäristön huomioon toimeenpantaessa uutta strategiaa. Seuraavana selvitan valitun viitekehyksen muuttujien liiketoiminta-analytiikan keskinäiset alaisuudet luodakseen alustavan KMLAT:n. Hyödyntäen abduktiivista tutkimusmenetelmää, KMLAT:ia jatkojalostetaan ja sen asemaa vahvistetaan käyttämällä sitä erään tapausyrityksen tutkimisessa.</p> <p>Diplomityön lopullinen KMLAT perustuu McKinsey:n 7S viitekehykseen, jolla saadaan kokonaisvaltainen ymmärrys organisaation muuttujista toimeenpantaessa strategiaa. Mallin avulla on tunnistettu kolme rajoja ylittävää teema, jotka vaikuttavat liiketoiminta-analytiikan menestykselliseen toimeenpanoon; johtajuus, organisaation liiketoiminta-analytiikka kyvykkyys, ja omistajuuden edistäminen. Johtajuudessa merkittävänä osatekijöinä ovat strateginen ja operatiivinen viestintä, ja johtamismalli, joka edistää oivalluksien tuottamista. Organisaation liiketoiminta-analytiikka kyvykkyys taas ottaa kantaa tekijöistä, joihin tulisi erityisesti asettaa huomiota kehittäessä liiketoimintaa-analytiikka järjestelmää ja työntekijöitä. Kolmanneksi, omistajuuden edistäminen organisaatorakenne ja kulttuuritasolla on havaittu olennaiseksi tekijäksi toimeenpannukseen käytäntöön liiketoiminta-analytiikasta saadut havainnot.</p> <p>Tämä tutkimus edistää olemassa olevaa liiketoiminta-analytiikkaa kirjallisuutta yhdistämällä niitä yhden tutkimuksen alle ja tuo perusteellisen analyysin kriittisistä menetystekijöistä toimeenpantaessa liiketoiminta-analytiikkaa. Vaikka KMLAT:ia on jatkojalostettu erään tutkimustapauksen avulla, sitä tulee jatkojalostaa ja vahvistaa edelleen, jotta mallia voidaan pitää yleispätevänä. Siitä huolimatta, tämä diplomityö luo vankan perustan tulevalle tutkimukselle, ja toimii lähtökohtana rakentaessa yleismallia liiketoiminta-analytiikan toimeenpanoa varten.</p>		
Avainsanat: liiketoiminta-analytiikka, muutosjohtaminen, analytiikan toteuttaminen		

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List of Abbreviations

BAF	Business Analytics Framework
BAT	Business Analytic Tools
CAGR	Compound Annual Growth Rate
CMBAI	Conceptual Model for Business Analytics Implementation
ERP	Enterprise Resource Planning
IT	Information Technology
M7S	McKinsey 7S Framework
QDA	Qualitative Data Analysis- software
ROI	Return on Investment

1. Introduction

This Chapter will serve as an introduction to this thesis by providing background information on the motivation for the thesis, elaborating the research questions and objective for the research, and outlining the structure of this thesis.

1.1. Background

In the contemporary era, where information and data are being considered the oil of tomorrow (Parkins, 2017), it is no wonder that executives are under pressure to accelerate in-house capabilities in data-driven decision making (Dominic & Court, 2012; LaValle et al., 2011). Top executives admire data-driven technology firms such as Google and Amazon, and continuously see how traditional industry players have successfully transformed their business models, where utilization of internal and external data is in the core of their operations (Dominic & Court, 2012). The unanimous admiration and desire to replicate the success in their own organizations is not at fault, as numerous researches have indicated the same- companies profiling themselves as evidence-based decision-takers are on average more productive and profitable than their respective industry counterparties (McAfee & Brynjolfsson, 2012; Negash, 2004; Nucleus Research, 2014).

The pressure of adopting data-driven decision-making methods in organizations has forced top executives to invest heavily in analytics somewhat blindly (Dominic & Court, 2012). Indication of the blindness derives from the fact that majority of the investment focuses on increasing digital capabilities of the organization, although transforming an organization into an evidence-driven decision-making one, requires an organization-wide change in mindset and working habits of different stakeholders (Sharma et al., 2014). As the transformation needs to be organization-wide, it is essential that executives take a holistic approach to comprehend the variables to take into consideration during the implementation of business analytics.

Identifying the variables and acting upon them accordingly, will not necessarily improve ROI; however, it will considerably enhance an organization's likelihood in reaping the fruits of data-driven decision making. Currently, executives have fragmented knowledge of what needs to be focused on, when investing in business analytics (Dominic & Court, 2012; Yeoh & Koronios, 2010). Fragmented and incomprehensive knowledge in this field while investing in business analytics may be considered irresponsible by executives making the decision, as the multitude of variables are interconnected with each other (Golfarelli et al., 2004). Unintentionally

overlooking to develop a particular variable, will lead in the other interconnected variables to perform weakly, despite actively investing resources on the identified variables. Therefore, this thesis aims to provide a holistic model for executives to utilize, when implementing or developing their in-house business analytics capabilities. Through an extensive literature review of business analytics and the utilization of existing organizational model frameworks, a conceptual model for successful business analytics implementation has been configured. The model has been further iterated utilizing Dubois and Gadde's (2002) abductive research method to consolidate its position by active comparison between empirical and theoretical research.

Personal motivation for conducting research surrounding the topic in question roots from the need of this category of research. Middle- and large sized companies have acceleratingly increased investments to gain competence in business analytics (LaValle et al., 2011). Despite the accelerated global investment into the technology, there lacks a unified model when implementing business analytics (Dominic & Court, 2012). Not being able to identify the critical elements of implementing business analytics comprehensively, may lead to substandard outcome. Although literature on business analytics is broad (Holsapple et al., 2014), little research exists aiming to propose a holistic model for business analytics implementation. Generally, literature focuses on a singular theme related to business analytics, resulting in dispersed literature for executives to utilize when implementing business analytics. Through this research I hope to unify the dispersed and fragmented literature and provide executives with a practical model to utilize for successful business analytics implementation.

1.2. Research questions and objective

The field of business analytics is vast, and therefore there is a multitude of research conducted surrounding the topic (Holsapple et al., 2014). While it is unanimous that implementation of business analytics is crucial for organizations to comprehend both the external and internal environment (Dominic & Court, 2012), it is far less clear what are the explanatory variables to consider and how to consider from a holistic level (Yeoh & Koronios, 2010). This calls for research to be conducted, where the abovementioned vacuums are addressed from an academic perspective.

Based on the identified needs, the objective of this thesis is to provide management with a holistic understanding of the explanatory variables to be considered for successful

implementation of business analytics in an organization. By dividing the objective of the thesis into multiple parts, we may discern the research questions that require to be answered.

This thesis focuses on the term *holistic understanding*, emphasizing the encompassing nature of the desired outcome. For a holistic outcome to be achieved, a framework-based approach to the research problem is most desirable, as a framework pursues to enable an organization to apply general principles to the organization's specific environment (Richardson, 2008). The appropriate framework would aim for the variables to be mutually exclusive by scope, but collectively exhaustive, for a truly holistic view. For narrowing down the horizon of various types of frameworks, both Sharma et al.'s (2014) and Watson and Wixom's (2007a) papers regard business analytics implementation being a cultural transformation process rather than a pure technology investment. This direct the thesis to locate an appropriate organizational model framework to frame organizational variables from a holistic level. Based on these preliminary rationalizations, the first research question to be answered is as follows:

R1: Which organizational model framework holistically takes into consideration the multivariate nature of implementing business analytics in an organization?

Following the identification of a proper organizational model framework, comes the application of business analytics implementation specifics. Whereas the term *framework* indicates the perspectives for one to view a situation, the term *model* aids in imposing details to the specific variables depicted through the framework. Through the mentioned definition, the secondary research question aims to comprehend the organizational model framework variables' business analytics related conformities. The exact secondary research question is as follows:

R2: What are the business analytics implementation- specific conformities that apply to each variable of the chosen organizational model framework?

I will initially answer both of the abovementioned question through literary means, creating a conceptual model based on literature. By applying Dubois and Gadde's (2002) abductive research methodology, I will develop the model through a systematic combination method. Abductive research methodology is characterized by its mentality of developing a model, instead of creating (inductive research method) or deducting (deductive research method) a model from data (Dubois & Gadde, 2002). During the systematic combination process, the conceptual model based on literary findings will be cross-referenced against a case-study, thus providing real-life contrast to literature. Not only will systematic combination provide more

accurate answers to the first two research questions, but it will also aid in both developing and consolidating the conceptual model. This leads to the final research question of this thesis.

R3: How can the case company's business analytics initiative develop and consolidate the proposed business analytics implementation model?

By answering the three abovementioned research questions, I hope to capture the necessary organizational conditions for an organization to implement business analytics at an organizational level successfully. First, a holistic framework is defined, through which business analytics specific components are described. Each components' conformities will be elaborated creating a literary-based conceptual model. The conceptual model will finally be developed and consolidated by cross-referencing it against a case study in a systematic combination approach.

1.3.Scope and structure

The term business analytics has not been consolidated in the field of research. Different sources utilize synonyms such as data-driven decision making (Sharma et al., 2014), business intelligence (Gangadharan & Swami, 2004; Gartner, 2012; Negash, 2004; Yeoh & Koronios, 2010), performance management (Schl fke et al., 2012) and evidence-based management (Holsapple et al., 2014) to imply similar meaning. In this thesis, I will utilize the term business analytics; however, it should be noticed that the term encompasses researches where one of the aforementioned terms has been used. In this thesis business analytics (BA) is utilized as a concept, whereas business analytics tools (BAT) is used to define the different tools to visualize/ communicate analytics such as spreadsheets, dashboards, and reports. (Shanks et al., 2012).

The objective of the thesis is to identify the explanatory variables that constitute the successful implementation of business analytics. For an impartial approach to identifying the explanatory variables, I have decided to approach the problem by identifying an organizational model framework that would depict the internal variables within an organization that requires management's attention. Although the approach broadens the horizon of matters to be inspected, I believe the approach is necessary to address the objective of this thesis of proposing a comprehensive model. Strategy implementation, however, is not singularly dependent on the internal variables of an organization, but also the external environment plays a significant role in the success (Kral & Kralov , 2016). The analysis of the variables and impact of the external

environment to the implementation of business analytics will be excluded from this thesis. This is primarily due to scoping the research to internal variables, to which management can take action.

Following the identification of an appropriate organizational model framework follows the topic of business analytics. Due to the field of business analytics being both extensive and detailed from various perspectives, it is integral to clarify the scope of this topic. Under each variable of the chosen organizational model framework, all of the business analytics associated components will be aimed to recognize. Following the identification of the components, general guidelines for being successful in the named variables will be elaborated. The word “general” needs to be emphasized here, as going in detail through each components’ “best-practices” is not the objective of the thesis. Instead, the explanatory components for capturing insights will be discussed. For example, in the creation of business analytic tools, the thesis will elaborate on the recommended process and components that need to be taken into consideration. However, a detailed analysis of the content, design or governance-specific matters of the business analytics tools will be left out of scope.

Furthermore, the term *successful* in the title of this thesis requires clarification. Despite the objective being to locate the explanatory variables for successful business analytics implementation exhaustively, it requires to be noted that *successful*, under this thesis translates into being in a position, where the organization has identified the necessary prerequisites for realizing the benefits of business analytics. Under no circumstance does this thesis aim to message that by taking the mentioned found components into consideration, ROI is guaranteed to be high. Furthermore, as we analyze singularly the internal environment of an organization, it automatically disregards the impact of external environment, even though the external environment dictates the limits of potential efficiency and value creation gains originated from business analytics.

For a consistent and unified understanding of the relationship between different stakeholders, the thesis has utilized the following terms to characterize specific stakeholders:

Table 1: Terminology elaboration and codification

Stakeholder	Coding	Characteristic
Analyst	DEV	Has the primary responsibility of developing the tools for business analytics. Analysts characterized in this thesis will generally have limited knowledge of the business itself. In reality, analysts do have varying knowledge of the business, depending on their positioning within the organization.
Business Manager	BM	End-user of the business analytics tools that Analysts create. Business managers are “white-collar” workers, who are not officially supervisors of anyone, however, are in a position of making business-related decisions.
Management	MGMT	Are direct superiors of previously mentioned Business Managers and Analysts. Management also utilize business analytics tools; however, their focus is on producing long-term strategical plans and targets.

2. Literature Review

This Chapter will focus on elaborating the key concepts related to this thesis. The objective of this Chapter is to provide the necessary literary background for the formulation of a conceptual model for implementing business analytics in an organization. The Chapter has been segmented into three sections. The first Section will discuss the multivariate nature of the term *business analytics* and introduce a preferred manner for developing business analytic tools (BAT). Both of the topics lay the fundament to rest of this thesis. Whereas definition provides higher-level and seldom neglected (Moss & Warnaby, 1998) aspect of strategy implementation, development process provides a more hands-on approach to increasing an organization’s capabilities in the area of question. Following the first Section, the Chapter will focus on identifying an existing organizational model framework applicable to this thesis’ case that projects to answer the first research question. Finally, the Chapter will conclude by discerning conformities associated with business analytics implementation of each variable of the chosen organizational model framework.

2.1. Business analytics

Business analytics may be defined as *evidence-based problem recognition and solving that happens within the context of business situations* (Holsapple et al., 2014). Data gathered from the surrounding environment is aimed to contextualize and visualize in a manner that is both linked to business strategy and supports organization members in decision-making situations (LaValle et al., 2011).

Globally BA has been the top priority for Chief-Information-Officers (CIO), according to a study conducted by Gartner in 2012 (Gartner, 2012). CIO's identified BA as being one of the best ways to filter the vast amount of information organizations hold. In this study, Gartner calculated the global BA market to be \$10.5 billion during 2010. Gartner conducted a similar study in 2016 again, resulting in a global BA market of \$16.9 billion in 2016 (Gartner, 2016). Combining the values above would amount to a CAGR of 8.26%, which can be considered as a relatively high CAGR in comparison to other industries (Janben et al., 2016). The high CAGR cannot be considered as a surprise considering the overall mindset of CIO's globally. According to a study conducted by IBM, where they interviewed over 3000 executives, managers and analysts between 2009 and 2011, over half of the respondents considered developing BA as being their top priority in their organization for gaining competitive advantage (LaValle et al., 2011).

Additionally, research related to return-on-investment (ROI) supports CIO's hype towards BA. A study conducted by Nucleus Research (2014) indicated that BA would pay back \$13.01 for each dollar spent, and another study by IDC (as cited in Negash, 2004) calculated an average five-year ROI of 457%, ranging from 17% to 2000% of BA investments by 43 European and North American organizations. Even though the ROIs are impressive, it needs to be noted that the assessment of ROI prior to the investment is challenging to compute (Negash, 2004). Just as any other IT investment, BA investments also require detailed screening for approval (Negash, 2004) and high investment in a particular technology does not intuitively translate in being a lucrative venture (Sharma et al., 2010). For approval, BA investment initiators need to showcase a business plan on how BA is connected to firm performance. This implicitly implies that for BA to have an impact on firm performance, insights generated from BA need to be leveraged by business managers into either strategic or operational decisions for value generation (Shanks et al., 2010).

2.1.1. Definition of business analytics

Just as any investment initiative, BA initiatives are also subject to screening to critical stakeholders. During Holsapple et al.'s (2014) study in the field of BA, they noticed that both literature and organizations utilize the term BA incoherently, each with an emphasis in different aspects. Incoherent terminology easily leads up to challenges in communicating a common objective to the organization and subpar outcome due to lack of uncomprehensive understanding of what the term “business analytics” encompasses. From the vast amount of available literature, Holsapple et al. (2014) categorized BA emphasis of different literature according to Table 1.

Table 2: Holsapple et al. (2014) categorization of BA terminology

	BA Emphasis	Description
1	Movement	Evidence-driven philosophy for solving strategies, operations, and tactics.
2	Practices and Technologies	Tools for analysis are in the core for data comprehension.
3	Transformational Process	Evidence (both quantitative and qualitative data) is transformed into insights or action.
4	Capability	Intangible skills of evidence processing through models and logical reasoning.
5	Activity Set	A specific set of capability in the following activities: accessing, examining, aggregating, analyzing evidence.
6	Decisional Paradigm	Adoption of a decisional paradigm that focuses on analytics.

The emphases illustrated in Table 1, are not mutually exclusive from each other, thus having some overlapping within. However, the emphases highlight the problematic nature when communicating BA initiatives. For strategy communication to be coherent, executives require to encompass the multiple emphases when discussing BA. Holsapple et al. (2014) suggest a business analytics framework (BAF) that incorporates the different emphases for BA initiators to utilize when planning and executing a BA initiative. As Figure 1 illustrates, continuous cultivation of an analytical culture grounds the BA initiative. The culture is built upon unique capabilities that can be moved in a coordinated fashion. Effective utilization of the capabilities can only happen when elements of the transformational process are aligned with the capabilities. Essentially, understanding the plausible insights and actions, and identifying the capabilities required to capture them. On top, we have specific activities and the tools for conducting the

necessary steps. The successful execution relies on a constant decisional paradigm clarity, where a philosophy of insightful decision-making drives the organizational BA initiative. (Holsapple et al., 2014)

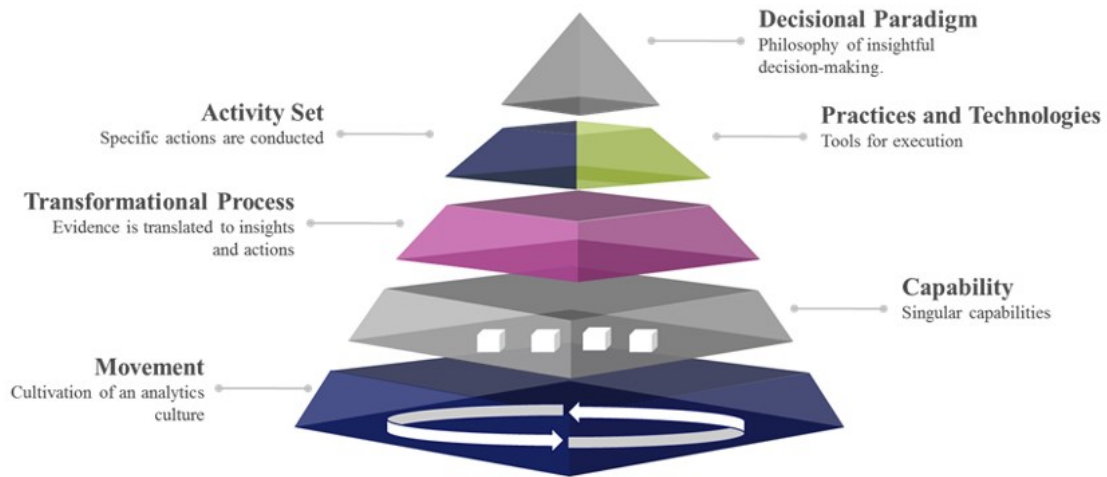


Figure 1: BAF model based on Holsapple et al. (2014)

The BAF model proposed by Holsapple et al. (2014) has its limitations, one of the major ones being that it has not been tested with quantifiable measures. Furthermore, the division of variables proposed by Holsapple et al. (2014) cannot be taken as the only manner for dividing them. Even Holsapple et al. (2014) mention that practices and technologies may be readily collapsed with the capability variable, due to having only connotational difference. Nonetheless, currently, literature fails to illustrate a wholesome view to business analytics as Holsapple et al. (2014) has in their paper. That mentioned, Holsapple et al. (2014) lack argument on whether it is necessary for an organization to communicate such extensively the multivariate nature of business analytics. It may be easily argued that the communication of the multivariate nature of business analytics may induce an organization from adequately focusing on primary variables that truly drive their corporate strategy (Moss & Warnaby, 1998). Already from a terminology and communication perspective, it is necessary to comprehend, on how should management communicate business analytics, so that the organization is motivated to strive for a common objective. The necessity can be defined two-way: what should the underlying driver for strategy communication be and how inclusive should strategy communication be from a terminology perspective.

2.1.2. Process for developing business analytics

Value from BA is extracted, when it enables insights to emerge, allowing business managers to construct narratives on how the surrounding environment works. This general, but detailed narrative gives business managers resources to act in a manner that aligns with the narrative received. For the narrative to rightfully interpret the surrounding environment, there needs to be a structured process of engagement between the analysts creating the narration and business managers interpreting from it (Schl afke et al., 2012; Sharma et al., 2014; Watson & Wixom, 2007a). The engagements require to be structured and documented to some extent, for the process to be replicable for future iteration (Sharma et al., 2014).

Just as product development for consumers or business clients begin, the process for building BA starts by analyzing the “market” (Gangadharan & Swami, 2004). This includes the identification of business problems and justification of the benefits the BA will bring regarding the overall development cost (Watson & Wixom, 2007a). For agile development, it is recommended that the initial design would be created in sandbox or prototyping environment (Gangadharan & Swami, 2004; Wixom, Yen, & Relich, 2013). Wixom et al.’s (2013) case study four-folded their usage of BA after adopting agile development practices. Their study boiled down the practices into three actions:

1. Automation of data-onboarding through structured and coherent data warehouse governance.
2. Rapid identification and validation of business requirements by prototyping and co-locating analysts with business managers.
3. Modular practices including practices such as usage of visualization catalogs for objective orientated design.

Following the prototype approval by the business managers, the analyst may go ahead and develop it to production quality and deploy it after the necessary tests are passed. Just as any other product, BAT should also be continuously monitored and evaluated for further iteration. (Gangadharan & Swami, 2004)

Gangadharan and Swami’s (2004) proposition of BA development resembles closely to the Software Development Life Cycle -waterfall model proposed by Royce (1970). In agile development, Royce’s (1970) model is valid; however, instead of a single development cycle, it is recommended to develop the software in multiple “sprints” (Bhawna, 2011). During each

sprint, the software would go through an iteration process of requirement validation – design – implementation – testing. After multiple sprints, the final version would be released to an environment for user testing (Bhawna, 2011). Bhawna's (2011) agile software development model aligns with Wixom et al.'s (2013) second criteria of quickly identifying and validating business requirement through close cooperation between analysts and business managers.

What both Wixom et al. (2013) and Bhawna (2011) do not address are the practical restrictions or barriers that may occur in organizational contexts. The theoretical model for agile development is preferred, however, amongst other factors that will be later discussed, profoundly relies on the competencies of the employees involved in the development process (Cockburn & Highsmith, 2001; Wang & Wang, 2008). Where individuals' competencies play such a significant role, it instantly prompts to ask whether agile BAT development method, where the end-user is involved, is the preferred way of development. Processes provide useful frameworks for an organization to replicate a working system. However, processes per se cannot aid when it comes to lack of competency (Cockburn & Highsmith, 2001). Due to literature not being able to demonstrate the appropriate BAT development model within organizational limitations multiperspectively, empirical research is required. Empirical research would aid firstly in understanding the organizational constraints and limitations that occur when applying theoretical agile BAT development method, but also provide insights as to how the constraints and limitations may be overcome.

2.2. Organizational model framework

Currently, there is a wide variety of research conducted on the adoption of discrete practices such as utilization of ERP or specific accounting practices; however, there is a definite vacuum when exploring more arbitrary practices such as re-engineering or total quality management (Westphal et al., 1997). As Westphal et al. (1997) mention, these arbitrary practices require action in multiple levels of an organization. Therefore, a single perspective analysis is not sufficient enough, when planning the implementation of the practice. Business analytics falls in a similar category of arbitraries, where the utilization of BAT is not in the core, but rather the transformation of the organization towards an evidence-driven decision making culture (Powell & Dent-Micallef, 1997; Sharma et al., 2014; Watson & Wixom, 2007a). Although contemporary literature regards transformation to occur in a continuous flow, transformation undoubtedly leaves a trail of discrete evidence behind within the organization's structure

elaborating the changes (Král & Králová, 2016). To act upon preemptively on the discrete organizational variables requires in identifying them beforehand. As literature consists of a multitude of organizational model frameworks (Hanafizadeh & Ravasan, 2011; Král & Králová, 2016; Richardson, 2008), widely acknowledged Waterman and Peter's (1982) McKinsey 7S Framework (M7S) will be utilized as the base organizational model framework. M7S will be later be cross-analyzed against other organizational model frameworks, to receive a holistic understanding of the internal organizational variables one should take notice when implementing a strategy.

2.2.1. McKinsey 7S Framework

Former management consultants from McKinsey & Co. Waterman and Peters (1982) published a well-known organizational model framework called McKinsey's 7S Framework. Based on interviews of 70 large organizations of that time, Waterman and Peters (1982) found a total of seven *levers*, that management should take notice when analyzing the position of the organization in relation to the objective. An effective organization would thus aim to achieve an organization-variable fit for long-term growth and sustenance. It needs to be noted that Waterman and Peters (1982) intentionally left external variables out of the framework, to keep the framework concise and clear. Table 2 names the seven criteria, with the short elaboration of each.

Table 3: McKinsey 7S Framework (Waterman & Peters, 1982)

Type	Criteria	Elaboration
Hard	Strategy	Purpose and pathway for the organization to achieve its target.
Hard	Structure	Co-ordination within the organization to achieve objectives.
Hard	Systems	Both formal and informal processes to support strategy.
Soft	Shared Values	Organizational culture
Soft	Skills	Capabilities and competencies of the organization.
Soft	Staff	Characteristics of the available human resources.
Soft	Style	Management and leadership culture

Categorization between 'hard' and 'soft' are based on the level of influence management can take directly (Waterman & Peters, 1982). 'Hard' values were commonly noticed in all of the 70 organizations Waterman and Peters (1982) interviewed. These values are commonly noticed

and measured to some extent when executing a new strategy. ‘Soft’ values, on the other hand, were more rarely considered, due to them being less tangible and more swayable by organizational culture. Despite the difficulties to grasp ‘soft’ values in strategy implementation, Waterman and Peters (1982) noticed that ‘soft’ values had a more significant influence on the implementation of a new strategy in the long run.

Waterman and Peters (1982) have acknowledged in their book that the variables in their conceptual framework do not follow the principle of MECE, i.e., *mutually exclusive and collectively exhaustive*. They have mentioned that there are some variables left out, and some of the mentioned variables overlap each other, depending on the interpretation. However, the choice of the final seven variables was based on importance and simplicity for remembering and applying. Dahlggaard-Park and Dahlggaard (2006) highlight in their research the deficiencies of McKinsey 7S (M7S) in pursuit of a more applicable framework for modern day challenges. One of the primary problems with the M7S are the companies evaluated in Waterman and Peters’ (1982) research. During the period of writing, the companies were required to be in the top half of its industry in at least four of the six measures Waterman and Peters (1982) considered important. However, many of the companies chosen during that period have been unsuccessful after the research was completed, e.g., Kodak, Rockwell Automation, and Xerox. This invokes a question yet to be responded, whether the M7S highlights the criteria for successful strategy implementation or whether the unsuccessful companies did not focus on the M7S criteria Waterman and Peters (1982) mention in their paper. Limitations related to the utilization of M7S for this thesis’ second research question will be discussed under Chapter 3.

2.2.2. Other relevant frameworks for organizational model depiction

Due to limitations of M7S, it is necessary to scope for other organizational model frameworks aiming at a similar objective of identifying the various dimensions within an organization. Král and Králová (2016) researched the different organizational model frameworks for analyzing changing organizational structures. In their paper, they provide a literary review of the widely used frameworks for an in-depth analysis of strategy and organization alignment. The literature review has been utilized to locate frameworks that have been created with the basis of closed system theory. Unlike open system theory, closed system theory disregards the external environmental impacts and relations to the company itself (Katz & Kahn, 1978). The underlying theory behind open-system theory is that the organization is in a continuous process of input

and output engagements with the environment and in between transforms the inputs by utilizing social and technical processes (Cummings & Worley, 2014; Katz & Kahn, 1978). As mentioned in Section 1.3 regarding scope, interlinks with the external environment will be left out from this thesis' scope.

In addition to M7S, six other widely used frameworks were identified for understanding the components of successful strategy implementation. Although each framework was created from different premises, there lies a consensus that each variable is interlinked with each other. Therefore, the success of a strategy implementation depends on the comprehension of the balance between the multitude of variables. Table 3 illustrates a summarized view of the variables each framework depicts. It should be noted that the variables are subject to interpretation. For example, the Star Model (Galbraith, 1973) does not depict *culture* as being one of the primary variables; however, it has been merged under the variable *people*. Table 3, therefore only illustrates the variables that are emphasized explicitly in the respective framework. Table 3 is followed with a summarized description of the singular variables located from the framework.

Table 4: Comparison of organizational model frameworks

Model \ Variable	People	Structure	Strategy	Leadership	Mechanisms	Culture	Technology	Rewards	Skills
The Star Model (Galbraith, 1973)	X	X	X		X			X	
McKinsey's 7S Framework (Waterman & Peters, 1982)	X	X	X	X	X	X			X
The Leavitt's Diamond (Leavitt, 1965)	X	X			X		X		
The Components of Institutional Architecture (Churchill, 1997)	X			X	X	X			
The Six-Box Organizational Model (Weisbord, 1976)	X	X	X	X				X	
Tichy's Model (Tichy, 1982)	X	X	X	X		X	X		
Model for Organizational Diagnostics (Cummings & Worley, 2014)	X	X	X	X		X	X		
Share of variable in cited frameworks	100%	86%	71%	71%	57%	57%	43%	29%	14%

People (Staff and Skills)

As Table 3 indicates, all mentioned frameworks emphasize the role of *people* in their organizational model frameworks. The variable *people* takes in the human perspective of the organization by allowing managers to analyze the relationship between people themselves and their engagement with the environment, e.g., technology (Leavitt, 1965; Weisbord, 1976). Several frameworks also include skills and personnel development under *people* (Churchill, 1997; Leavitt, 1965). During the elaboration of Leavitt's Diamond Model, Leavitt's (1965) emphasize the necessity of training staff to strengthen the relationship between employees and the party they are about to engage. Here he identifies three areas of change, which should always be followed with trainings: tasks, structure, and technology. Well planned and executed training allows the personnel to be always up to date on the relevance and method to upkeep the relationship with the changing party (Churchill, 1997; Leavitt, 1965).

Weisbord (1976) found that dysfunctionalities in people management lead to lack of motivation to execute the strategy in place. Common mismanagement when it comes to people is not being able to work with the other party (Leavitt, 1965; Weisbord, 1976) or being forced to work with another party, even though the strategy does not require it (Weisbord, 1976). An entire field of literature exists in aiming to solve people mismanagement from forcing to work together to deny the problem exists (Weisbord, 1976). Identification of the general mismanagement issues let us beforehand take notice on them and take pre-emptive measures.

As Table 3 indicates, both the Six-Box Organizational model and Star Model emphasize *rewarding* as an individual variable. Both Weisbord (1976) and Galbraith (1973) use Maslow's Theory of Motivation (Maslow, 1943) to consolidate the need for incentive analysis. Maslow (1943) theorizes that people have five levels of need, from psychological or essential needs such as food and shelter to needs of self-actualization. When the lower needs are fulfilled, a person will desire to fulfill the next need (Maslow, 1943). In the context of strategy implementation, management may influence employee activity by aligning needs according to Maslow's Theory of Motivation hierarchy and the desired strategical activity (Galbraith, 1973). Incentives increase an organization's costs and productivity; however, the critical question lies on how to increase productivity in relation more than costs (Churchill, 1997). Due to the topic of rewarding being tied with *people* and *skill* development, rewarding itself will not be discussed separately in this thesis.

All of the frameworks that describe the variable *people* have a slight connotation towards the organization or management being responsible for the development and knowledge base of the employees. Most of the organizational frameworks chosen are from papers written a couple of decades ago, when understandably the corporate environment was different, and therefore the organization's responsibilities might have been different. This particular matter is raised due to literature on business analytics taking the assumption that employees possess a knowledge base that is developed through both internal and external drivers (Bhatt, 2001), and employees are expected to possess beforehand certain degree of personal characteristics that enable working with other parties (Cockburn & Highsmith, 2001). Both literary and empirical research is required to comprehend and distinguish the responsibilities of both the organization and the individual when it comes to people management and competency development.

Structure

The foundation of an organization is built upon the staff that shapes the relationship between single employees (Churchill, 1997). Active organizations require a consolidated structure to function as *every structure is good for something, no one is good for everything* (Weisbord, 1976, p. 436). Traditionally, literature has identified three primary structures, each having their pros and cons: functional, divisional and matrix (Galbraith, 1973; Weisbord, 1976). As each structure has its pros and cons, a diagnostic approach is required to understand which structure best fits the strategy to be implemented (Leavitt, 1965). Galbraith (1973) identified four variables when analyzing the optimal structure for a strategy: specialization, shape, power distribution, and departmentalization.

Excluding the Model of Organizational Diagnostics by Cummings and Worley (2014), the rest of the organizational model frameworks depict structure quite narrowly. Cummings and Worley (2014) elaborate the capabilities each structure enable, and therefore, focuses on the capability enabled by the structure. Although organizational transformation requires changing organizational structures (Král & Králová, 2016), capabilities per se are the underlying reason for changing the organization's structure (Cummings & Worley, 2014). As capabilities are the root cause of the change in organizational structures, business analytics related literature requires to be further investigated into understanding, whether structure per se is the matter for management to focus.

Strategy

In the core of strategy implementation, is strategy itself. Strategy, in essence, represents the means for an organization to achieve its goals by utilizing its available resources (Cummings & Worley, 2014; Waterman & Peters, 1982). As mentioned, M7S inspects strategy from a top-bottom perspective, where strategy defines what the organization does. Weisbord (1976) on the other hand see a successful strategy to be more of a bottom-up procedure, where a successful strategy is defined by how well it fits and is accepted by the employees and customers. Instead of using the term *strategy*, Weisbord (1976) utilizes the term *purposes*, to emphasize the human perspective related to strategy.

Despite literature focusing on a multitude of aspects in strategy depending on the motivation of the researcher(s) (Moss & Warnaby, 1998), there nonetheless exists a consensus that the message delivered to the organization needs to be transparent and ubiquitous (Waterman & Peters, 1982; Weisbord, 1976). However, communication is commonly *superficially considered* and has been promptly gone through in general research (Moss & Warnaby, 1998, p. 131). To avoid this sort of superficial consideration, the proposed model should consider the components of strategy communication in-depth and connect strategy with daily operations. However, due to the scope being in the components of each variable rather than the content itself, the objective of the thesis' conceptual model's strategy variable is to identify all of the strategical communication components through literary and empirical research.

Leadership (Style)

Waterman and Peters (1982) depict leadership style as how management operates to achieve their personal and organizational goals. In the interlinked entity of variables, Weisbord (1976) inserts leadership to the center. He comprehends *leadership* to be the acting force for keeping the other five 'boxes' in balance. Despite many of the frameworks differentiating leadership style from organizational cultural (Galbraith, 1973; Leavitt, 1965), the elements related to leadership style are similar to organizational culture, i.e., leading based on values, norms, and beliefs (Waterman & Peters, 1982). Therefore, in addition to unified strategy communication from the management, leaders should attain the necessary qualities associated with the new strategy.

Waterman and Peters (1982) solely focus on the method of leadership, which in many cases is too narrow when we are discussing leadership's role during the process of transformation

(Powell & Dent-Micallef, 1997). Vroom and Jago (1973) parallel the position of a leader and decision-maker. This positioning emphasizes the importance of content knowledge contrary to Waterman and Peters' (1982) leadership style. This begs to ask through empirical research on the appropriate composition between tacit content knowledge and intangible management style executed by leadership for the efficient implementation of business analytics.

Mechanisms (System)

Mechanisms are not merely the information and decision processes that are drawn on paper or presented to the management, but more importantly the informal procedures and engagements between different stakeholders that happen in reality (Weisbord, 1976). Galbraith (1973) identify two primary mechanisms of decision making: vertical and horizontal. In vertical processes, management collects information from departments for activities such as budgeting, whereas in horizontal processes, departments engage with each other for example in activities such as product development (Galbraith, 1973).

Research by Vroom & Jago (1974) regarding the decision made in social environments such as in organizations identify two criteria for right decision:

1. Quality of the decision: The decision taken, advances the general position towards the pre-defined final objective. Objective orientated decision-making is also advocated by Leavitt (1965).
2. Acceptance of the decision: The decision taken is accepted by subordinates and other stakeholders responsible for the execution of the decision.

As acceptance of the decision is one of the primary factors, Vroom & Jago (1974) suggested that the participation and influence level of the key stakeholders have a prominent position on the decision's acceptance and overall successful implementation.

Culture (Shared Values)

Organizational culture, in essence, represents the underlying assumptions, values, and norms and organization shares between themselves (Cummings & Worley, 2014, p. 98). Churchill (1997) categorized organizational culture into the external culture that is communicated and reflected external stakeholders such as clients and suppliers, and internal culture that reflects the core values of the organization and defines the working habits and relationships of each. As culture orients individuals' working habits, it ultimately dictates whether a new strategy

affecting past practices is successful or not (Cummings & Worley, 2014). However, Canato et al. (2013) noticed in their research of coerced practice implementation that this is not the case always. Despite there being a high probability that the culture will trump practice, prolonged coercion to a culturally different practice may initiate transformation in previous cultural norms and beliefs (Canato et al., 2013).

2.3. McKinsey 7S in the context of business analytics implementation

Based entirely on literary analysis, the McKinsey 7S Framework has been chosen to represent the organizational model framework. By cross-referencing with other similar organizational model frameworks, each variable was elaborated, thus answering the first research question of this thesis. As stated in Section 1.2, following the identification of an appropriate organization model framework, comes the contextualization of the variables by business analytics implementation conformities.

For value to be extracted from BA, business analytic tools (BAT) should be widely adopted at an organizational level. Organization-wide adoption is considered one of the prerequisites of successful BA investment, as the study conducted by IBM between 2009 and 2011 reveals (LaValle et al., 2011). From the study, over a fifth of the over 3000 respondents felt significant pressure in adopting ‘*advanced information and analytics approaches*’ within the organization. However, managers and executives of the organizations had different perspectives as what are the critical success factors for an organization to successfully adopt BA (Dominic & Court, 2012; LaValle et al., 2011). LaValle et al.’s (2011) study explicitly indicate the need for a holistic model for management to utilize, thus both clarifying and unifying the business analytics implementation.

Currently, there is limited literature on a set of non-ambiguous variables that take a stance on the variables required for BA adoption (Yeoh & Koronios, 2010). The handful of literature that then takes a stance on this issue has their own frameworks with limited cross-referencing. There is a need for unification of the existing literature to identify the critical success factors when implementing business analytics at an organizational level. This Section will therefore unify the findings from literature under each variable of M7S, allowing us to create a conceptual model for business analytics implementation based on contemporary literature.

2.3.1. Strategy and systems in BA

As M7S (Waterman & Peters, 1982) highlight, strategy initiative require to be stated clearly and coherently throughout the organization. Similar ideology applies for business analytics initiative- clarity and coherency is the critical strategy element (Watson & Wixom, 2007b). For the message to be clear, it requires the essential elements of strategy: mission, vision, and roadmap from the current state to the vision (Schl fke et al., 2012; Waterman & Peters, 1982; Watson & Wixom, 2007b). Applying Holsapple et al.'s (2014) BAF, the vision of the organization in the initiative, is to create an organization-wide philosophy of insightful decision-making. This is initiated by the fundamental of cultivating an analytics-driven culture within the company. Following the intangible aspects of strategy communication, we come to the tangible aspects of strategy, i.e., mechanism and roles (Holsapple et al. (2014). Understanding the interconnectedness between each function helps in clarifying how each role and level of hierarchy aids in the overall success of strategy implementation (Watson & Wixom, 2007a).

Holsapple et al.'s (2014) definition translated into strategical communication provides a wholesome understanding of the BA initiative to the intended stakeholders. However, the multidimensionality of the definition is in contradiction with Moss and Warnaby's (1998) finding on strategy communication needing to be easily communicated, for the organization to have a clear and motivational strategic vision. Even though the multidimensional definition would encompass the entire nature of business analytics, it may in some parts confuse, and thus demotivate employees. Due to the conflicting nature of strategical communication in literature, it is necessary through empirical research to draw the line when choosing the context of business analytics. Through empirical research, it is vital to receive an understanding of what sort of strategical communication provides employees with a unified view of business analytics but also motivates them to strive for achieving the common goal.

For a more hands-on connection between strategy and operational activities, in the context of business analytics, Golfarelli et al. (2004) illustrated a simple process framework on how BA can be in continuous engagement with organizational strategy (Figure 2). As Figure 2 illustrates, in each level of the hierarchy, decisions and actions are made that creates a data trace of some kind. Understanding the interconnectedness between different functions and how they ultimately define the strategy in a data-driven organization aid create business analytic tools that take the premise of reaching a specific objective (Golfarelli et al., 2004). Creating tools

that follow this principle would allow the right sort of tools to be developed allowing for good insights to be captured and executed (Vroom & Jago, 1974; Leavitt, 1965).

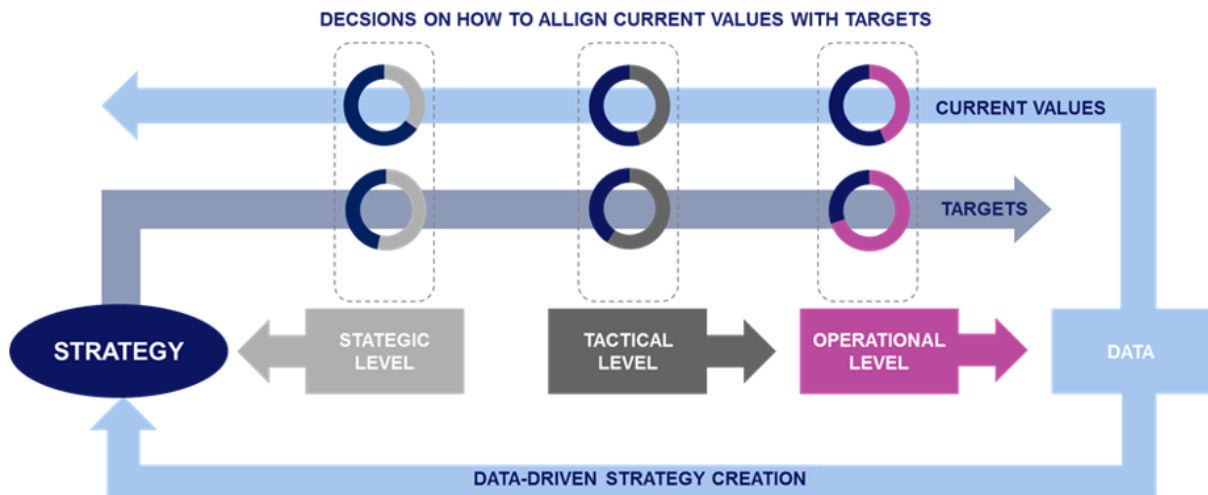


Figure 2: Golfarelli et al. (2004) closed-loop in business performance management

Golfarelli et al.'s (2004) theoretical model is too simplistic from a practical perspective, primarily due to it suggesting that data can easily be translated into insights, which can further down be cultivated into strategic directions. This is not the case, as most of the current business analytic tools provide weak proactive signs (Rouibah & Ould-ali, 2002). Modern business analytic tools can take remedial or reactive actions, however, when it comes to strategy, a strategy commonly takes a forward-looking approach (Richardson, 2008), thus requiring forward-looking insights (Rouibah & Ould-ali, 2002). Due to current business analytic tools providing weak proactive insights, it is necessary through empirical research to understand whether at all it is possible to translate insights into corporate strategy systematically.

Bhawna's (2011) proposition of agile development of BAT does advance the possibility of creating right types of BATs, however continuous evaluation and iteration is required to distinguish what information belongs to the category of 'good to know' and what concretely advances good decision-making. Bhawna's proposition of agile development can be further iterated by Shanks et al. (2010) suggestion on containing evaluation checkpoints, where metrics would go through scenario analysis to determine, on whether different outcomes could lead to different strategic or operational decisions. On the contrary, both of the mentioned processes rely on the competencies of the different parties involved (Cockburn & Highsmith, 2001). From literature, it is not evident on what is the suggested manner of BAT development, when accounting the level of competency differentiation within an organization.

In partial parallel with Shanks et al.'s (2010) suggestion on scenario analysis, Watson and Wixom (2007b) and Schläfke et al. (2012) propose that internal business analytic tools should be either directly or indirectly tied with the organization's performance. By tying individuals' activities with different metrics and providing metric performance-based rewarding, organizations may increase organizational BAT penetration level (Watson & Wixom, 2007b). Furthermore, this sort of performance-based approach to choosing the appropriate metrics is in line with Golfrarelli et al.'s (2004) closed business performance management framework. However, solely relying on business performance metrics is not feasible, if an organization desires to create a forward-looking strategy based on analytics (Rouibah & Ould-ali, 2002), as the primary objective of performance-based analytics is to increase efficiency (Watson & Wixom, 2007b).

Related to Vroom and Jago's (1974) second principle, Weisbord (1976) noticed during his research that if teams had a gap between 'what is' and 'what should be', this would be commonly discussed in informal environments i.e. lunch or coffee break, whereas good managers and consultants would aim to create a formal environment to close these gaps. Even though informal environments allow ideas to cultivate effectively, it inevitably leads to not all key stakeholders being involved in the decision-making process (Sharma et al., 2014). Sharma et al. (2014) noticed that decision executioners and implementers were rarely invited to the BA development process. A similar phenomenon was found by Dominic and Court (2012), where marketers did not utilize one of their retail case company's ad-optimization analytics. The underlying reason was that the key marketers making the ad-related decisions did not believe the model's results and had little understanding as to how it worked, due to not being in the development conversations. Dominic and Court's (2012) case company finding is in consistency with Vroom and Jago's theory (1974)- lack of involvement by decision-makers will inevitably lead to a low overall acceptance level of BA initiative, undermining the validity of utilizing BA in decision-making. However, just in the paragraph before, we stumble across the issue regarding the competency of individuals within the organization. Despite, there is a consensus that involvement increases BAT utilization, is involvement necessary if there are more competent higher-ups within the organization, who may provide more insightful information? Due to the issue of competency, a direct question will be asked from the interviewees regarding, how does lack of competency of certain parties affect BAT development process and how can it be overcome.

2.3.2. Structures for value extraction from business analytics

Utilization of organizational BA can be seen to have a decentralizing and democratic effect on the decision-making process (Huber, 1990). Since the use of BA allows available data transparency of both internal and external data, the potential of organizational data-driven decision-making increases (Huber, 1990; Wixom et al., 2013). However, increased utilization of available information does not automatically translate to increased firm performance (Powell & Dent-Micallef, 1997; Shanks et al., 2010). Just as any other IT system such as ERP, BA is merely a tool for increasing organizational performance (Powell & Dent-Micallef, 1997). However, general literature tends to assume that the quality of decisions, thus organizational performance can be improved through the utilization of BA (Sharma et al., 2014). Sharma et al. (2014) noticed that general literature assumed that benefits of BA could be captured regardless of the restructuring of the resources within the organization, however organizational restructuring is necessary for the benefits of BA to be captured (Dominic & Court, 2012; Huber, 1990; Watson & Wixom, 2007b). The fact that general literature ignores the theme of organizational reconstruction raises the question of its cruciality for the implementation of business analytics. To both understand and consolidate the necessity of organizational reconstruction, empirical research is in demand. Empirical research should aim to answer why organizational restructuring is necessary and to what extent. Comprehension in this aspect could extend existing literature with root causes as to why and to what extent reconstruction is required.

Capturing insights through BA calls for organizations to have dynamic action taking capabilities (Sharma et al., 2014; Sutano et al., 2008; Watson & Wixom, 2007a). Helfat et al. (2007) describe dynamic capabilities as the '*capacity to purposefully create, extend, or modify its resource base*'. Here tangible, intangible and human assets that can be owned or controlled are defined as a *resource base*. The definition additionally emphasizes the term capacity, replicability, and reliance on the capability to some extent (Helfat et al., 2007). Replicability of activity allows it to be defined as an organization's capability rather than being an ad-hoc performance.

In a dynamic organization structure, the organization requires efficient processes for both decision-making and action deployment. The processes are defined as capabilities of *search-and-selection* and *asset orchestration* in Helfat et al.'s (2007) research. High capability in search-and-selection, indicates employees being aware of their internal and external

environment they work in and having clarity on how the different processes are in cooperation with each other. Understanding the processes in the surrounding environment allows the employees to know from where to search the necessary information. In the context of BA, business managers would be able to convey analysts the relevant metrics and information they require for decision-making (Helfat et al., 2007; Watson & Wixom, 2007a). Helfat et al. (2007) consider asset orchestration as being equally important as search-and-select capability. Both tangible and intangible assets of an organization are rarely independent so that it can be developed without the development of another asset. However, business managers commonly have control of only assets within its field. Effective asset orchestration capabilities would allow business managers to take actions or influence on assets that are beyond its area of responsibility (Helfat et al., 2007). Instead of organizational asset orchestration, Watson and Wixom (2007a) take a more comprehensive approach of *response*, highlighting that action should always be taken after *sensing* a change.

Despite Helfat et al.'s (2007) definition and categorization of *dynamic capabilities*, the term is still not consolidated in general literature and is considered vague by many researchers (Barreto, 2010). The dispersed understanding of the term in general literature has led researchers advocating dynamic capabilities with business analytics, however with several different explanations. The explanations themselves, are not in contradiction with each other, however, do not unambiguously validate one another. Barreto's (2010) terminology cross-analysis of nine literary definitions of *dynamic capability* depicted the following four capability dimensions: opportunity and threat sensing, timely decision making, market-oriented decision making, and resource base changing. Helfat et al.'s (2007) categorization takes all of the mentioned perspectives into account and due to the definition being referenced to in both Sharma et al.'s (2014) and Watson and Wixom's (2007a) papers, I have chosen Helfat et al.'s (2007) definition of dynamic capability as this thesis' definition for dynamic capability. Although literature confirms the need for dynamic capabilities in an organization for successful business analytics implementation, further empirical research is required to comprehend the elements of dynamic capabilities requiring to be distinguished.

Applying Helfat et al.'s (2007) findings on Galbraith's (1973) variables on structure, distribution of power needs to be decentralized and departmentalization loosened. Both structure changes aim to provide business managers with broader rights to influence and develop departments that are beyond their core area focus. However, clear guidelines need to be given to business managers as to what matters are they able to influence. The suggestion is

in uniform with Churchill's (1997) and Shanks et al.'s (2010) finding that decentralized organizations with minimalistic departments can transfer information from one party to another in a more agile manner and adapt to changes faster. Upkeeping clarity between insights business managers may receive through BA and actions they can take, increases the acceptance of BA usage in decision-making according to Vroom and Jago's (1974) second principle.

2.3.3. Staff and skills for BA

As Table 3 establishes, *people* are in the core of successful strategy implementation. Unlike ERP systems, where the impacts of process standardization are felt immediately in the company, impacts of BA system are commonly seen incrementally and require both entrepreneurial motivation from employees in local context (Shanks et al., 2010) and analytical mindset in problem approach (Dominic & Court, 2012). The entrepreneurial mindset combined with a common understanding of the cooperation model between business managers and analysts is crucial for avoiding common pitfalls of people management (Bhatt, 2001; Weisbord, 1976). Interaction objectives and techniques during and off the engagement instance require to be clarified by the management (Bhatt, 2001). In the context of BA, Wang and Wang (2008) propose a simplistic model for both business managers and analysts to follow as a solution to the pitfall above (Figure 3).



Figure 3: BA development cycle (Wang & Wang, 2008)

The BA development cycle identifies clear tasks for both business managers and analysts. Business managers bring the market knowledge to the table, whereas the analysts create business analytics tools that help address the issue in hand. As the business manager cycle

indicates, learning holds an essential part of BA utilization. Considering that not only new technology is being introduced, but rather a decision-making process and structure is being changed, training is crucial (Leavitt, 1965). Insight as a concept refers to a firm and holistic understanding of phenomena (Sharma et al., 2010). To receive relevant insights, one requires to comprehend the relation between analytics and real-life decisions (Watson & Wixom, 2007a). This can only be effectively achieved through a training environment, where users are trained on how to use the tools; through what means has the data been captured; exemplification through multiple scenarios; and access to analysts creating the BAT (Watson & Wixom, 2007a, 2007b).

As the business manager's portion of the BA development cycle (Figure 3) illustrates, a vital stage is the evaluation of the BAT, and whether it genuinely brings additional value to the business manager's activity. During the following knowledge sharing instance, the response from the business manager should be accordingly, and the analyst should exploit the response accordingly for the following iteration (Wang & Wang, 2008). Three fundamental problems occur commonly with the last statement: lack of competence for a rightful evaluation (Cockburn & Highsmith, 2001); business managers not knowing how can they benefit from the data (Dominic & Court, 2012); and tools created by the analysts being too complicated for the front line to use (Dominic & Court, 2012).

The issue regarding competence is a reoccurring barrier to the theoretical frameworks, primarily due to the individual-centric nature of business analytics (Shanks et al., 2010). Related to the second issue, Dominic and Court (2012) saw that often managers were not aware of how granular data could potentially aid them in their decisions. This again relates to the matter that proactive insights are commonly weak by nature (Rouibah & Ould-ali, 2002), and therefore provide challenges in creating forward-looking strategies. As there is no clear-cut answer to this, Dominic and Court (2012) propose to actively engage from a holistic perspective with the available data and decisions that occur. Shanks et al. (2010) identify that an entrepreneurial mindset is required from the business managers to see the potential behind the massive amount of data. Furthermore, proper incentives are required for business managers make the extra effort (Schl fke et al., 2012). Per Maslow's Theory of Motivation hierarchy (Maslow, 1943), this could potentially be fulfilling *safety needs* through monetary benefits or *esteem needs* through public recognition of achievement. Nonetheless, the issue requires to be addressed through empirical research, for a more clear-cut answer. However, there poses the risk that the case

study has similarly vague understanding to the problem, leading to a similar outcome as Dominic and Court (2012).

Thirdly, in the case companies Dominic and Court (2012) analyzed, the tools were too complicated for business managers to use. Design of the tools required for the business manager to be an expert in analytics and this ultimately led in the business managers not engaging enough with the BAT (Dominic & Court, 2012). For BAT to have a pervasive impact on the organization, the BAT needs to be simplified to a level that is up to par with business managers' understanding (Dominic & Court, 2012; Wixom et al., 2013).

Current business analytics literature regarding training is vague and is brought out in literature more like a “matter to be executed,” without further elaboration to it. Out of all the business analytics literature utilized in this paper, only Wixom et al. (2013) elaborated a singular perspective of training further. The authors encouraged IT employees engaged with the development of business analytics within the organization, to gain increasingly amount of training on the business environment they work in. However, Wixom et al. (2013) did not consider the training aspect of the user, who would utilize BATs as decision-making tools. As mentioned, rest of the literature took a vague approach to the issue in the following manners: management is responsible for facilitating training (Dominic & Court, 2012; Watson & Wixom, 2007b); training is necessary for employees (Shanks et al., 2012; Sharma et al., 2014); people responsible of IT should receive training (Gangadharan & Swami, 2004; Powell & Dent-Micallef, 1997); and training is required for all employees during course of organizational practice transformation (Eckerson, 2007; Guth & Macmillan, 1986; McAfee & Brynjolfsson, 2012; Shanks & Sharma, 2011). As the examples mentioned above highlight, more profound knowledge is essential in the field of skill development, which is aimed to be clarified through empirical research.

2.3.4. Style and shared values in BA

The strategy section clearly emphasizes the encompassing and coherent communication throughout the BA initiative. However, as important communication is, support from all levels of leadership to strategy should also be visible (Watson & Wixom, 2007b). Watson and Wixom (2007b) identify three methods of supporting BA initiative: leadership through example, effective data governance, and training facilitated by leaders. In leadership through example method, leadership utilizes BA actively to receive insights and acts accordingly. Through action,

leadership consolidates the organizational strategy of perceiving BA as a strategic resource (Watson & Wixom, 2007a). Governance, on the other hand, takes into account the intangible aspects from ensuring that there lies a strategic alignment with the activity currently executed to the establishment of unified data definitions for common understanding (Dominic & Court, 2012; Wang & Wang, 2008; Wixom et al., 2013). Despite the unified understanding that data governance is required, the approaches to data governance differ between the three mentioned literature sources. Dominic and Court (2012) have an approach of first sourcing as diverse and quality data as possible, establishing an IT-infrastructure and finally identifying potential insights through business problems. Wang and Wang (2008) take a more knowledge-intensive based approach, where first the terminology should be standardized, and leadership should take the initiative to establish linkage between knowledge base, business analytics, and decision-making. Finally, Wixom et al. (2013) take a technology-first approach to data governance, where management should utilize state-of-the-art technologies and methods to create an optimal ecosystem for BA, for fast deployment and pervasive usage amongst end-users. Due to the ambiguous definition of data governance, more consolidated standardization to the definition through empirical research is needed.

In the core of cultivating an analytics-driven culture (Holsapple et al., 2014) is creating an organizational philosophy, where decisions are based on something tangible instead of relying on ‘gut feelings’ (Watson & Wixom, 2007a, 2007b). Legacy practices in decision-making may lead in the organization have challenges adopting the new method of decision-making and in some cases resist the change towards data-driven decision making. Situations, where the leadership may enforce a new practice, which potentially creates conflict between what is commonly done and what is requested, can be regarded as low cultural fit between practice and organizational culture (Canato et al., 2013). Despite low cultural fit, commonly leadership implements new practices due to *rationalized myths* that certain practices are ‘the way to success’ (DiMaggio & Powell, 1983). Rationalized myths are highly relevant in the context of BA, majority of executives felt pressure in adopting ‘*advanced information and analytics approaches*’ within their organization in LaValle et al.’s (2011) research. Prolonged coercion of a new practice despite low-cultural fit will through reinterpretation be adopted; however, acceptance of the new practice can be accelerated through additional means. This requires leaders to provide the organization with an appropriate narrative on the new practice, which aligns with the organization’s core values, and also the benefits of the new practice to be demonstrated (Canato et al., 2013). Utilizing the BAF (Holsapple et al., 2014) as the narrative,

leadership may encompass all of the necessary elements in business analytics. Applying Watson and Wixom's (2007a) suggestion on the evaluation of benefits to costs for each new metric before initiating development, allows for the management to convince business managers regarding the benefits of BA. Watson and Wixom (2007a) agrees that this is a somewhat cumbersome approach to the issue, and therefore requires to be evaluated through empirical case study method research, whether the theoretical model is feasible in real-world circumstances.

Though business analytics is commonly individually analyzed, insight generation and decision-making in organizational contexts commonly occur in teams (Sharma et al., 2014). This requires to understand individuals' relations in the decision-making instance. Henderson and Clark (1990) noticed in their research that even cross-functional teams were unable to see the significance of emerging technologies in their industry due to cognitive barriers. Individually, the members noticed the importance of the emerging technologies, however, in decision-making instances, the individuals failed to raise the issue due to unsuitable organizational culture. Henderson and Clark (1990) noted that the organization did not subsidize pivoting ideas; however, the case organization did not proactively encourage people to an entrepreneurial mentality, which in through subtle means created cognitive barriers within the employees. What is unclear from the literature, is the recommended culture, for BA to flourish in both penetration and realization. Due to the aspect of culture being ambiguous in literature, multiple interview questions will be allocated to understand what sort of culture may act as a barrier but also encourage the use and realization of business analytics.

3. Conceptual model for implementing business analytics

It is evident from the literature that business analytics may provide an organization with substantial benefits. However, as the literature Chapter highlights, there is currently no unequivocal framework that takes a holistic stance on the strategical, organizational and behavioral variables that consolidate the successful adoption of BA at an organizational level (Sharma et al., 2014). Based on the literary findings in the previous Chapter, I configured a conceptual model of the explanatory variables of business analytics implementation (Figure 4). This Chapter will first provide elaboration to the created framework following with reflection to the research questions I proposed in Section 1.2 and potential limitations related to the proposed model to be developed.

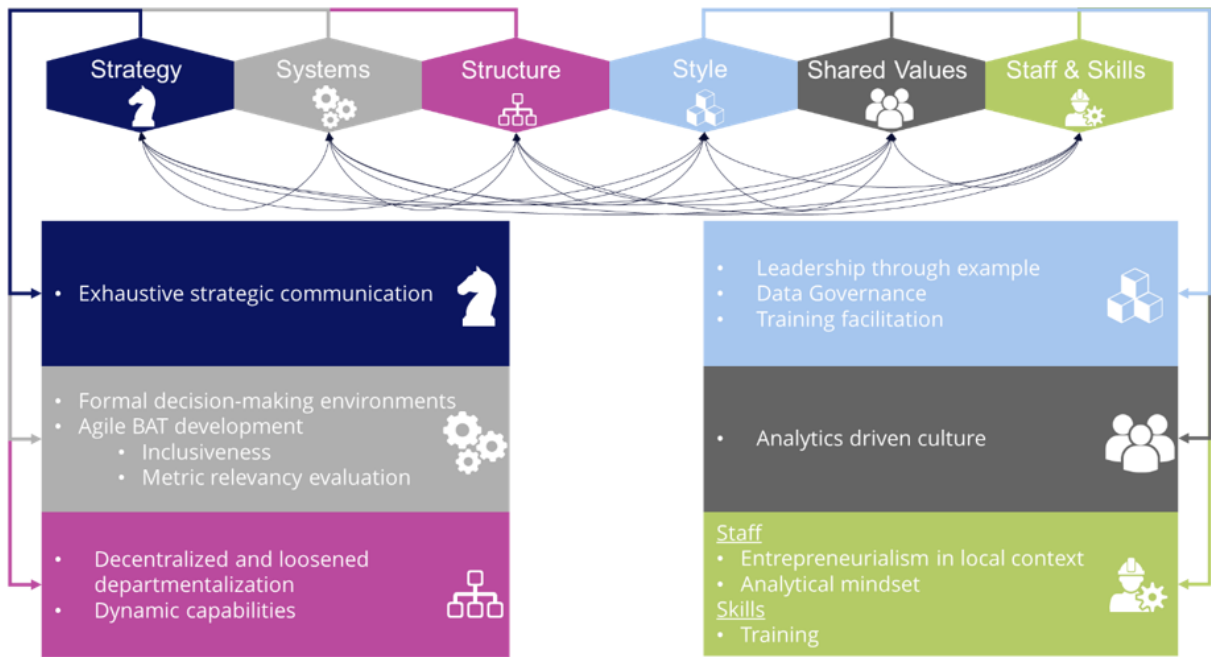


Figure 4: Conceptual model for business analytics implementation (CMBAI)

3.1. CMBAI elaboration

A holistic understanding of the critical elements in the adoption of business analytics in an organizational level allows management to increase their possibility of reaping the benefits of business analytics proficiently. From a business analytics implementation perspective, the conceptual model for business analytics implementation (CMBAI) provides management, with a visualized understanding on the interconnectedness between organizational variables, and more importantly, illustrates the explanatory variables for business analytics implementation.

As CMBAI illustrates, there is no hierarchy nor order between the variables, but rather the variables are interconnected with each other. The interconnectedness implies essentially two matters: any change in one of the variables, will either directly or indirectly affect another variable(s), and the variables require constant balancing between each other. I will elaborate each BA implementation related component of CMBAI shortly below, following with potential open items that need to be addressed through empirical research.

- **Strategy:** Inclusive strategical communication of the initiative’s mission and vision. These require to be communicated clearly and coherently throughout the entire lifespan of the BA initiative. Empirical research is required to understand how comprehensive the communication requires to be, due to the conflicting views of exhaustiveness and clarity.

Additionally, through empirical research, it is necessary to identify how strategy can be developed or directed based on business analytics, as business analytics tend to provide weak proactive signals (Rouibah & Ould-ali, 2002).

- **Systems:** Decisions require to be made increasingly more in formal situations for BAT development and insight generation to occur in an inclusive manner. Additionally, management should focus on the process of BAT creation to maximize both the potential of BAT and BA penetration within the organization. Although agile and end-user involvement is recommended in literature, there exists an impasse regarding the suggested nature of development when we take the element of competence into question. Through empirical research, potential manner of overcoming competency variability will be sought. Nonetheless, there is clear rationality in having a systematic manner of evaluating metrics. Literature provided the options of scenario analysis (Shanks et al., 2010) or/and linking metrics with individuals' performance (Schl fke et al., 2012; Watson & Wixom, 2007b).
- **Structure:** A decentralized and loosened departmentalized organizational structure aids in reaping the benefits of insights generated from BA. The structure is closely related to the dynamic capabilities of an organization, i.e., search-and-select and asset orchestration. Theoretically, by acquiring the mentioned dynamic capabilities, the organization allows for decision-maker to actively capture and execute insights accordingly. Further comprehension on the essentiality of organizational restructuring is necessary to consolidate the phenomena. Additionally, through empirical research, the root elements of dynamic capabilities require further elaboration.
- **Style:** Understanding whether there is visible support from the leadership for employees to utilize business analytics in decision-making. Visible leadership can be conducted in three manners: leaders utilize BA themselves in decision-making, active governance related to matters concerned with business analytics, and trainings facilitated or encouraged by leaders (Watson & Wixom, 2007b). Aspect regarding data governance requires to be specified through empirical research due to dispersed knowledge in literature.
- **Shared values:** Comprehension of the organizational culture before and after business analytics is put into place. Is there a clash between previous habit, norms, and values with the new practice that needs to be specifically addressed?
- **Staff and Skills:** Understanding on how to employees engage with the new method of decision-making and whether they have an entrepreneurial mindset that is required to reap

the benefits of business analytics. Additionally, an analysis is required to make on whether the staff members have received sufficient amount and quality of training to comprehend how evidence-based decision-making is executed in practice. The aspect of training requires to be specified through further research, due to literature elaborating the issue imprecisely.

3.2. Reflecting CMBAI to research questions

The objective of this thesis is to provide management with a holistic understanding of the explanatory variables to be considered for successful implementation of business analytics in an organization. To address this objective, I have proposed three research questions in Section 1.2., each addressing a perspective of the objective.

R1: Which organizational model framework holistically takes into consideration the multivariate nature of implementing business analytics in an organization?

The conceptual model for business analytics implementation (CMBAI) is segmented according to Waterman and Peter's (1982) McKinsey 7S framework, complementing with the variable elements found from other widely utilized organizational model frameworks. The only difference between M7S's and the conceptual model's categorization is that the variables *staff* and *skills* have been combined under one, as both closely relate to the development of employees. I have chosen M7S as the organizational model framework primarily due to its comprehensiveness in relation to other widely acknowledged organizational model frameworks (Table 4). Moreover, M7S illustrates clearly the interconnectedness of single variables which some of the other organizational model frameworks do not.

R2: What are the business analytics implementation- specific conformities that apply to each variable of the chosen organizational model framework?

Under each variable in M7S, I have identified several conformities based on literature and inserted the highlights to the CMBAI variable, respectively. The components of each variables have further been elaborated in both Sections 2.3 and 3.1. Despite the elaborations, I have identified two deficiencies that should be addressed further down the research; in-depthness of each variable and overarching components. Although, Section 2.3 goes through the conformities of each variables, there lacks namely in-depthness amongst several components, such as training and data governance that should be addressed, if desired to pose a holistic model for management to utilize. Moreover, several overarching components were identified

critical in Section 2.3 such as the aspect of competency, however, they are not illustrated as overarching in the proposed CMBAI. Lack of illustration of the overarching nature of these components, might give false indications to people utilizing the model.

R3: How can the case company's business analytics initiative develop and consolidate the proposed business analytics implementation model?

Both research questions one (1) and two (2) has allowed for me to create a rudimentary CMBAI based on literature. However, solely relying on literature will not do justice to the objective of this thesis, but rather requires further development and consolidation from real-world to enact as practical model to utilize. Here I apply Dubois and Gadde's (2002) abductive research method, to connect empirical evidence with theoretical compilation. Through systematic combination I hope to develop the model in a manner that addresses the deficiencies identified below and consolidates the findings from literature.

Firstly, utilization of Waterman and Peters' (1982) McKinsey 7S Framework poses an inclination risk due to the organizational model framework not being fully comprehensive (Dahlgaard-Park & Dahlgaard, 2006; Waterman & Peters, 1982), thus being likely that some variables essential for BA implementation might get overlooked. This risk will be attempted to be overcome by asking interviewees to mention organizational model variables that have not been discussed about during the interview. Additionally, the semi-structured interview method will allow for pivots to directions that have not been discussed in the Literature Chapter to occur. Potentially new variables risen from interviews will be cross-referenced against relevant literature, to decide whether they should be incorporated to the conceptual model or not. Secondly, both M7S and CMBAI assume equal importance of all variables (Král & Králová, 2016), which might not be the case. Despite the interlinkage between the variables, it highly probable that there are certain variables that have a more substantial influence on the outcome than others. As the empirical research method will be qualitative by nature, it is not feasible to take the additional dimension of ranking the variables against each other without quantitative evidence. Therefore, this thesis will assume an equal importance of all variables, despite it potentially being otherwise. Thirdly, as mentioned, there lacks in-depthness amongst several components, that require elaboration for full comprehension. Fourthly, empirical research may indicate that there are more overarching relations amongst M7S variables. Identifying the overarching elements, may allow to develop a revised CMBAI that illustrates the overarching elements as well.

4. Methodology

The objective of this Chapter is to elaborate and clarify the chosen research method and data analysis techniques utilized. The Chapter begins with a brief introduction of the case study company, following with the motivation and reasoning for the chosen research design. Then practicalities regarding the research will be elaborated, ending with an analysis of the reliability and validity of the research method executed.

4.1. Background information on the case study

The case organization utilized for the empirical portion of this thesis is a Finnish air cargo carrier that is currently one of the largest and modern in the Nordic and Baltic region. The case company will hereafter be referred as Case A. Case A operates under its Finnish mother airline company, and therefore holds a critical role of upkeeping the mother company financially profitable. The mother company will hereafter be referred as Group.

Case A's primary operational hub is located in Helsinki, which has a geographical specialty of being the optimal transfer point when connecting West with East. Despite Case A being a crucial subsidiary for the Group, Case A currently does not have dedicated freight airplanes, but utilizes available airplane capacity after passenger and baggage weights are calculated in. Utilization of available 'belly' capacity allows Case A to serve in all of Group's target destinations. As the mother company's network and flight planning is primarily planned according to passenger revenue forecast, Case A's strategy is to maximize revenue from the available network capacity. To complement the air freight offering, Case A utilizes road feeder services to extend the network and offers temperature-controlled and express services to serve premium cargo.

From an organizational structure perspective, Case A is a flat and departmentalized organization. The total headcount of Case A is relatively small in relation to the revenue generated by the company, due to customer level sales and cargo handling being outsourced to multiple subcontractors. This implies that Case A's personnel are primarily affiliated with activities related to management and communication with different stakeholders. Currently, Case A is divided into four departments: sales, operations, revenue management & pricing, and finance.

Due to the nature of work of the employees in Case A, utilization of business analytics in decision-making is crucial. The increasing complexity of managing global supply chains, require Case A to have continuously a holistic comprehension of both the surrounding environment, but also an understanding of its own internal performance. The organization identified this issue and have been gradually advancing its capabilities in business analytics for the past 2.5 years. During the past 2.5 years, two massive investments accelerated significantly Case A's ability to pursue towards a more evidence-driven decision-making style: inauguration of new terminal at Helsinki on 2017, and investment in an integrated air cargo management IT-system. Both investments have allowed Case A to receive more detailed and specified data of its performance.

As data flow to Case A has increased, similarly pressure to utilize the data has grown. The new terminal is meant to increase Case A's supply capabilities, thus increase its support to Group's financial outcome. Increased pressure to enhance Case A's capabilities, calls for evidence-driven decision-making, where Case A may maximize its total output. Case A has improved its supply capabilities increasingly, however, both management and business managers agree that a stronger inclination towards data-driven approaches is required, to address the increased internal and external demand.

4.2. Research design

Despite the wide popularity of business analytics utilization in organizations, there remains to exist a profound non-ambiguous model for understanding what variables constitute to the successful implementation in organization-wide business analytics (Yeoh & Koronios, 2010). Based on business analytics literature I have contextualized Waterman and Peter's (1982) McKinsey 7S Framework, allowing a literary-based conceptual model to be configured (Figure 4). As the contextualization is purely conducted through literary analysis, the objective of the empirical research section is to consolidate and revisit the conceptual model of business analytics implementation, and also answer the open items mentioned in Chapter 3. For a systematic process to occur during the research, a research design is necessary (Sinkovics & Alfoldi, 2012). The research design acts as a *blueprint* that logically connects the background problem with an outcome (Sinkovics & Alfoldi, 2012).

Traditionally, there has been two primary research methods: deductive and inductive (Eisenhardt et al., 2016). Deductive research method can be characterized as outcome-based,

where the objective is to test a research hypothesis, usually through quantitative statistical methods, and either validate or reject the initial hypothesis (Eisenhardt et al., 2016). On the contrary, inductive research method is characterized as explorative, where a theory is aimed to generate from the data (Eisenhardt et al., 2016). The objective of this thesis does not fit into either research methods accurately, due to there being a proposed framework that needs to be validated, however, also reviewed if new information approaches. Dubois and Gadde (2002) propose an ‘abductive’ research method, which is characterized as a successful process of continuous reorientation of an analytical framework when confronted with the empirical environment. The abductive research utilizes a systematic combination method where theory is in a continuous process of evaluation against empirical research, and the original model is simultaneously developed. Abductive research methodology is from a research perspective also the most feasible. As the objective of the thesis is to identify a holistic model for management to utilize, it would be extremely challenging in identifying “all of the relevant” literature beforehand, since empirical research would parallel theoretical conceptualization (Dubois & Gadde, 2002).

The high-level process of Dubois and Gadde’s (2002) proposal of abductive research method is the continuous alignment on what theory depict and what is found from the empirical world. Despite abductive research method’s objective in validating a hypothesis, which resembles the characteristics of deductive research method, abductive research method, in reality, resembles more to an inductive approach (Dubois & Gadde, 2002). Instead of *creating* a theory out of the data, the abductive method *develops* a theory through data. Utilizing Waterman and Peters’ (1982) framework of McKinsey 7S and contextualizing it with literature orbiting implementation of business analytics, a conceptual model for a holistic approach for implementing business analytics is created in this thesis. The theory thus has two sections that are being both validated and developed during the empirical research:

1. The variables in the McKinsey 7S Framework. Empirical research may reveal that there either more upper-level or overarching variables that require to be accounted for or some of the variables’ importance is not as high as the theoretical portion of the thesis let one understand.
2. The business analytics related context within each variable. Literature review might not have included, emphasized enough or emphasized too much an activity that is revealed from the empirical portion of the research.

Despite the applicability of the method for this thesis, there are drawbacks in abductive research strategy that requires to be addressed. Dubois and Gibbert (2010) take notice that the research method is vulnerable to “*unintended ‘blindness’ by the researcher towards unexpected empirical evidence and unorthodox theoretical insights.*” Dubois and Gibbert (2010), thus suggest exceptional openness by the researcher to transparently showcase all of the insights received, even though they might conflict with the suggested conceptual model.

4.3. Research process

Adopting an abductive research process framework of Sinkovics and Alfoldi (2012), I have created a research process (Figure 5) to utilize in this thesis. Unlike Sinkovics and Alfordi (2012), where they depict each process a singular one that is reiterated throughout the research process, the research process illustrated in Figure 5 has distinct high-level processes, where reiteration occurs within. Dubois and Gibbert (2010) emphasize the iterative nature between a framework depicted from literature versus the findings during the empirical portion of the research, whereas Sinkovics and Alfodi (2012) extend the ideology of *systematic combining* to even the initial research questions themselves. Therefore, the division of sub-processes into three high-level processes was decided. The three high-level processes in the overall research process are preparation and creation of theoretical framework, data collection and theory development, and interpretation of findings.

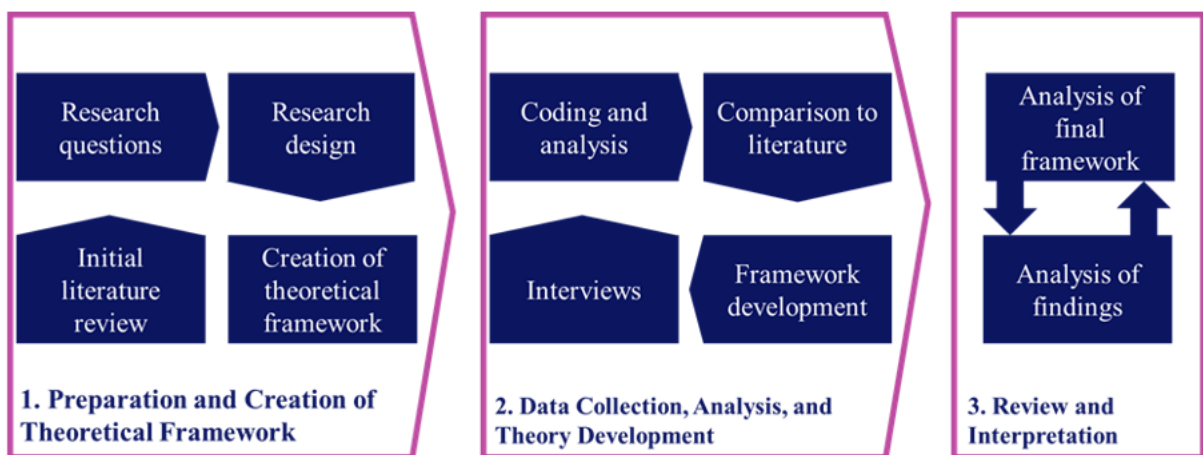


Figure 5: Research Process

I first analyze the literature on different organizational model frameworks that literature has to offer for analyzing variables in strategy implementation. Systematically the variables of the frameworks are cross-analyzed against the variables mentioned in BA specific literature, to

receive a holistic understanding of the current situation in literature (Sinkovics & Alfoldi, 2012). Based on the initial literature review, I formulate research questions accordingly. Following the specification of the objective and background literature, appropriate research design is applied. As mentioned in Section 4.2, Dubois and Gadde's (2002) proposition of an abductive research strategy, is seen to be most appropriate in contrast to the traditional research types of inductive and deductive (Eisenhardt et al., 2016). Based solely on literary findings and deductions, I have created a conceptual model for business analytics implementation (Figure 4)

The second phase of the research is the empirical portion of the research, combined with the simultaneous comparison of prior literature and framework development. As Figure 5 indicates, the process of developing the framework goes hand-in-hand with the interviews. This allows for both to align theory with empirical insights and test, whether the developed framework applies to the following interviews. To distinguish, which findings are case specific and, which can be generalized, *systematic combining* of the new insights from the interviews are cross-referenced against prior literature (Dubois & Gadde, 2002).

In the final phase (Figure 5) I analyze the developed framework and interpret it further. Contrasting empirical findings from the interviews with literary findings, are depicted in Chapter 5. As Dubois and Gibbert (2012) emphasize, to avoid misusing abductive research method to advance one's personal objectives, the researcher should apply utmost transparency and clarity on what was revealed from the empirical section of the research, despite it contradicting with the researcher's hypothesis.

4.4.Data collection

Due to the qualitative nature of case studies, they have been traditionally associated with inductive research method (Yin, 1998). However, Yin (1998) argues that case studies may be utilized for any research strategies if the following three conditions of case studies are met.

1. The questions are asked in a *why* or *how* format, thus the interviewer not constraining the interviewee from expressing their knowledge in an open format.
2. The interviewer to no extent exerts control over the interviewees behavioral events. This can be exerted directly, precisely or systematically. For example, allowing the interviewee to choose an answer from a set of pre-selected choices is a form of exerting control over the possible outcomes.

3. Case studies aim to answer questions related to the contemporary era. Questions regarding the interviewee remembering the past may lead to answers that do not reflect accurately history, thus unintentional manipulation to the data may occur. Therefore, most of the questions will aim to uncover the current situation at Case A. Utilization of case studies in research is recommended by Yin (1998), as it allow to ground literature with real-life events, giving the overall research an additional dimension.

Utilizing the principles of Yin (1998) and applying Dubois and Gadde's (2002) research strategy, I created a semi-structured interview guide to unify the interviews to a certain extent (Appendix 1). Before the interview instance, I noted the interviewee of the topic at hand with a brief interview invitation email. The purpose of the brief note is to semi-prepare the interviewee for a fruitful and insightful discussion to emerge. I begin the interviews with a recap of the purpose, expectations, and objectives of the interview and research. Furthermore, confidentiality and level of anonymity is mentioned to the interviewee. The interview consists of two sections: developing and validating the configured CMBAI and understanding how Case A aligns with the suggested conceptual model. Due to interviewees not being experts in the field of business analytics, it is unwise to assume that interviewees would have full knowledge on the variables impacting business analytics implementation. Therefore, initial interview questions will be asked through the lenses of CMBAI. After the interviewee has a more comprehensive understanding of the topic in question, the interviewee will be more knowledgeable for proposing subtopics that might extend or compress the conceptual model proposed in Chapter 3.

I conducted a total of 20 interviews, out of which six (6) were from Case A's management, eleven (11) business managers, and three (3) analysts. For thesis consistency, the interviewee codes will be identical to the categories of Table 1. Due to Case A organization being relatively small, the objective of interviewee sampling was to receive as diverse sample as possible from all functions utilizing business analytics to some extent. Interviews themselves varied in length between 45 and 90 minutes and were conducted face-to-face in the Case A's premises. Interviews were conducted in both Finnish and English depending on the preference of the interviewee. Lingual comfortability allowed the interviewee to express their ideas and opinions in a manner that truly reflected what they were thinking, without a language barrier filtering the results. Despite the interviews were recorded, notes were taken actively for both in being able to ask follow-up questions, if an interesting point came up during the interview itself, and writing personal *memos* about methods for data categorization (Burnard, 1991). The interviews

themselves were conducted within a three-week period in interview ‘clusters.’ In practice, this meant a continuous cycle of several interviews conducted one-after-another following with a break for analysis and conceptual model development continuing again with the interview ‘clusters’. Conducting interviews in clusters allowed for an honest practice of Dubois and Gadde’s (2002) abductive research methodology. During the interval breaks, interviews conducted were transcript and analyzed against literature. The method and practices for analyzing the interviews will be illustrated in Section 4.5.

4.5.Data analysis

Technological advancements in the realm of qualitative data analysis software (QDA) has eased the process and techniques significantly for analyzing qualitative data (Sinkovics & Alfoldi, 2012). For this research, ATLAS.ti has been chosen as the QDA to perform the analysis in, primarily due to the user-friendliness of the software, flexibility and wide range of both literary and video-based user guides. This Section will go through in detail how data-analysis between the interview clusters were conducted utilizing ATLAS.ti. Additionally, the method on how the analysis impacted the original proposed framework and future interviews will also be illustrated in this Section. However, the context of the analysis and the contextual influence on the configured CMBAI and future interview questions will be elaborated in the Findings Chapter. Based on Sinkovics and Alfoldi’s (2012) progressive abductive research process model, the general analysis process for each interval was as followed: transcription and translation if required, codification, systematic combination with literature and previous interviews, and framework development and refinement of interview questions.

The transcription process for interviews were conducted in-between single interview clusters as mentioned in Section 4.4. Transcription was conducted using ATLAS.ti’s transcription service, allowing seamless transcription by having the audio file and the transcription document under a single software. ATLAS.ti allowed for interviews conducted in English to be transcribed automatically, thus requiring only aftermath reviewing, whereas interviews conducted in Finnish required manual transcription and translation. Utilization of ATLAS.ti for English transcription accelerated the entire process considerably, as by normalizing interview durations, English interviews were transcribed 3.53 times faster on average than Finnish interviews. All in all, transcription process of the 20 interviews took me around 38 hours, averaging 1.87 times the interview duration itself.

Transcription process was followed with two level codification. Despite the utilization of different terms in qualitative data-analysis literature, there is a consensus that codification should be done in two levels (Burnard, 1991; Richards, 2015; Sinkovics & Alfoldi, 2012; Strauss & Corbin, 1994). The first level of codification is regarded to be executed in an open manner- *topic coding* (Richards, 2015) or *open-coding* (Burnard, 1991; Strauss & Corbin, 1994). The objective of first level coding is to categorize the complex qualitative data into critical phrases that may be applied to other interviews discussing the similar issue (Sinkovics & Alfoldi, 2012; Strauss & Corbin, 1994). As there is no definite guide, on how the key phrases should be chosen, Richards (2015) appeals to the researchers' rationality of filtering out *noise*, but not *data*. Richard's (2015) methodology of open-coding was utilized in this research and as presumed the total number of first level codes increased in a logarithmic scale as the number of interviews passed on (Figure 6).

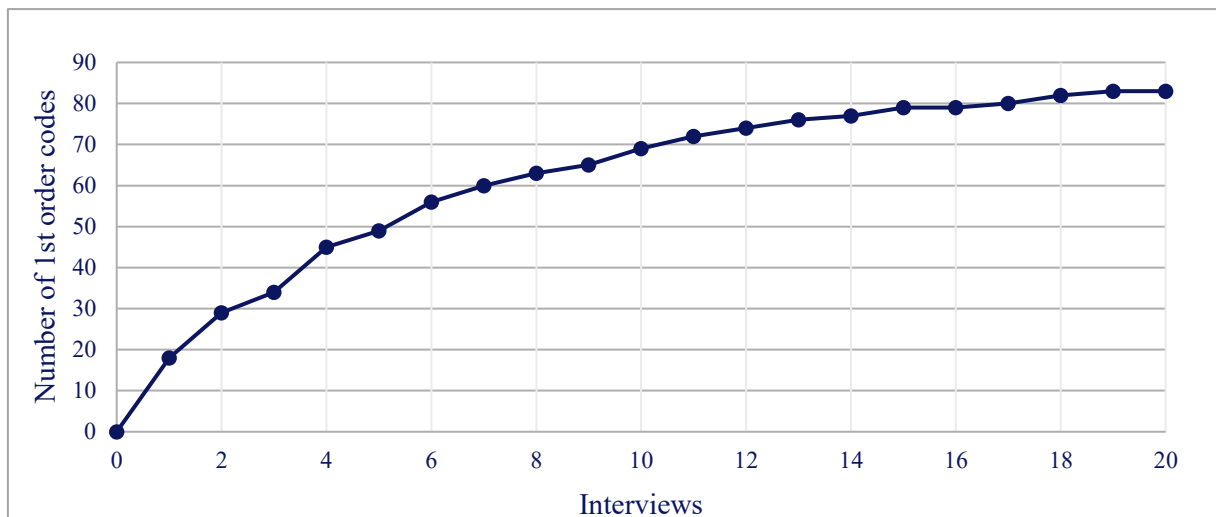


Figure 6: Cumulative number of 1st order codes per interview

Following the procedure of first level coding, began the second level of thematic coding. Again the terminology in literature differs, however, principle of thematic coding exists- *analytical coding* (Richards, 2015) or *higher-order heading* (Burnard, 1991) or *axial-coding* (Strauss & Corbin, 1994). The objective of second level coding is to *collapse* the open-codings into headings or themes (Burnard, 1991), allowing for interpretation and elaboration further in the research. In addition to aggregating the open-coding into overarching themes, codings are refined to match relevant theoretical terminology (Strauss & Corbin, 1994).

For intuitive comprehension of the first- and second-level codes, Gioia et al.'s (2013) proposal of data structures are utilized. Data structures not only allow for a visual representation of the qualitative findings to be made intuitively (Gioia, Corley, & Hamilton, 2013), it, more

importantly, allows readers of the paper to comprehend transparently how statements are translated to themes transparently (Gioia et al., 2013), thus advancing Dubois and Gibbert's (2012) advice on utmost transparency in abductive research methodology. In this thesis, I have grouped interviewees' statements under first level concepts, following with aggregation towards theoretical second-level themes. Finally, the second-order themes are aggregated even further into *dimensions*, which in most cases act as headings for subsections of this thesis. For each M7S variable under the Findings Chapter, a data structure has been inserted, respectively. Due to the overlapping nature of the findings, handful of first-level codes may be found under multiple variables. Interconnectedness of findings will be further elaborated in the Discussions Chapter.

The essence of Dubois and Gadde's (2002) abductive research methodology is applied during the following process in data-analysis. As Dubois and Gadde (2002) elaborate in their research, *systematic combining* aims to link the information gathered from empirical research (interviews) with the theory (literature). The method of linking empirical findings with theory is similar to the *grounded qualitative research method*- theory proposed by Strauss and Corbin (1994), where the researcher is at a continuous process of questioning, hypothesis development and comparing. In practice, second level thematic codings were referenced against the proposed initial framework. If the findings aligned with the theoretical framework, then position of the framework was consolidated. However, if the codings were not in line with the proposed framework, then coding specific theory was revised to understand whether the findings required reiteration of the framework or were the findings case specific (Dubois & Gadde, 2002; Sinkovics & Alfoldi, 2012). Dubois and Gadde (2002) refers to this subprocess of "going back-and-forth between framework, data sources, and analysis" as *matching* (Dubois & Gadde, 2002, p. 556). For *matching* to be more relevant, Dubois and Gadde (2002) the secondary process of systematic combining- *direction and redirection*, to be applied. Direction and redirection emphasizes the utilization of a multitude of sources and methods for data collection and validation (Dubois & Gadde, 2002). The mentioned methodology allows for findings to be "double-checked", but also more convincing and generalizable from the research perspective (Yin, 1998). In practice, direction and redirection was applied in the following two methods:

1. Asked such questions from the interviewees that they were not directly responsible of but had or was indirectly influenced by it. For example, management was asked on how the development of business analytic tools were currently executed, even though they directly

had no influence on it or asked middle management how strategy communication was planned, despite again having secondary influence on it.

2. Attended actively internal meetings and trainings related to the development and utilization of business analytics in the case firm. Observations outside formal empirical research instances allows for unanticipated data and questions to arise that might not have otherwise (Dubois & Gadde, 2002).

Depending on the findings from the *systematic combination* process, the conceptual model was iterated accordingly. Findings Chapter will elaborate further on the first level and second level codings utilized for model development. In addition, for the initial model to be continuously developed, Dubois and Gadde (2010) suggest the iteration of interview questions, to match the latest conceptual model in question. In the bottom of the Interview Guide (Appendix 1), three additional questions have been created due to the reiteration of the model, and one was removed during the interview process.

4.6. Research reliability and limitations

Similar to case studies in general, also this thesis' case study research is subject to vulnerabilities. The following five limitations have been identified from literature. Even though identification of the limitations does not automatically lead in this research being free of the vulnerabilities, they do aid in being continuously aware of the potential pitfalls and thus act pre-emptively.

1. The greatest fault in case studies is the researcher's subjective faults. Yin (1998) elaborates the mentioned fault by stating "*too many times, the case study investigator has been sloppy and has allowed equivocal evidence or biased views to influence the direction of the findings and conclusions*". In practice, this may be seen as intentional or unintentional hand-picking of case study answers to fit the research in question or demonstrate a particular view more effectively (Dubois & Gibbert, 2010; Easton, 1995; Yin, 1998). Dubois and Gibbert (2010) propose two rectifying actions to overcome this issue based on Yin's (1998) studies: establishment of clear chain of evidence, for outsiders to reconstruct the research and *triangulation*- analyzing a single phenomenon from multiple perspectives and sources.
2. Case studies commonly have features that are specific for the case study in question, thus not scientifically generalizable (Easton, 1995; Yin, 1998). This is especially true in this

research, as there is a single case firm that is being analyzed through the lenses of the contextualized model. However, Dubois and Gadde (2002) argue that decision between analyzing one or multiple cases is based on the researchers desire of the balance between in-depthness and breadth. If there are a handful of specific variables to analyze, frequency enumeration would profile better, however, if the analysis is regarding multiple interdependent variables, with complex structure, an in-depth analysis of a single case is preferred (Dubois & Gadde, 2002). Unlike in quantitative analysis, where the goal is statistical generalization, the objective in case studies is analytic generalization- expand and generalize theories (Yin, 1998), which again is the objective of this research.

3. Case studies traditionally are illustrated as being bothersome, producing excessive amounts of unreadable documents (Yin, 1998). Unstructured and irregular documents may easily lead in the single interviews not being scientifically comparable to each other. This, however, can be avoided pre-emptively with a structured interview guide that is followed stringently throughout all interviews. (Yin, 1998)
4. The research paper includes *rich descriptions* of interviews and events, without link to a theory or a matter that the researcher want to elaborate further (Easton, 1995). This problem is, however, not limited to only case studies, but instead all sorts of investigations, whether being literary review or statistical summaries. One needs to evaluate continuously, whether a ‘finding’ is relevant to the text or not (Easton, 1995) and create a clear chain of causality between findings and outcomes (Dubois & Gibbert, 2010). Dubois and Gibbert (2002) summarize this problem by smartly noting that “... *some researchers tend to describe everything and as a result describe nothing.*”. As poetic as Dubois and Gibbert’s (2002) statement might sound, the researcher requires to be on top, and evaluate whether the inserted finding provide additional value to the research paper or not.
5. Despite the aim of transparency within the text, combining with a critical analysis of relevance for research findings generalization, this thesis is subject to what Dubois and Gadde (2002) refer to as *quasi-deductive theory testing*. Due to theory development will coincide with conceptual model validation, there poses a risk of positivistic risk. Here the researcher would automatically generalize findings from the empirical findings into theory. Just as the solution for the first research limitation, the researcher should aim in establishing a transparent chain of evidence (Dubois & Gadde, 2002).

All of the interviews were conducted face-to-face, and therefore are subject to vulnerabilities related to the specific interview method. The primary characteristic of the interview method is

the synchronized and real-time communication from time and place perspective (Opdenakker, 2006). This interview method allows to gain multisensory answers to questions (Opdenakker, 2006). In addition to the verbal answer to questions, interviewers gain further insight through the interviewees social cues, which is not possible to receive in for example interviews conducted by mail. I tried to take social cues attentively into consideration when asking personal questions relating to the interviewee's capabilities in utilizing data-driven methods and organizational culture. Full transparency, however in face-to-face interviews may lead to the interviewer on being pervasive, and guiding the interviewee in a particular direction, which lowers the reliability of the research (Opdenakker, 2006; Yin, 1998). This can, however, be avoided by attentively utilizing a predefined interview structure to guide the interview forward (Opdenakker, 2006). Additionally, as some of the interviews were conducted in Finnish, the transcription process of Finnish interviews required translation into English. Despite having a good control over both Finnish and English, there remains a risk that the underlying expressions in Finnish language cannot be adequately translated into English.

5. Findings

This Chapter will discern the results of the empirical portion of the research. The findings have initially been divided according to Waterman and Peters' (1982) McKinsey 7S Framework. Each Section will start by depicting the primary constituents affecting the implementation of business analytics, supported by contextualized data structure proposed by Gioia et al. (2013). Following the elaboration of the explanatory constituents related to business analytics implementation, analysis of Case A's situation on the particular constituents will be depicted. By reflecting the general findings of each variable against the case company, the paper will receive a far more in-depth picture of the potential and risks that may apply during the implementation process in reality.

5.1.Strategy

Just as literature indicates (Holsapple et al., 2014; Watson & Wixom, 2007a), there is a consensus among interviewees that implementation of business analytics in an organizational level calls for a holistic cultural shift towards an evidence-driven mindset from the entire organization. In the essence of strategy, comes its communication to the people implementing

it (Moss & Warnaby, 1998; Waterman & Peters, 1982; Weisbord, 1976). It promptly became apparent through interviews that the CMBAI strategy description of *exhaustive strategy communication* is too narrow and requires to be segmented further into strategical and operational communication.

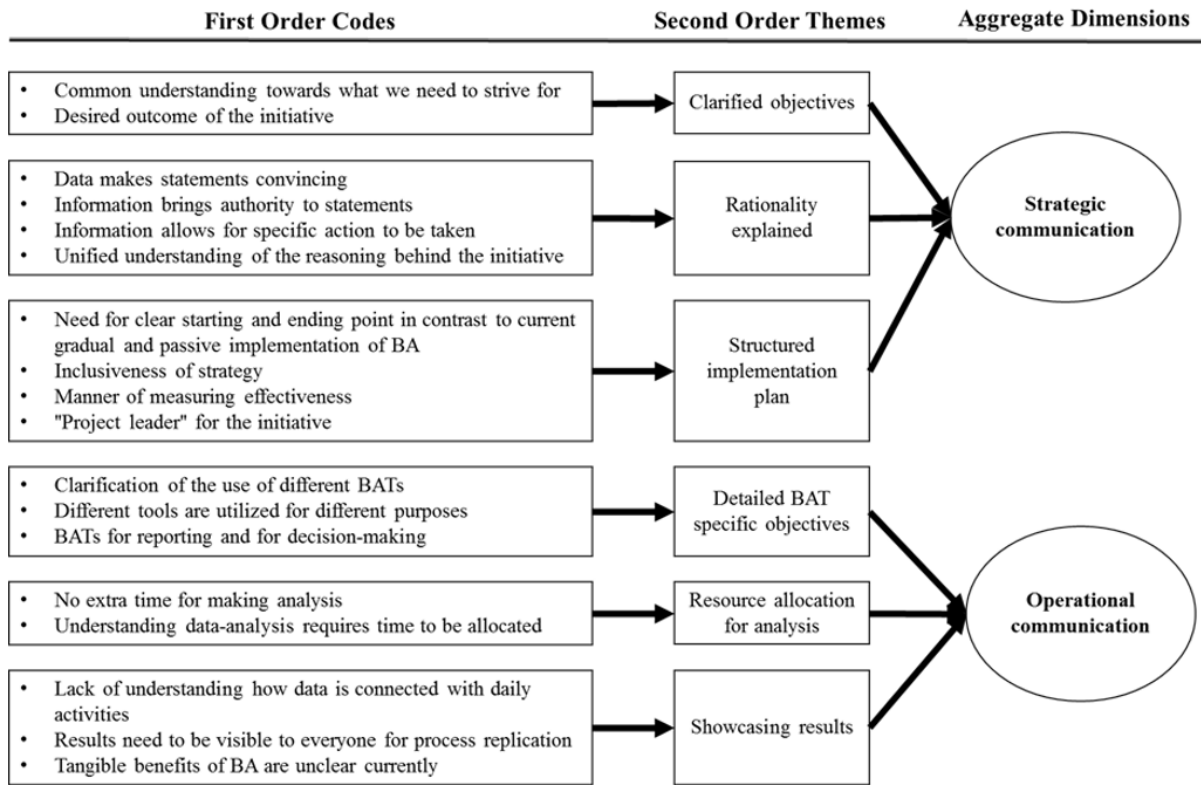


Figure 7: Data structure for strategy variable

5.1.1. Strategical communication

In the core of strategical communication is the explicit announcement of mission and vision regarding business analytics to all stakeholders involved with the organization. Both business managers (BM) and management (MGMT) agreed that an explicit declaration through a formal channel would ensure that employees regard the implementation of business analytics as a change in practice and culture, rather than simple addition of a new tool to the existing scope of tools. Interviewees did not have a consensus on what should the content of the message be, however, the objective of the message should be to motivate employees towards a common goal. The inclusion of all Holsapple et al.'s (2014) elements of BAF was not seen necessary, although the grounding element of *movement* or cultural transformation was seen necessary to be included in the strategic communication. The following three perspectives were emphasized

by the majority of interviewees when questioned on what questions MGMT should answer when announcing the implementation of business analytics in an organization:

1. What is the desirable outcome of the initiative, and when can we say that we have achieved it?
2. Why is the initiative important? What type of benefits can we reap from the initiative?
3. How will the strategy be executed and with what sort of resources?

The perspectives listed are not in any specific order of importance; however, the questions as a whole do remotely correspond with a familiar strategy anecdote of answering the questions of *what, why, and how*, to ensure an exhaustive communication of strategy (Moss & Warnaby, 1998). Two interviewees also brought up the perspective of *who*, however, both of them followed up the perspective with the fact that the cultural transformation should be all-inclusive for an organization to realize the benefits of business analytics. The findings indicate that exhaustive communication of all Holsapple et al.'s (2014) BAF elements is not necessary. However the strategical communication should be exhaustive in the sense of including the elements of what, why and how are we going to implement business analytics.

All of the interviewees agreed that Case A had invested resources in business analytics; however, there was no unified view on whether MGMT has clearly announced and expressed its initiative to all of the necessary stakeholders. By categorizing the answers related to communication effectiveness by coding, there was a slight inclination towards MGMT saying that the effort has been declared to everyone, whereas business managers saying vice versa. Nonetheless, the answers vary tremendously as can be seen from the transcripts below.

“The usage of business analytics in [Case A] has started gradually and has somewhat been implemented at its own pace. Top management obviously supports the initiative, as there has been no restrictions on the amount of time or resources allocated in developing it, however, till this day there has not been a formal announcement that data and analytics drive our decisions.” (DEV)

“During periodical gatherings, I have heard talks about [Case A] being the “next generation cargo.” However, I do feel that communication needs to be more tangible than this.” (BM)

“Top management clearly supports us in using numbers to make decisions, and I do feel that all of us understand the importance of using numbers” (BM)

The variation in answers regarding formal strategy communication also reflected on the answers of the three strategy communication perspectives.

What: Due to the current hype around business analytics, everyone had a general knowledge that the objective of adopting business analytics, was to drive decisions based on data. However, as Holsapple et al. (2014) identified in their research, people commonly have different emphases, based on their personal motivation towards understanding and applying business analytics. Out of the 20 interviews, most of interviewees emphasized Holsapple et al.’s (2014) elements of *Practices and Technologies* and *Transformational Process*, in their own terms. All of the other, except *Capability- intangible skills of evidence processing through models and logical reasoning*, were mentioned. Unrecognition of the *capabilities* component might either indicate that the Case A does not consider the intangible cognitive skills as being a component of business analytics or that the case company has not recognized it at all.

“The desired outcome would be when there is systematic monitoring of all of the processes to make insightful decisions. Leadership would systematically go through the performance of Cargo based on the different KPIs and make decisions based on it” (BM)

“The objective is to transition from reactive to proactive slowly. Instead of looking today at yesterday’s numbers in meetings, we would start looking today at tomorrow’s number” (MGMT)

“The optimal situation in a data-driven organization would be, when we could create and align supply and demand strategies for all three horizons- short-, mid-, and long-term.” (BM)

Why: The importance behind the usage of BA in decision-making and operations overall was unanimous amongst interviewees. Two aspects were identified when asked for elaboration in importance, authority to statements and having the tools for identifying and solving problems. Before the effective usage of BA in the case company, people tended to communicate “facts” based on gut feelings, and thus make decisions based on gut feelings. However, through numbers, “gut” feelings could now be either consolidated or eradicated with data, leaving little room for argument. Effective usage of data could potentially remove speculations and

anecdotes that hindrance employees from focusing on the core issue. Secondly, by gathering data from each instance of the entire process chain, bottlenecks can be identified and fixed promptly.

“Before we continuously received from the ground handling units that they could not plan their activities correctly because trucks were arriving much later than they were scheduled to arrive. However, due to the lack of scheduled and actual arriving data, we could not make impactful actions. Through data, we identified that there was a certain forwarder, which tended to arrive later, and thus we could take targeted development actions” (MGMT)

How: As one of the developers mentioned, management had a positive attitude towards the development of business analytics, and this could be seen in the flexibility and leniency from the management towards allocating resources into the development of business analytics. However, so far there has been little formal communication on a strategy on how to implement an evidence-driven decision-making organization. 4/5th of BMs thought there should be a clear plan as to how Case A could transform their culture into a data-driven one. Currently, evidence-driven decision-making has been communicated abstractly through Case A’s digitalization initiative enabling employees with ever-more information of both the internal and external environment. The digitalization strategy, however, focuses on the technology aspect rather than the change of mindset, which in essence is in the core of implementing business analytics at an organizational level. Even though the change of mindset towards an evidence-driven approach cannot be measured accurately, the pervasiveness of BAT usage in the organization is one method of measuring. The suggested method is in line with Watson and Wixom’s (2007a) finding, stating that sophisticated business analytics enabled organization is such where business analytics is pervasive throughout the entire organization. Here Watson and Wixom (2007a) do not disregard any function of the organization, but rather highlight that the entire organization needs to apply business analytics in its specific context. In a pervasive environment, people from different departments and hierarchies utilize BATs frequently, as it is integrated into their areas of responsibilities (Watson & Wixom, 2007a)

“The necessary technical aspects for measuring pervasiveness is in place. We know who, when and for how long is a [BAT] being used. There should be a strategical objective on what is the desired pervasiveness of [BATs] both from a duration and diversification perspectives.” (DEV)

5.1.2. Operational communication

Whereas strategical communication focuses on providing the high-level lines of the strategy implementation, operational communication aims to communicate the strategy in operational terms. Unlike in the strategical communication, the focus on operational communication is to elaborate the *how*, in a rather detailed level. MGMT agreed that the *how* in an operational level is challenging to elaborate, especially if the person does not have educational or previous work experience in utilizing numbers for decision-making. The primary challenge in *how* is to connect practical daily activities and decisions with the business analytics that anyone could easily interpret and take actions accordingly.

As Negash (2004) notes in his research, the benefits of business analytics require time to realize and are challenging to define from a monetary perspective. A similar observation was noted by several interviewees, which was followed by three recommendations to aid solving this challenge: clarity on the objective of specific business analytic related initiatives; allocating specific time for analyzing data, and showcasing success stories of the process and benefits of utilizing business analytics in decision-making for others to replicate.

The case company has working BATs in place; however, the objective of different BATs has not been explicitly stated, causing unconstrained requests to flow towards the developer to add it into the BAT. Furthermore, the lack of unified understanding on the objective of each BAT, has led towards general confusion amongst employees from where to search the desired information and in addition to the existing information duplication in multiple BATs.

As the developer of this [BAT system], it is clear that the objective of this [BAT] is very much unclear for specialists [business managers]. I suppose the primary reason behind this, is the fact that the objective of this has not been communicated to all of the stakeholders. Clarification on the purpose would also reflect on the metric requests I'm receiving from specialists [business managers]. (DEV)

Due to evidence-driven decision-making not being the top agenda of the case company, but instead, digitalization being it, role transformation has not occurred as the literature suggests. Multiple research paper suggests that the organization would need to restructure working habits, in order to integrate business analytics as a part of daily working habits (Dominic & Court, 2012; Huber, 1990; Watson & Wixom, 2007b). However, as this has not occurred, workstations

that had not required before business analytics as a part of their working habits, have not been able to integrate business analytics as a part of their daily working habit.

“As our work time structure has not changed, we do not have time to analyze the data provided. Our work consists of making continuously on-the-moment decisions: thus we would require weekly at least a couple of dedicated hours to analyze the data and make mid- and long-term decisions based on them.” (BM)

As mentioned in Section 4.1, the case company has mobilized business analytics recently, and have managed to realize several benefits of BA already. Despite the several prompt realizations so far, due to the lack of operational communication, mobilizing the organization in understanding the connection between business analytics and practical actions has been passive.

We still have a long way in becoming a truly data-driven organization; however, we have seen some outstanding preliminary results. The results should be showcased often to other employees to learn on the thinking process behind this. For example, through our [BAT], we identified that our daily operations’ human resource allocation was planned to match the daily demand- during peak times, we had most people working and vice-versa, leading to a problem that during mornings we would have a considerable stash of previous day cargo unloaded. Therefore, we moved the resourcing focus more towards the night shift, resulting in that we currently have almost all previous day cargo unloaded by the next morning. There are plenty more examples, but they need to be more openly showcased.
(DEV)

5.2.Systems

Literature regarding systems in business analytics highlighted two aspects; the creation of business analytics tools and increasing decision-making instances in formal environments. Interviews quite uniformly directed that the emphasis in systems should direct towards the process and level of inclusion when creating business analytics tools, whereas the importance of decision making in formal environments was interpreted ambiguously.

“To decide in a formal or informal environment depends more on the decision to make, then anything else. To say that formal environments would be better is incorrect, as formal decision-making environments are not as agile.” (MGMT)

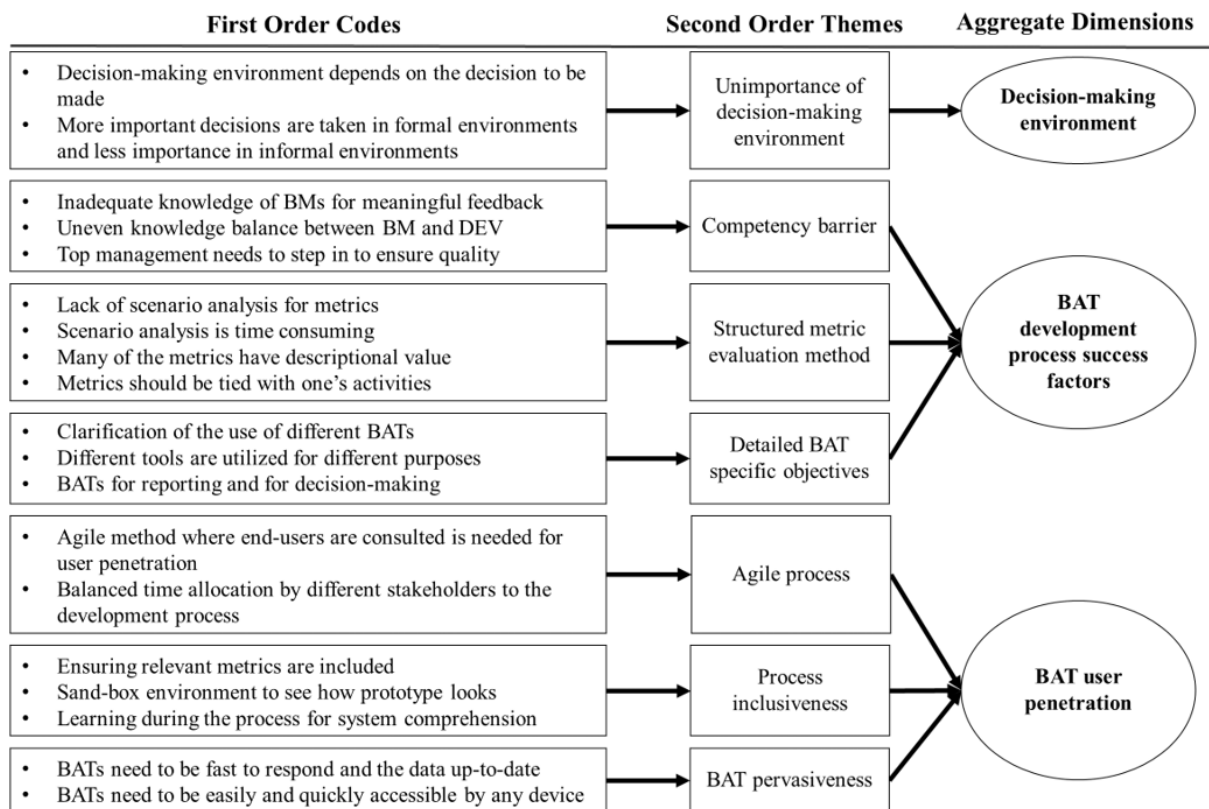


Figure 8: Data structure for systems variable

Gangadharan and Swami's (2004) proposition of agile development process of business analytics, and Wang and Wang's (2008) proposition of development cycle both reflected the general mindset of interviewees when asked how business analytic tools should be developed. An agile development process would ensure that the tools are being developed towards the right direction and the sunk cost of pivoting would stay relatively low. Similarly, the development cycle would allow a continuous engagement between the developer and business manager furthering the understanding of one and another. Through the engagement instances the developer would gain knowledge on the business environment and variables the business manager operates in, and correspondingly the business manager would learn on both the potential and constraints the available data might cause.

Despite the unanimous agreement towards the theoretical models of agile development process and development cycle, several practical issues were identified, which were not identified in the literature. Regarding the Gangadharan and Swami's (2004) agile development process, risk related to the extended duration of the project was identified.

“An agile development process is indeed needed, however, if there are too many iterations, the project may become too cumbersome for both parties. Business managers also have “daily priorities” to do and therefore cannot focus on the testing in each iteration. There needs to be trust towards colleagues’ ability to execute in quality.” (BM)

Wang and Wang’s (2008) development cycle, on the other hand, had several bottlenecks that need to be addressed: inadequate knowledge from business managers for meaningful contribution, product ownership unevenly distributed between the developer and business manager, and lack of clear and unified process for metric evaluation.

The first issue related to inadequate knowledge from business managers for meaningful contribution to the BAT development process, roots from business managers not having previous experience in working with structured data. As previous working habits and decisions may have been based on qualitative measures, business managers may have challenges in contributing business-related factors that could be measured quantitatively. Case A had several instances where this dilemma occurred resulting into the following two problems.

1. 4/5th of the business managers interviewed, considered that their overall involvement in the development of business analytic tool was a bit deficient, especially during the “ideating” stage of the process. There were speculations that management was rather heavily involved during the entire development process of the BATs, leading into the BATs suiting for “higher level” analysis, therefore, specific needs for detailed analysis were not design-wise feasible- the desired information can be extracted from the BAT; however, the metrics are visualized in an unintuitive manner and require a multitude of “clicks” to be extracted. Even though there is not anything wrong in this method, as mentioned the BATs started to gradually reflect the needs of management, even though the primary users had different needs. This lead to poor end-user penetration amongst business managers of which more will be discussed in Section 5.2.1.
2. Users had difficulties in providing feedback to the developer at the end of the BAT development cycle. A recommended structure of productive feedback would consist specific benefits the BAT produces, but also the hindrances of it, following with a recommendation. If the user has challenges in working through numbers, generating recommendations for change may be beyond one’s comprehension. In practice, this has led in BATs becoming more and more crowded, due to not removing or changing previously developed metrics.

It is challenging for me to know precisely what specialists need, as I am not in their shoes. As I am not challenged on the metrics that are already created, it is challenging for me to make productive changes to it. However, when I am requested for a new metric, I do try to dig as deep as possible, to understand the use cases and cruciality of the request before implementing it. (DEV)

The second issue related to product ownership unevenly distributed between the developer and business manager leads to BAT not being able to serve its real purpose. It was agreed that ownership of the BAT cannot be solely the business managers' neither the developers'. Even though business managers are the end-users of the BAT, the developer has the ultimate knowledge on technical factors that might boost or hinder the usability and user penetration of the BAT system. On the other hand, as developers do not operate in the "operational field," they do not have a comprehensive understanding on the multivariate environment business managers work in. The case company's BAT ownership is primarily in the hands of the developer who develops it. Not only does this lead to the problem that the much of the content in the BATs are not relevant for the business managers but combined with the first systems issue regarding business managers being unsure on what is beneficial, creates an end-result that is marginally utilized. However, the case company does have *hybrid* developers-knowledgeable in both technical and business matters (Eckerson, 2007; Shanks et al., 2012), who are a great asset in the creation of BATs. As Shanks et al. (2012) mentioned, *hybrid* employees may be given primary responsibility, however, quality communication is vital with end-users to ensure that the BAT consists of the right components. Despite calling the first and second mentioned points as "issues," these workarounds simultaneously acted as medicines for the competency problem identified both in literature and empirical research. Although both management and business managers agreed that this is not the optimal solution, by giving both more responsibility to management and having hybrid developers, BATs were developed according to interviewees towards the right direction, and thus the issue regarding competency was overcome.

The third issue related to the lack of clear and unified process for metric evaluation, led to unnecessary metrics being included in the final version. Wang and Wang's (2008) development cycle's "decision making"- component push the importance of objectively aiming to evaluate the different potential outcomes that may occur due to different results from the metric itself. Literature proposes the options of scenario analysis (Shanks et al., 2010) or/and linking metrics with individuals' performance (Schl fke et al., 2012; Watson & Wixom, 2007b). The necessity

of scenario analysis was identified in the interviews as essentiality when evaluating new metrics; however, this rarely occurred, primarily due to two reasons: scenario analysis on each metric would be time-consuming, and many of the metrics have a descriptive value instead of having an actionable value. The second point is in contradiction with scenario analysis mentality, which could potentially eradicate the descriptive metrics.

“For example, following the entire network’s sales will not give any actionable insights; however, it is essential when trying to understand, how single actions may influence the bottom-line of our operations.” (BM)

Performance-based metrics were similarly welcomed with contradicting views. Despite there existing like-mindedness that metrics should be created so that they are either directly or indirectly attributed with one’s actions, there existed resistance by stating that it could lead to sub-optimal activities. Nonetheless, it was seen that if appropriate performance metrics are created, and are attached with appropriate incentives, this could boost the organization’s performance. However, for rightful performance-based metrics to emerge, employees should have clarity on their responsibilities, and there should exist alignment between to what extent they can take actions and the impact of the performance measurement on their general performance.

“... performance related metrics and incentives, could lead to people solely aiming to maximize their personal metrics. None of the metrics should contradict each other. For example, it would not be right if sales’ incentive is to sell a particular high-yielded product that OPS [operations] cannot handle over a certain threshold ... for even these sort of metrics [to emerge], we should know what our responsibilities and influence powers are.” (BM)

In addition to the general systems related findings, due to lack of operational communication in the case company, there existed a void between business managers and developers on what is the objective of each tool in use. The lack of having a common view on the objective has led in end-users requesting for items that are not aligned with the developers’ vision on what the output of the business analytic tools should be. It needs to be emphasized here that there are no absolute “wrong-or-right” answers to whether the business managers or developers are correct, but rather a lack of collective understanding of the objective has led toward the mentioned impasse. Clear operational communication from the product owner or management on the

objective of each tool in use, would clarify how business managers and developers consider the BAT in question.

5.2.1. Causation between BAT development inclusiveness and user penetration

The ratio between the level of involvement and user penetration emerged as one of the critical aspects of the implementation of business analytics in an organization. Despite the research method not being quantitative, 4/5th of business managers felt demotivated to engage thoroughly with the BAT if they were not personally involved in the creation and development process. Business managers collectively highlighted the following three reasons why involvement has correlation and causation with the motivational level of BAT usage:

1. Ensuring that metrics that I need for decision-making would be included in the BAT.
2. Ability to influence the design of the metric, as visualization plays a critical role in how information is interpreted.
3. Understanding the data source in use, and limitations from the data perspective, therefore maintaining trust on the BAT.

This aligns the Vroom and Jago's (1974) theory regarding inclusiveness in development projects. However, despite literature and interviewees' emphasis on the importance of involving the end-users in the process, involvement as such was not an essentiality, if higher priority matters related to the specific BAT were in place. When followed up in this specific question, the following BAT related priorities were risen as being more important than the physical involvement itself.

1. Level of relevancy the business analytic tool metrics provide to one's work and decision-making.
2. Pervasiveness of the system from technical aspects. In other words, how mobile the BAT is (does it require a separate industrial application to be installed versus web-based application able to use on a mobile), and how current is the data behind the system.
3. Design of the data visualized in the BAT.

The findings regarding the priorities as such are not in direct contradiction with Vroom and Jago's (1974) theory, as involvement during the development process would increase the probability of accounting the higher priorities appropriately.

5.3. Structure

12 out of 20 interviewees identified processual dynamic capabilities as being an integral part for transforming an organization to a data-driven one. As Helfat et al. (2007) identified, both search-and-select and asset orchestration capabilities were seen to be vital in reaping the benefits of BA. The aspect of organizational restructuring was not firmly confirmed neither eliminated, due to interviewees generally not seeing the pros and cons of both perspectives. Therefore, under the variable structure, the concept of dynamic capabilities was explored further. Although dynamic capabilities were seen to be in core of the variable *structure*, interviewees agreed that it is necessary to establish an infrastructure first that allows the dynamic capabilities to emerge.

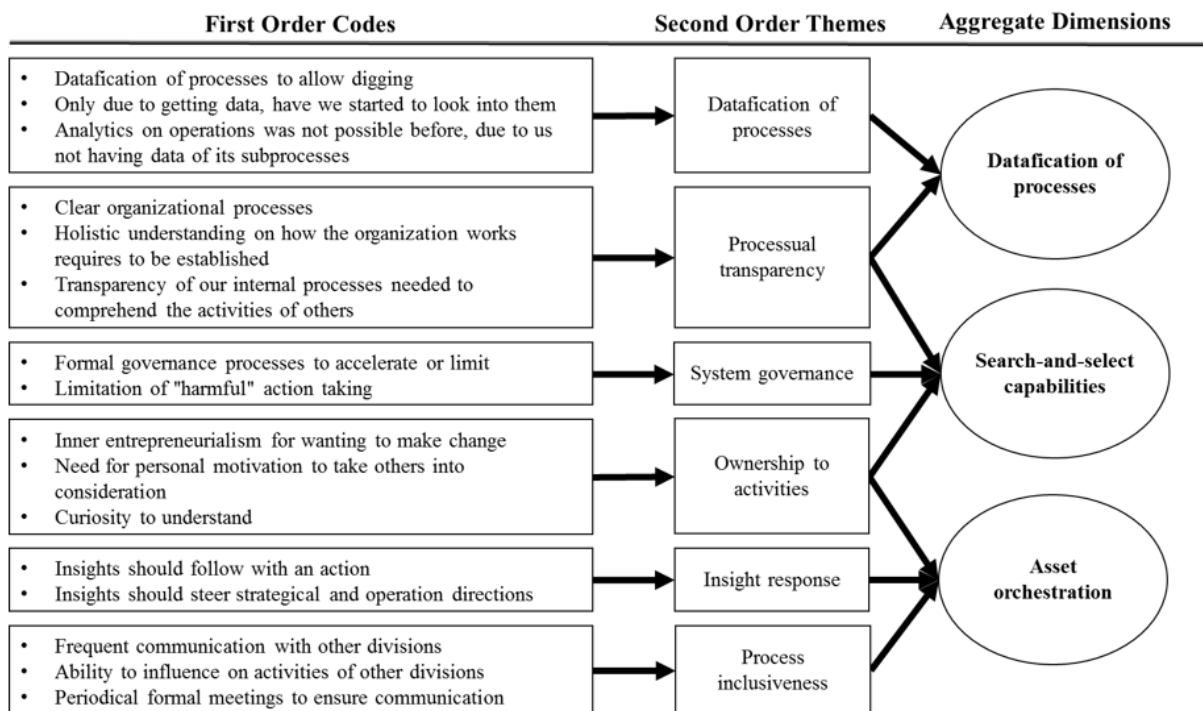


Figure 9: Data structure for structure variable

5.3.1. Datafication of processes

Helfat et al. (2007) elaborate on search-and-select capabilities as such where employees are aware of how other parties' activities affect its own and additionally comprehends how his activities affect other parties' activities as well. For employees to even come into consideration of how he as a unit relates to each other, there needs to be clarity from the organizational perspective on what are the overall established processes.

Several interviewees regarded the establishment of clear organizational processes as the primary agenda when contemplating the initialization of data-driven decision-making in an organization. As the term describes, data-driven decision-making basis on having *data* to make the decisions upon. This requires for single "transactions" within entire operational chain to be "datafied."

"To utilize analytics efficiently within the organization, clear processes need to be put in place. All exchanges and communications generated within our internal environment need to be captured. Only then, when we have these in place, can we apply analytics and algorithms to cases where it seems to have a positive impact" (DEV)

Findings on the importance of processual clarification are somewhat in line with literature. For an organization to utilize business analytics efficiently, organizational processes need to be restructured to fit the data needs (Dominic & Court, 2012; Huber, 1990; Watson & Wixom, 2007b). Whereas literature does not specifically mention that all processes need to be "datafied," restructuring of processes to meet data needs do imply that processes should be deliberated in a manner that can be reproducible through data flows.

As mentioned in Section 4.1 while introducing the case company, only recently has the case company gained the ability to measure its operational processes quantitatively due to the launching of the new terminal. The focus while building the terminal was to allow a seamless transition from the prevailing "paper" trailed operations towards a more digitalized. Despite the terminal's readiness to a digitalized environment, majority of the external stakeholders the case company currently deals with, e.g., forwarding and shipping companies, use paper Air Way Bills (can be related to plane tickets) hindering the terminal's digitalization endeavors. Nonetheless, a lot of the Case A's operations are currently "datafied" to some extent, allowing for analysis to be made of them.

“Despite the world viewing us as a mature organization, only have we recently truly established a holistic understanding of our processes for algorithms to start doing their jobs.” (DEV)

5.3.2. Search-and-select capabilities

From a theoretical perspective, as the higher-level organizational processes become clear, transparency within the organization becomes clearer (Helfat et al., 2007). Whereas Helfat et al. (2007) consider the external environment to be an essential part of search-and-select capability, interviewees punctuated the importance of the organization’s internal environment. From a generalization perspective, it is challenging to identify whether the emphasis of the internal environment is due to the case company’s own situation, or whether it can be generalizable. Nonetheless, the message of a transparency was supported.

“Transparency and ownership increases, when an organization has crystal clear understanding of its processes- from a department level to a team level, and finally to a single unit level. When I know my position in the organization, only then will I have the ability to take the organization into account in decision-making” (MGMT)

Processual transparency alone does not lead to an organization having high search-and-select capabilities: rather it may be considered a prerequisite for the enabling of the mentioned capability. Literature regarding dynamic capabilities fails to take a stance on the human aspects of the topic. Interviews with both management and business managers confirmed that there is a need for a personal motivation to understand and account other stakeholders’ position when making a decision. This can be identified from the case company, as there are employees who focus solely on own numbers and own responsibility, whereas employees with a more “entrepreneurial” mindset, try to take other stakeholders into account. One top manager mentioned that in addition to curiosity, formal governance processes might accelerate the organization’s search-and-select capabilities. For example, in the case company, the person deciding whether to offload cargo can execute the offloading with a single press from the cargo management system. From a system perspective, the “action” is relatively simple and straightforward, however, from a client management perspective, this creates a more significant problem. By offloading the shipment, the company fails to deliver its customer promise, thus causing difficulties for the sales department to ensure future sales from the specific client.

Despite cargo offloading being a standard procedure in the industry, governance actions such as ensuring that the cargo management system would not allow for a single client shipment to be offloaded more than x times during a period would increase the company's search-and-select capabilities.

“For us to enhance our performance, we have to get rid of our artificial work constraint. It is simply not enough for each worker to just execute, but rather other stakeholders need to be considered continuously. In aviation terms, we need to move from a leg-based approach, towards a network-based mindset.” (MGMT)

Due to the recent restructuring of the case company's physical facilities, responsibilities of each are not clear throughout the organization. The mere absence of comprehending one's area of responsibilities is also a reflection of the unit's incomprehension of its position within the bigger picture. As theory suggests, this has led to low search-and-select capabilities within the organization, where much of the decisions do not consider other stakeholders. However, on the flipside of the coin, despite business managers' confusion on their roles and responsibilities, management does not want to establish specific boundaries of responsibilities yet. I did not identify sufficient literature that would establish the connection between fluid roles and dynamic capabilities. Rather there exists specification on clear roles and dynamic capabilities (Helfat et al., 2007).

“We have gone through major changes recently. It is known that responsibilities are not clear; however, we wish areas of responsibilities would semi-automatically be created through employees' personal interests and skills. This would ensure that we have the right people in the right place.” (MGMT)

5.3.3. Asset orchestration

To reap the benefits of the insights gained from business analytics, the organization needs to have the dynamic capabilities to seamlessly take development actions both within its own department, but also other departments (Helfat et al., 2007). As mentioned at the beginning of Section 5.3, this was agreed by the interviewers as an essential capability for harnessing business analytics at an organizational level. However, the notion that insights from business analytics should always lead to a *response* (Watson & Wixom, 2007a) was welcomed by the interviewees with modification. The modification related to Wang and Wang's (2008) notion

that insights might not always trigger an action, but rather provide business managers to develop tacit knowledge of intriguing emerging patterns in data.

“As a rule of thumb, insights should be followed with actions the insights should be inserted to a strategical time frame, thus steering the organization’s strategical and operational direction” (BM)

Helfat et al. (2007) sided the notion regarding departments having overarching capabilities to impact the development of other departments. Despite not being generalizable through a single case company, the interviewees did not see overarching communication as being the problem, but rather the ability to take overarching development projects through to the finish line. The case company has processes in place for frequent and quality communication between different stakeholders over department borders. Both formal periodical meeting and informal encounters stir-up development issues, however rarely the overarching development issues are taken to the end. Interviewees generally felt that it was relatively easy to bring new matters up; however, they were rarely executed unless there was a formal “order” from the management. Resourcing was identified as being one of the primary reasons for not being able to initiate ad-hoc development projects; however, the motivation of the initiator was seen generally as a more remarkable actor for getting the overarching development issues through.

“We go through previous day performance daily through our automated reporting dashboard (BAT), however, very rarely do we investigate into the problems identified from the daily performance reports. If there seems to be a trend in some issue, then those are taken up and solved. As there are currently, multiple “large “issues identified, resourcing for development issues is a bit tight now.” (DEV)

” As many of the development issues require multiple stakeholders from different departments to communicate, people are generally hesitant to take up or be involved in such projects. Usually, the initiator requires to “push” a bit extra to get such development issues done.” (MGMT)

5.4.Style

Four primary components were identified under leadership style: change in overall leadership culture from managing employees towards enabling employees, leadership through role-modeling, structured data governance model, and business analytics trainings enforced by

management. Addition to the mentioned four components of style: communication was also attributed into this category. Difficulties in distinguishing strategy from style in itself was no surprise as a vital component of successful leadership is communication. Furthermore, as high-level strategy is commonly driven in a top-down method, management is associated with strategy configuration, thus from the perspective of business managers, leadership consists of creating and communicating an effective strategy. Out of the four mentioned components of style, the second and third were identified by Watson and Wixom (2007b) almost verbatim, and the final component with slight modifications.

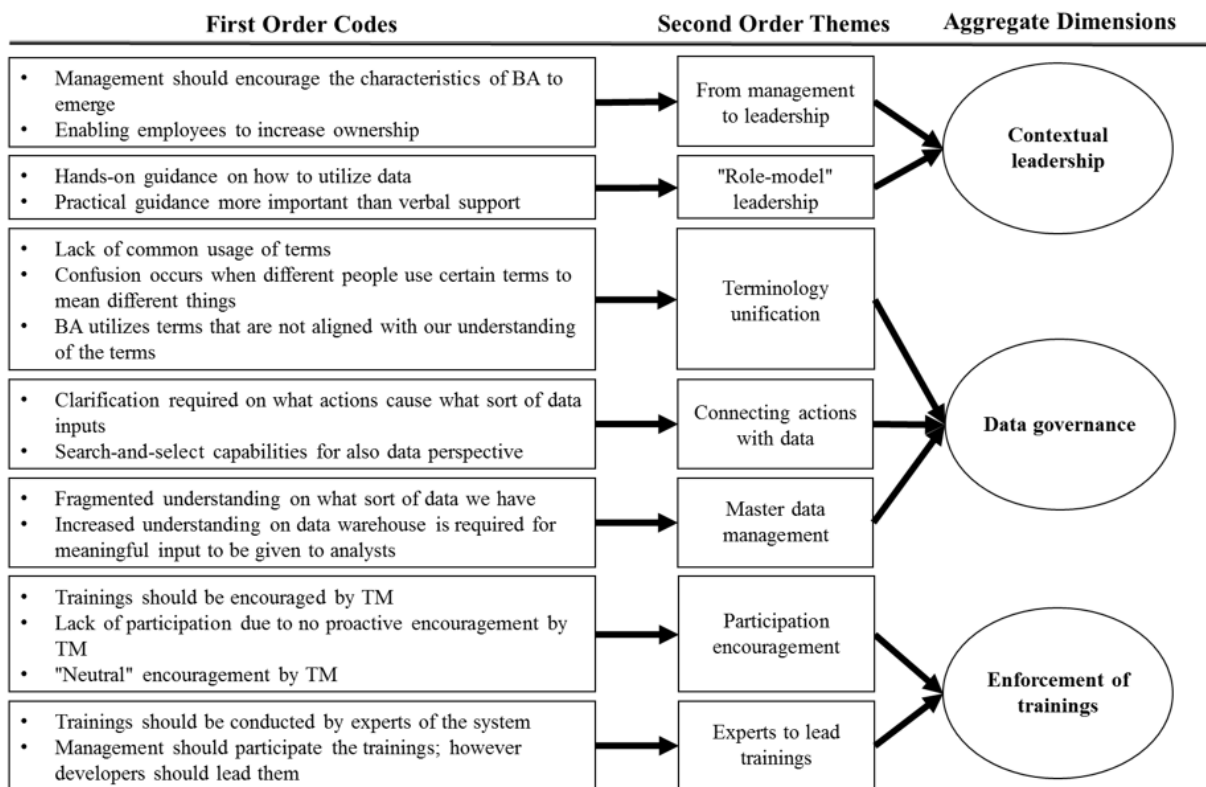


Figure 10: Data structure for style variable

5.4.1. Contextual leadership

Employee management and leadership as such were identified as one of the components that require change when an organization aims for implementing business analytics at an organizational level. As management style itself should root from the needs of the organization, an organization wanting to reap the benefits of business analytics should enforce a leadership style that enables that. In practice, this means in providing support to employees for taking ownership of own activities. One business manager elaborated the need for a changing leadership method in the following manner:

“Effective utilization of business analytics requires ambitious employees with ownership towards own activities. This requires management to also change towards a leadership model, where leaders no longer manage, but rather enable employees to become pioneers and push boundaries” (BM)

As the transcript highlights in the final sentence, management should aim to enable business managers to alter their mindset towards entrepreneurialism and curiosity. As both Canato et al. (2013) and interviewees agree on, an incentive is required for changing the mindset of business managers. Incentivization then again boils down to understanding the underlying motivators of employees within the organization. As incentivization as such is a broad topic on its own, the topic is not further drilled down. Instead, the concept of ownership and enabling an organization for employees to take ownership of its own responsibilities are discussed in Section 5.5.1. According to the interviewees, the case company performs extraordinarily well in this variable. Business managers uniformly agreed that the case company has transitioned during the past years from a management model towards a leadership model, where encouragement and enabling employees is in the core. However, the benefits of business analytics have not been fully realized due to lack of clear ownership within the organization, as discussed in Section 5.3.2. Uniform agreement of enabling leadership style is aligned with findings related to asset orchestration under dynamic capabilities.

“I do not feel that we have any artificial boundaries that keep us from speaking up. There is even proactive support from leadership to share your ideas. However, on the contrary, the development ideas rarely get initiated, especially if it is related to a department outside [own department]”. (BM)

Vocal and moral support, however, were not seen to be enough. A call for role-modeling was seen to have in part either an equal or higher importance than verbal support. Watson and Wixom (2007b) elaborated in their paper, that for business analytics to fully integrate into an organization’s working environment, management needs to show example on how business analytics is taken into consideration on a daily basis. Watson and Wixom’s (2007b) findings are in line with business managers’ interviews. Implementing a new practice that may be unknown for the organization, calls for management to set an example on precise execution of it.

“Moral support is all good; however, contextual support is more important. Top management should set an example as to how to communicate and take actions using business analytics for others to learn the habit.” (DEV)

“The concept of being a data-driven organization needs to be demystified, as it seems to be more of ‘sexy’ concept rather than changing indeed the manner in which we work and identify ourselves as.” (BM)

Amongst both management and business managers, there was an inclined agreement that management is lacking the showcasing of business analytics usage in communication and decision-making. However, it was notified that there are noteworthy differences in the usage of business analytics between individuals within management. Even though the entire management does support the usage of business analytics verbally, there is a need for increasing the contextual know-how of utilizing business analytics both in communication and decision-making.

5.4.2. Data governance

The third identified component under leadership style was to ensure that there exists a data governance model. Interviews depicted essentially three aspects of data governance that need to be taken into account in the following order:

1. Uniform terminology shared by all employees.
2. A clear connection between actions and data to ensure data quality.
3. Master data management for identifying new use cases.

Terminology inconsistency was seen to be one of the significant culpabilities when moving towards an era, where ambiguous usage of terminology in communication is not an option anymore. Not only does ambiguous usage of terminology affect how communication is comprehended by different parties, but also what sort of decisions are taken. As important it the correct understanding of terminology a necessity, interviewees sought that terminologies should be enforced and corrected if been misused. The second point related to the clear connection between actions and data, was seen as being the driving force for employees maintaining trust towards the data. Here accuracy is the key- employees are aware of what actions are followed

by what sort of data inputs to the data warehouse. The final components regarding data governance was identified as being master data management. For insights to emerge from business analytics, employees in general, should have an idea on what are the potential and limitations from data perspective. Only can then beneficial use cases emerge democratically from different functions.

All of the different parties from the sample of interviewees agreed that there was an inconsistent usage of terminologies, primarily related to process related terminology. Employees at the case company do understand what each specific term means, however, confusion occurs in communication when common words are utilized to mean a specific term. Despite the uniform agreement of terminology inconsistency, the problem was identified to be minimal and is being proactively fixed. The transcription below from a business manager elaborates the nature of the problem more specifically.

“... for example, when we talk about the amount of cargo that should be going to the next flight, are we talking about cargo that has received an ARR stamp [the physical cargo has arrived] or are we talking about cargo that has received also an RCF stamp [cargo has arrived and been administratively received in the system]. (BM)

Depending on the interviewee as to his or her involvement with business analytics, the knowledge behind specific actions and the data stamps that get inserted to the data warehouse varied. It was seen that the case company could accelerate the employees’ understanding between data and actions, by increasing the organization’s search-and-select capabilities and also providing an in-depth training of how specific actions create specific data stamps. The case company admitted that currently there is only a handful in the organization that understand what data the organization has in its databases. Most employees have a fragmented understanding of this and are primarily related to the department they are within. Just as interviewees assumed, this creates a cognitive barrier from the organization diversely being able to contribute to the development of business analytics.

Data governance as such was brought up by only a handful of interviewees, all of whom were aware of the processes required for a smooth transition towards a data-driven organization. Despite only a handful mentioning the term *data governance*, significantly more interviewees from all parties mentioned one or more of the three data governance components identified in the beginning of this Section. Furthermore, the decision of including data governance as one of the findings is due to Watson and Wixom (2007b) also identifying it as one of the vital

components for implementing business analytics in an organization. A uniform identification of data governance would have required all of the interviewees having prior knowledge and experience in business analytics.

5.4.3. Enforcement of trainings

Watson and Wixom (2007b) depicted in their paper that management should themselves participate in training employees in the use of business analytics for decision-making. Findings from interviews, however, suggested that it is instead the proactive facilitation and enforcement by management on employees to attend business analytic associated trainings that count. The underlying rationality behind both findings from literature and empirical research align well with each other. Under both rationality, involvement of management in the process of training employees in the use of business analytics, emphasize the importance of the initiative. It is reasonable to assume the higher importance a matter has, the more involved management is with the issue, and therefore the inclusion of management in the training process reflects its importance indirectly to the entire organization. From a practical perspective, it is however understandable why interviewees suggested that management should encourage employees to attend trainings, instead of hosting them. This mainly due to time constraint and limited knowledge on the specific technicalities related to the business analytics.

The case company does host trainings primarily hosted by developers, who have been involved in developing the business analytic tool itself. The enforcement of trainings was categorized “neutral” by the developers, as attending trainings were not proactively encouraged by management, however, management does not limit employees’ ability to attend the trainings in any way. The neutral enforcement has led to a situation, where business managers who are motivated and have an interest towards business analytics have attended the trainings; however, those who do not share similar level of motivation, have not.

“... ,I would hope that the overall participation level would be higher. People coming into my trainings are active, but I would like to reach also those people who have not been using the system so actively. I have always invited everyone, however, a push from leadership team would do no harm.” (DEV)

5.5. Shared values

Canato et al. (2013) mention in their paper that even though the anecdote stating *culture trumps practice*, coercion from the management may divert the organization to adopt the new practice with slight modifications. Findings from the empirical portion of the research also supports Canato et al.'s (2013) findings. Top management has the potential through leadership manners to coerce the organization to cultivate an analytics-driven culture. For example, the case company's management's communication of a "next-generation cargo" and earlier investment to a data-driven cargo terminal can be seen as method of coercion. Both activities were directly in clash with the organization's previous methods and norms of working. After the inauguration of the new terminal, interviewees felt that there has been a change in attitude of how to get matters conducted. Whereas before much of the operations and decisions happened through "gut feeling," the new data-driven terminal has changed the overall mindset of employees. Interviews confirmed that management should take notice on the previous dominant cultural and the desired future culture, to evaluate on what actions need to be taken. As Henderson and Clark (1990) argue it is necessary for the organization to dig deeper into the culture of the organization to locate the underlying variables that may act as cognitive barriers from fully adopting a new method of practice. Empirical research identified two cognitive barriers that may hinder an organization from adopting business analytics: lack of ownership and personal relation with data. Combining the barriers together allows us to understand why several interviewees perceived that their colleagues do not perceive business analytics as an essential part of their daily activities.

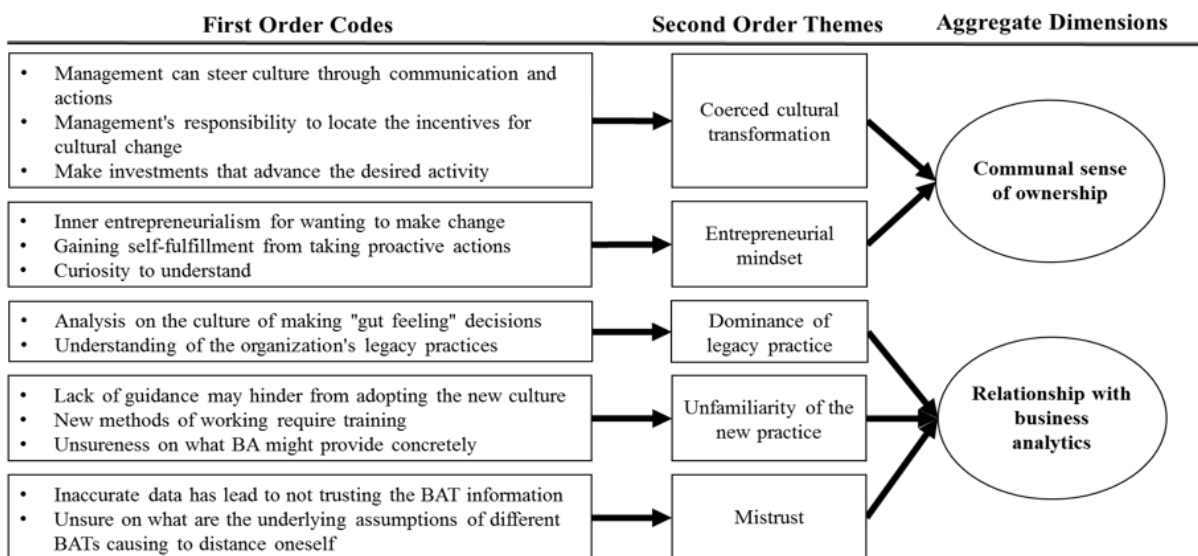


Figure 11: Data structure of shared values variable

5.5.1. Sense of ownership

The sense of ownership towards one's area of responsibility is intertwined with CMBAI's variable regarding structure. However, through interviews, the term "ownership" gained a broader meaning than what can be enabled through optimal organizational structures. Whereas structure promotes an organization's dynamic capability of search-and-select and asset orchestration, shared values in the organization dictate on whether the dynamic capabilities are put to action for reaping the benefits of business analytics. From a shared value perspective, ownership translates further into one taking responsibility of their field but also pursuing to develop it actively.

Rectified structures enable performing actions that fall into the category of ownership, but personal stimuli were seen to be the drivers for taking the actions. The terms "self-fulfillment" and "self-actualization" were commonly utilized to describe the driver. Given the right environment for taking actions, the employee will increase their sense of ownership if they are able to clearly identify a logical chain between the activities and decisions they take and the feeling of accomplishment or personal development. For example, in the case company, interviewees mentioned that it was relatively easy to speak up, however, as actions were rarely initiated, this decreased willingness of speaking up, and therefore the total level of ownership decreased. Another example that on the other hand increased the level of ownership was through investing into a new data-driven cargo terminal. Not only are processes now being measured, but also gradually employees have been able to establish chains of rationality between personal performance and operational performance in certain sectors. The ability to connect actions with business analytics has increased the general motivation for developing the organization. The second example also exemplifies how culture may be developed through the systems.

"A comprehensive change needs and to some extent has occurred in our traditions and norms. The change is not just on just how we work, but also the environment where we work in. For example, before we had a system that was "flexible"- in practice its objective was just to get cargo through one way or another. The system's mentality could be directly reflected to the employees' mentality of "just" executing one. However now due to the system having quality requirements, employees have also stepped up to require more from themselves." (MGMT)

5.5.2. Relation with business analytics

Legacy ways of working may slowly develop into an organization's culture, despite the overall communication desiring to steer towards the opposite direction. In the case of business analytics, a clashing legacy manner of working would be a "non-evidence-driven decision-making" or more commonly referred to "gut-feeling decision-making". The polar nature of the two manners of decision-making may easily lead to employees not willing to adopt the new manner of working. The polar nature between the two practices may easily lead to the following two habits that hinder an organization from adopting evidence-driven decision-making culture: unfamiliarity, and mistrust. Just as the shared value component regarding ownership, also the relationship with business analytics can be associated with other components of the business analytic implementation model.

Unfamiliarity or lack of knowledge of the potential and risk behind business analytics is assumable, especially if previous working methods did not require dealing with data in any form. Both leadership style and trainings take an enormous role in aiding to solve this issue. Under leadership through contextual leadership and effective data management, the organization will have the ability to be more familiar with the new way of conduct. In addition to external aid, internal motivators need to be in place or may hinder the organization from wholeheartedly desiring to learn. The case company reportedly faced this nature of issues during the commencing of business analytics within the organization.

"Many people, unfortunately, degrade into saying that we cannot use numbers for decision-making due as not having this and that data, without asking whether the requested data is available, or could the same insight be provided through other data. This has significantly decreased; however, this can still be heard seldom." (DEV)

Mistrust was acknowledged as the second component under personal relation with business analytics. Whereas leadership should take preemptive actions through effective data governance to ensure data quality, the culture of mistrusting data may overcome the benefits data may provide despite its minor inaccuracies. Not only would the mistrust lead in not using the data for decision-making, but also set a mindset within the organization that people "know" better than the system, thus expanding the distance between themselves and business analytics. It was noted that involvement in the procedure of creating business analytic tools could potentially aid in changing the mindset, however, this roots to the assumption that in-depth knowledge or transparency of something could eliminate mistrust.

“People should start believing and understanding the data that is provided to them. Small inaccuracies do exist in the data; however, it should not hinder us from working with data. We as humans make continuously mistakes, but that does not mean that we cannot trust and work with each other.” (BM)

5.6. Staff

Both of the staff qualities identified in literature were also identified from interviews-entrepreneurial motivation in local context (Shanks et al., 2010) and analytical mindset when approaching problems (Dominic & Court, 2012). Whereas interviews did not depict any new recommended qualities for staff, they did elaborate the cruciality of the qualities itself and provide insights as to their interconnectedness to other activities.

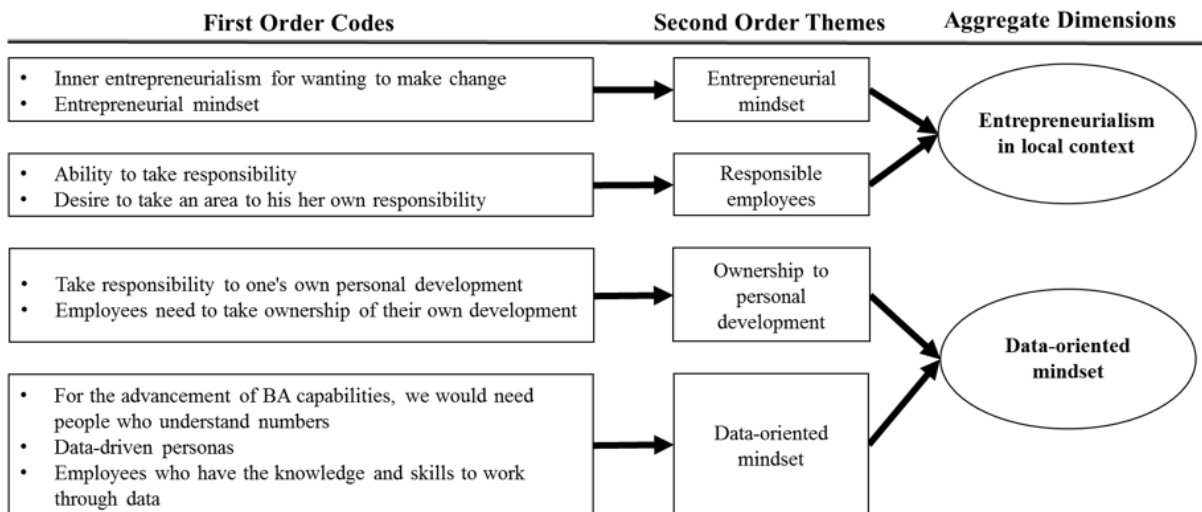


Figure 12: Data structure for staff variable

The term entrepreneurial mindset and sense of ownership were utilized interchangeably during the interviews, due to both explicitly emphasizing the importance of locating employees that are both able and willing to take responsibility, but also drive his or her area forward. From staff perspective, interviewees sought that staff members with entrepreneurial mindset would not only demonstrate ownership at work, but it would also reflect in one’s personal development. Entrepreneurial staff members would take ownership of the development of themselves, thus increasing the organization’s knowledge base collectively. In the application of business analytics, several interviewees sought that employees should take self-initiative in developing their own analytical skills set to become familiarized with working through numbers.

As presumed, owning a data-oriented mindset was supported by interviewees as an essential prerequisite for adopting business analytics efficiently within the organization. Unfortunately, when digging further as to why data-oriented mindset is necessary, it did not provide elaborated results. On the contrary, few interviewees correctified their statement translating data-oriented staff to insight-orientated staff. The difference between the terminologies lies on the mindset of the employees. Whereas data-orientation refers to always referencing to data, insight-orientation refers in being able to comprehend numbers as information. For example, in Case A, the act of regular reporting was relatively recent, however, many of the employees regarded the numbers in the reports as numbers, but not information. The mindset of seeing only numbers sets a cognitive barrier from deriving actionable insights to be implemented based on the numbers.

“Being data orientated regards people as being interested of numbers. However, data orientation does not imply that numbers should utilized for the sake of using numbers, but rather utilization of numbers should allow understand the phenomena better.” (BM)

5.7.Skills

Leavitt’s Diamond Model (Leavitt, 1965) emphasize the importance of individuals’ skills, by elaborating the need for staff training to consolidate the relationship between employees and the parties they are about to engage with. Similar mindset was acknowledged from the interviewees, where they saw that facilitation of a well-planned and organized training(s) are the prerequisite for successful implementation of an evidence-driven strategy. Just as the strategy component, the skill component is too narrowly elaborated in literature. Lack of competency was identified under both systems and structure variable to play a restrictive role. It is vital to understand, to what extent can skill development provide positive outlook to lack of competency. Furthermore, the necessary levels of trainings were demystified through interviews.

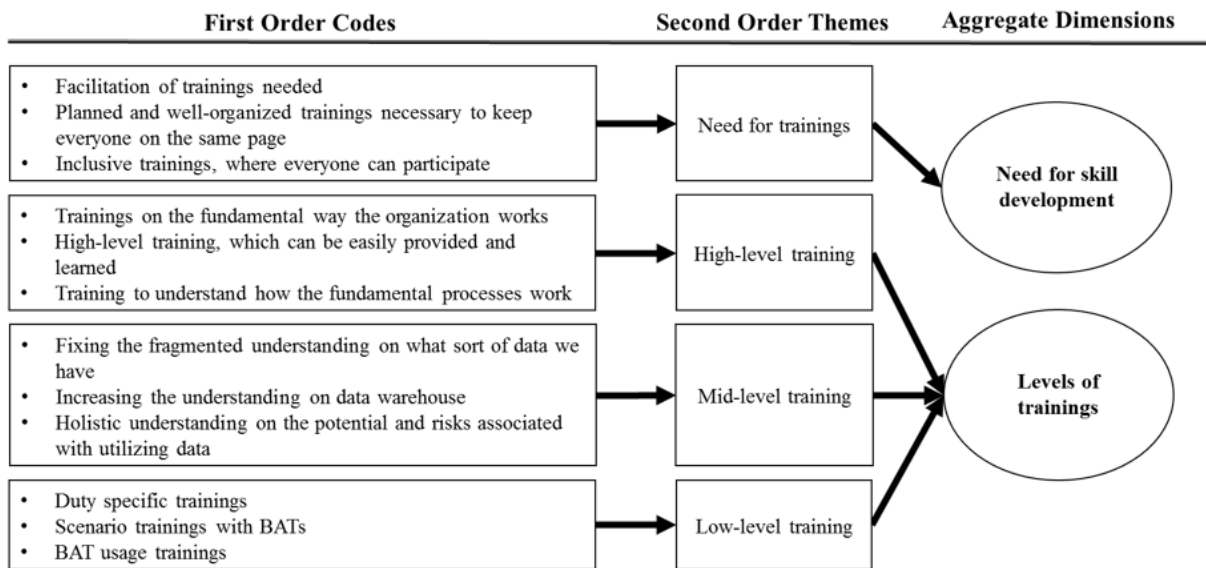


Figure 13: Data structure on skills variable

Due to the different level of trainings for efficient business analytics is not supported neither unsupported by literature, from a research perspective it is challenging to define whether the findings are case specific or can be generalized. Due to the challenging nature of the component, the different level trainings will be elaborated through the case study. Interviewees who have attended the training session hosted by the case company regarded the trainings to be informative and useful. The case company identified in general three levels of trainings that enables an organization to quickly adapt to a business analytics:

1. High-level training – Focuses on providing employees with necessary knowledge for increasing search-and-select capabilities. In practice, employees are trained from both a holistic and detailed perspective on the processes within the organization and how team’s or unit’s actions both depend and affect other stakeholders’ activities.
2. Mid-level training – Focuses on providing employees knowledge on data management, which was discussed under leadership style’s data governance. Allowing employees to receive a holistic understanding on the available data following with its potential and risks associated, enables employees to be more willingly involved in BAT development and adoption process. It was proposed by a single BM under mid-level training, to provide the organization with structured guidance as what sort of insights can be generated with data. The statement had a similar connotation with Wixom et al.’s (2013) suggestion on providing the organization with visualization catalogs, for stakeholders to efficiently convey the insight they would like to receive from BATs.

3. Low-level training – Focuses on the specifics in both utilizing the available BATs and connecting daily activities with outputs received from BATs.

The different levels of trainings holistically provide a positive impact on the issue regarding lack of competency. As identified earlier, lack of competency commonly occurred due to employees not having previous engagement with data either through work or education. Through managed and planned skill development procedures, employees may learn the mentality of data-driven thinking, thus increasing their competence in providing data related constructive feedback. For example, by providing mid-level training on data management, parties involved in BAT development process could provide feasible recommendations as to what metrics would be needed.

6. Discussion

Based on Literature Review and Findings, the objective of the Discussion Chapter is to take a critical stance on whether the proposed model for BA implementation requires to be modified. As the Findings Chapter clearly illustrated, there exists interconnectedness between several variables and the components of McKinsey 7S Framework. The Chapter will therefore, begin by discerning the interconnected variables and move gradually towards the evaluation and development of the proposed conceptual model to both suit empirical findings and literature according to Dubois and Gadde's (2002) abductive research methodology. Finally, this Chapter will end by reflecting the developed conceptual model to the case study for consolidation of the model.

6.1. Interconnectedness nature of findings

The Findings Chapter is framed according to Waterman and Peters' (1982) McKinsey 7S framework, however, as findings from each variable of the framework portray, there does exist interconnectedness between unique themes to some extent. The following two themes had a significant impact on the overall success of business analytics implementation: individual competency and ownership to activities. Neither empirical or literary research clarified on whether the themes have a restrictive or accelerative nature- does "fixing" the mentioned themes enable the adoption of business analytics or do they proactively accelerate the adoption

process. For the purpose of analyzing and solving the mentioned themes, I have created a matrix of the themes, where drivers are in the y-axis and themes on the x-axis (Figure 13). The *drivers* axis is categorized under internal drivers- matters that the individual needs to do, and external drivers- matters that the respective organization requires to do. Under each cell in the matrix (Figure 13), M7S variables are depicted in descending order of importance according to the overall influence of the variable in solving the respective theme in question. The content of the matrix will be further discussed under Sections 6.1.1 and 6.1.2.

	Competency	Ownership
Internal Drivers	<ol style="list-style-type: none"> 1. Staff <ul style="list-style-type: none"> • Internal motivation to learn 2. Shared Values <ul style="list-style-type: none"> • Organizational culture of learning 	<ol style="list-style-type: none"> 1. Staff <ul style="list-style-type: none"> • Curiosity • Entrepreneurialism 2. Shared Values <ul style="list-style-type: none"> • Common mentality of working
External Drivers	<ol style="list-style-type: none"> 1. Skills <ul style="list-style-type: none"> • Skill development through trainings 2. Style <ul style="list-style-type: none"> • Guidance through contextual leadership 	<ol style="list-style-type: none"> 1. Structure <ul style="list-style-type: none"> • Proper organizational structure to enable dynamic capabilities 2. Strategy <ul style="list-style-type: none"> • Operational communication to indicate clear responsibilities

Figure 14: Drivers against competence and ownership matrix

6.1.1. Competency

Both Cockburn and Highsmith (2001) and Wang and Wang (2008) identified competency of the employees being one of the significant barriers that may hinder an organization from realizing the benefits of business analytics investment. It needs to be noted that competency does not only apply to employees, but also management competency plays a critical role. The fundamental of business analytics utilization relies on the organization comprehending how data relates to daily activities and decision-making. Wang and Wang's (2008) illustration of a competent individual in the realms of business analytics is such, who can link his or her set of business knowledge with the large amount of numerical data. Despite this theme being highlighted in literature, the approach to competency development is narrow and fragmented. By unifying literary and empirical findings, we are provided with a more exhaustive and holistic solution for competency development. During the unification process, research identified that competency development is the combination of both internal individual and external organizational drivers.

Under internal drivers, variables staff and shared values were exclusively identified. Just as Case A, organizations generally will have staff that who do not have previous experience with data-driven methods through previous work or education. Despite the lack of previous experience, empirical findings indicate that the skill can be learned, thus satisfying the lack of competency. Just as with new topics, the organization needs employees that have internal willingness to learn new skills and apply them. Whereas the willingness to learn in principle roots from the individual themselves, the surrounding environment and organizational cultural unconsciously molds the individuals' behavior from multiple aspects, including motivation to learn (Canato et al., 2013). Both variables direct management's scope when evaluating new hires and evaluating the organization's shared values.

Under external drivers, variables skills and style were identified. Whereas leadership style does support the organization to overcome natural inertia (Canato et al., 2013), providing tangible skill development trainings were seen both in literature and empirical research as the driving force for developing one's competency. Literature did not provide concrete guidance as to the elements that require to be developed amongst the organization: therefore, elements of skill development are primarily based on empirical evidence. Empirical findings indicate that the organization should receive different levels of trainings, despite their position and duty within the organization. Although there lacks literary resemblance to the findings related to training levels, all of the different levels of trainings mentioned in Section 5.7 do accelerate Wang and Wang's (2008) illustration of becoming a competent individual. Whereas the highest-level of training provides employees with a holistic knowledge on what occurs in the surrounding environment, the lower levels provide linkage between the environment and business analytics. It may be presumed that this sort of approach could potentially provide individuals with the necessary capabilities of linking daily activities with business analytics. Following the trainings comes contextual leadership by management. Here the aspect of contextual guidance is highlighted, due to the importance of role-modeling in the initialization of a new method of working (Canato et al., 2013; Watson & Wixom, 2007a). In addition to the role-modeling aspect, it is essential that management provides visible support for competency development, thus shaping gradually the organizational culture, where learning is openly welcomed.

6.1.2. Ownership

The theme regarding ownership was risen multiple times during the empirical portion of the research. Ownership under dynamic capabilities context can be regarded as when one takes responsibility of his respective area of duty, and actively pursues to develop it. Whereas it is unclear whether the emphasis of ownership is due to its Case A's current situation or can it be generalized as a crucial element for successful business analytics implementation, ownership does pose rational linkage with dynamic capabilities depicted by Helfat et al. (2007) and Barreto (2010). I utilized Helfat et al.'s (2007) categorization of dynamic capabilities of *search-and-select* and *asset orchestration*, and interviewees' statements in Section 5.4, clearly supported the importance of these capabilities for harnessing the benefits of business analytics. Under both search-and-select and asset orchestration, interviewees emphasized individuals' importance in being able to take actions based on business analytics. Due to business analytics' individualistic nature, it takes the single individuals' efforts to take into consideration how rest of the organization works and develop the organization forwards. Even by utilizing Barreto's (2010, p.271) definition of dynamic capabilities: "... is the firm's potential to systematically solve problems, formed by its propensity to sense opportunities and threats, to make timely and market-orientated decisions, and to change its resource base.", it in principle relies on the individuals' capabilities to perform the aforementioned items. Having to execute these capabilities, requires the individuals in the organization to have ownership, which is enabled by both the individual himself and the organization.

Under internal drivers, similarly to the theme competency, both the variables staff and shared values were explicitly identified. Empirical findings portrayed multiple variations of the desired staff characteristics that one could argue in being synonyms to one another, e.g., curiosity, entrepreneurial and desire to develop. As mentioned in the previous paragraph, the nature of business analytics requires individuals to give extra effort to realize insights into actions or internalize into tacit knowledge, therefore requiring individuals to portray entrepreneurialism in local context. The position of shared values under ownership theme is similar to the competency theme- the surrounding environment unconsciously shapes the individuals' behavior from multiple aspects, including personal entrepreneurialism to take responsibility and action.

Ownership is not only enabled through internal drivers of self-actualization or self-fulfillment, but instead requires the appropriate external drivers for enabling these. Through literature and

empirical research, the variables structure and strategy have been identified under the external drivers of this theme. Both variables are somewhat interchangeable, however, the primary premise is that employees should have a transparent overview of the value chain they belong to and have clarity as to where does their responsibility start and end. By gaining an overview on where they stand in relation to the organization, division, and team, employees receive a holistic understanding on how different stakeholders' actions affect one another. Clarification on clear areas of responsibility allow the individuals to comprehend on what is "theirs" to develop. In addition to developing their own area of responsibility, effective asset orchestration includes the dimension that organizational structures should enable individuals to convey insights and take limited actions on divisions that are beyond their personal scope, due to development commonly requires the co-development of multiple areas. Due to practical management limitations, having free hands in developing other functions is not always feasible: thus it is recommended that management provides clarity to employees on what issues can they have an impact and what not (Vroom & Jago, 1973).

6.1.3. Business manager perspective in BAT development

BA initiative cannot be seen as a simple technological investment, but instead it incorporates the different aspects of change management that management needs to take into account (Yeoh & Koronios, 2010). Similar mindset also applies to the development of new business analytics tools, requiring overarching data and resources from multiple divisions (Yeoh & Koronios, 2010). Wang and Wang (2008) proposed in their paper an engagement process between business managers and developers for business analytics tools development. As this thesis has clearly indicated, the development process of BAT cannot be done in a vacuum without taking aspects such as ownership and competency into account. If an organization initiating business analytics is able tackle the issues regarding competency and ownership within the organization, Wang and Wang's (2008) proposed engagement process of the business manager perspective can be extended according to Figure 14.

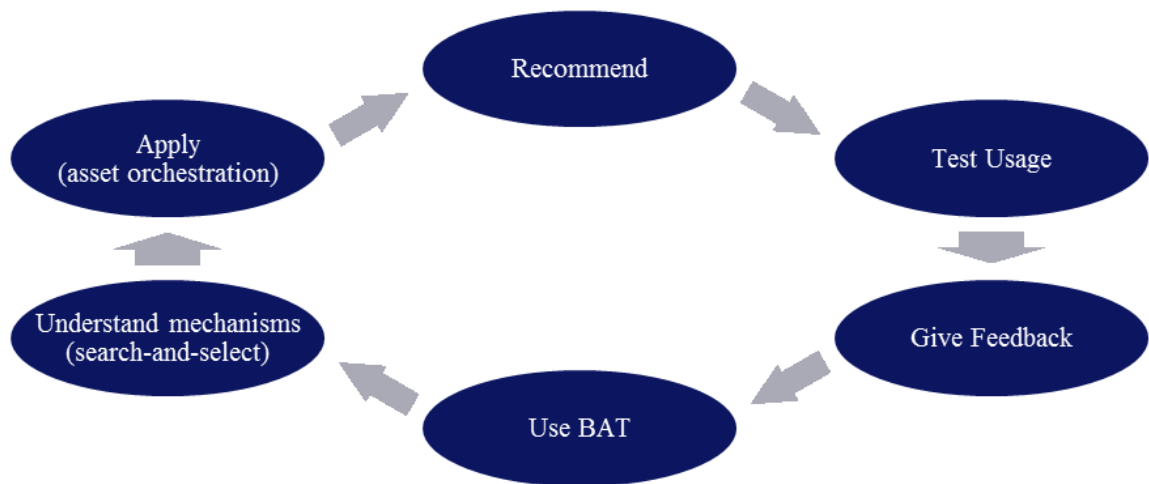


Figure 15: Business manager perspective in BAT development process

The extended development process model (Figure 14) proposes a BAT development process from the business manager perspective, where business managers are not only involved in the development but also actively apply and gain the benefits of business analytics. Assuming that business managers receive an in-depth training, where their competency regarding business analytics is raised to a sufficient level, the business manager will be able to create a linkage between contextual business knowledge and data (Wang & Wang, 2008). Being able to establish linkage between these two, would simultaneously allow the business manager to conceptualize metrics or other form of business analytics to recommend to the developer. Not only would this make the recommendation feasible to execute, but also the business manager would be able to validate and give constructive feedback on whether the created tool provides the insights the business manager seeks. Active participation in development process would additionally according to both literature (Gangadharan & Swami, 2004; Wixom et al., 2013) and empirical findings increase overall end-user penetration.

For reaping the benefits of the insights provided by the BAT, comes the aspect of ownership. Allowing that the business manager possesses internal drivers and the organization provides the necessary external enablers, the business manager will have the necessary tools at hand for yielding the benefits of BAT. Due to both high- and mid-level skill trainings, the business manager would be equipped with a holistic understanding of his position in the value chain in relation to the organization. This would allow the business manager to understand the underlying mechanisms that results into what is visualized in the BAT. Being able to connect what is visualized in the BAT and what have been the previous actions that have led to that specific outcome, enables the following two matters: the underlying data and visualization of

the BAT is trusted, and the business manager has confidence on what aspects to act upon for development.

Helfat et al. (2007) defines dynamic capabilities, as something that the *organization* possesses, not *individuals*. In practice, when business managers bring up insights of BAT to other colleagues, the organization should possess necessary structures and people to transform the insights into actions. For successful execution, the organization requires employees with a sufficient level of competency and ownership. As Figure 14 illustrates, the process is cyclical, indicating that it is both continuous in terms of longevity and simultaneousness. In an organization, where employees are both competent and have ownership according to their respective role, there will exist a shared practice among employees, where they continuously pursue to develop the organization in an evidence-driven manner.

6.2. Reviewed conceptual model for business analytics implementation

Initially the purpose in utilizing Dubois and Gadde's (2002) abductive research methodology, was to create a linkage between literature and the empirical world. Through critical analysis of literature, the CMBAI was created, thus providing a holistic understanding of where literature stands when it comes identifying the explanatory variables for successful business analytics implementation. However, as Dubois and Gadde (2002) mentions in their paper, literary analysis uncovered several topics that were narrowly depicted such as strategy communication, thus requiring further elaboration through empirical research. Furthermore, in the core of systematic combining is to identify the relationships between literature and the empirical world. Through the empirical lenses, as Dubois and Gadde (2002) hypothesized, the conceptual model gained the real-world perspective, allowing the reviewed conceptual model to be more relevant for its target audience. In accordance to Dubois and Gadde's (2002) research methodology, I created a reviewed conceptual model for business analytics implementation. The following paragraphs under this Section will illustrate on what assumptions were taken during the formulation of the final CMBAI (Figure 15), elaboration of each component, and finally limitations to the conceptual model. Appendix 2 includes a table illustrating the changes made to the original CMBAI.

The conceptual model for business analytics implementation consists of two parts: utilization of an organizational model framework to gain a holistic perspective to strategy implementation and identification of the explanatory variables for successful business analytics implementation.

As presumed in Chapter 3 regarding the limitations of using McKinsey 7S Framework, interviewees did not recognize any other variable outside the mentioned seven variables in the framework. It is however easily arguable, whether the conformities identified by interviewees fit well into one the seven variables or should there be an addition or modification to the existing row of variables. For example, the components regarding ownership and competency arose under multiple variables in the Findings Chapter, however, ownership is specifically located under shared values and competency under systems in the reviewed CMBAI. However, to emphasize the importance of the specified components, I arranged the positioning of the variables, allowing to recognize three overarching horizontal themes: leadership, organizational BA competency, and ownership facilitation. The decision on maintaining the original organizational model framework has little to do with scientific rationality, but instead premises on the notion that M7S is a familiar and intuitive framework. Additionally, the reasoning behind inserting the components to their respective variable is rationalized.

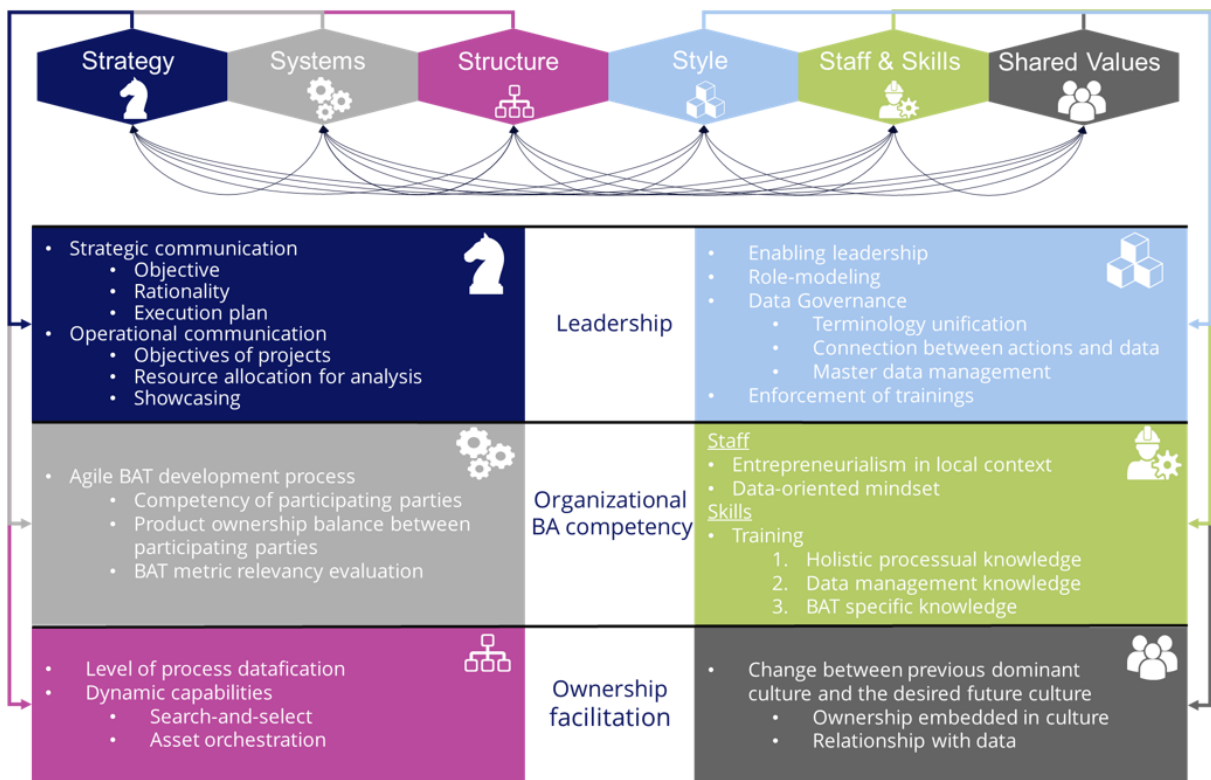


Figure 16: Reviewed conceptual model for business analytics implementation

Strategy

Under the variable strategy, the components strategic communication and operational communication were identified. Despite organizational model framework literature identifying clear and ubiquitous communication being the essence in successful strategy implementation

(Waterman & Peters, 1982; Weisbord, 1976), business analytics related literature provided weak reference as to why and what sort of communication is the most feasible, hence the narrow identification of strategic communication in the original CMBAI. Under strategical communication, empirical research identified common objective, rationality and implementation plan being the components that require to be included. Despite literature (Holsapple et al., 2014; Watson & Wixom, 2007b) not communicating strategy communication as clearly, empirical findings are not in contradiction with literature. Furthermore, when it comes to communicating the objective, including the diversified scope of definitions is not as important as clarity of the message delivered (Moss & Warnaby, 1998).

Operational communication includes the sub-elements of project-specific objectives, resource allocation for analysis, and showcasing. Operational communication illustrates a more in-depth necessity to communication, easing the process of gaining insights from weak signals (Rouibah & Ould-ali, 2002), thus allowing Golfarelli et al.'s (2004) closed business performance management to operate in reality. The sub-elements are in no particular order, but as an entity enable weak signals to be interpret easier. Just as any initiative, business analytics implementation requires to be treated as one, thus setting clear objectives for different projects, such as clarifying the user base and objective of a particular BAT. Especially during the initial stage, both people and time resource has to be allocated for insights to occur. This was evident both in literature (Negash, 2004) and empirical findings, where business managers could not utilize BA since they were occupied with “daily tasks.” Finally, for learning perspective and consolidation of strategy, act of showcasing the process and benefits of BA is necessary. Showcasing allows both other employees to benchmark successful insight generation process, and simultaneously gain confidence that the direction of evidence-driven decision making is right.

Systems

Unlike the general definition in organizational model literature, which depicts systems as the manner how decisions are taken within an organization (Galbraith, 1973; Weisbord, 1976), under business analytics implementation context, systems is inclined towards BAT related decision-making that maximizes BAT penetration in an organization. In respect to this definition, BAT penetration level can be maximized when, competency of participating parties, balance between product ownership of participating parties, and BAT metric evaluation methods are taken into consideration during the BAT development process. In accordance to

both literature (Bhawna, 2011; Gangadharan & Swami, 2004) and empirical findings, there was no debate on whether agile development method should be practiced, especially if the abovementioned components are taken into consideration.

The first subcomponent states that quality metrics require parties with the necessary competence to evaluate critically on what are the necessary analytics that may accelerate the performance of both individuals and organization. Despite the existing causality relationship between end-user inclusion in the BAT development process and user penetration (Dominic & Court, 2012; Vroom & Jago, 1973), both empirical and literary finding highlight the priority of identifying metrics that connect daily activities with organizational strategy. This also is in linkage with the second subcomponent regarding product ownership balance between participating parties. Whereas, it is suggestible that product ownership between business manager providing business context and analyst developing the metrics, has a 50-50 balance (Wang & Wang, 2008), product ownership balance should be adjusted according to what is predicted to provide best quality output. Hybrid developers are in this sense an asset, as they would be able to take product ownership without compromising the output quality (Eckerson, 2007; Shanks et al., 2012). However, hybrid developers are required self-discipline to take end-user perspectives into consideration. As Appendix 2 indicates, both the first and second component have replaced the *inclusiveness* component from the original CMBAI.

The final sub-component of systems is the structural manner of evaluating relevancy of the metrics assigned in the BAT. Findings indicate that despite business analytics primarily defined in literature as a method of making evidence-based decisions (Holsapple et al., 2014), it is commonly also associated with performance management metrics (Schl fke et al., 2012). Supported by empirical research, metric relevancy should thus be evaluated by whether it aids concretely in decision-making or is associated with one's performance. For decision-making, contemplation should made on whether through scenario analysis (Shanks et al., 2010), analytics leads to different actions or whether it creates valuable tacit knowledge for known use cases (Wang & Wang, 2008). Analytics providing tacit knowledge require discipline and critical thinking from the ones proposing, to evaluate whether it provides beneficial knowledge. For performance management, there requires to be a clear link between one's activity and the output metric (Schl fke et al., 2012; Watson & Wixom, 2007b). For end-user penetration on performance metrics, incentives and ownership to the matter to which against are being measured require to be evaluated appropriately.

Structure

Structure regards the interpersonal relationship of the organization's employees to one another (Churchill, 1997). Whereas empirical findings did not provide neither support or opposition to the optimal organizational structure for successful BA implementation, it did confirm literature's emphasis that organization restructuring is necessary (Dominic & Court, 2012; Huber, 1990; Watson & Wixom, 2007b). The restructure of the organization should aim to maximize an organization's dynamic action taking capabilities (Sharma et al., 2014; Sutano et al., 2008; Watson & Wixom, 2007a). For dynamic capabilities to purposefully be implemented in the organization for reaping the benefits of BA, empirical research indicated the necessity of "datafying" different processes to gain the capabilities of analyzing meaningful data. Only through consistent data flow of subprocesses, can metrics be created in a manner that allow easily to be interpret and acted upon.

Division of the dynamic capabilities into search-and-select and asset orchestration was confirmed by both literature (Barreto, 2010; Helfat et al., 2007; Sharma et al., 2014) and empirical findings. Search-and-select capabilities refer to the organization's individuals' ability to comprehend what and how do activities predeceasing and subsequently following the individual connect to another (Helfat et al., 2007). High search-and-select capabilities would ensure that parties take other stakeholders into consideration when deciding. Asset orchestration, on the other hand, reflect the organization's ability to take overreaching items of other divisions into development (Helfat et al., 2007). As development commonly requires multiple functions to co-develop, the ability to dynamically execute development activities beyond one's own responsibility area without unnecessary bureaucracy aids in reaping the benefits of the dynamic nature in business analytics.

Style

Variable style concentrates on the manner how management mobilizes the strategy on to the organization (Waterman & Peters, 1982). In the context of leadership style during the implementation of business analytics, four explanatory components were identified: enabling leadership, role-modeling, data governance, and enforcing trainings. Due to the nature of business analytics insight generation process being individualistic, management needs to transform their leadership style into such that encourages to make insights and take actions upon it. This also effectively promotes the organizational culture to cultivate into such that promotes entrepreneurialism and ownership, which are essential for business analytics

implementation. Role-modeling, on the other hand, is the act of doing what is preached. As mentioned in Section 5.4.1, according to Watson and Wixom (2007b) management should use business analytics in their own work and communicate utilizing numbers. Implementing a new practice that may be unknown for the organization calls for management to set example through detailed execution of it (Canato et al., 2013).

The third component under leadership style, data governance, ensures that the organization has a unified understanding on the components regarding business analytics. Through both literature (Dominic & Court, 2012; Wang & Wang, 2008; Wixom et al., 2013) and empirical study, the following three aspects of data governance were identified; terminology unification, establishing solid connections between action and data, and master data management. Through terminology unification, the organization will have a common understanding on what different terms mean, with limitations, removing potential communication barriers. By increasing the organization's search-and-select capabilities and facilitating an in-depth training on what actions cause what sort of data stamps, the organization will be more aware on how data and actions relate to each other. Finally, by facilitating trainings on the data, the organization has, employees, will gain ability to contribute in the development of organizational business analytics. Despite the term facilitation was utilized in this paragraph, it is understandable that management might not have the necessary competence or time to facilitate them. However, enforcing and participating the trainings consolidates the initiative's position in the employees' minds.

Staff & Skills

Staff & Skills illustrate the capabilities and mindset of employees and its development. Under variables staff, entrepreneurialism in local context and data-orientation were identified. As mentioned, due to business analytics' insight generation process and action taking being individualistic, it requires employees to be entrepreneurial in their own activities (Shanks et al., 2010). Even though the term closely resembles to taking ownership, entrepreneurialism brings in the perspective of innovation and trying to solve problems self-initiatively.

Under skills, the original training component still exists, however, it has been elaborated through three different levels of training objectives: holistic processual knowledge, data management knowledge, and BAT-specific knowledge. The holistic processual knowledge interlinked with variable style's *connection between actions and data* subcomponent and with variable structure's *search-and-select* capability. By gaining a holistic processual knowledge,

employees will be aware how activities predecesing and subsequently following the individual connect to another. Data management knowledge is again linked with variable style's *master data management*, aiming to increase data know-how of employees. By gaining data management knowledge, employees would be aware of the data's potential and risks, thus being able to provide more feasible and relevant development proposals. Finally, the BAT-specific knowledge aims to provide employees with the necessary know-how to operate the different BATs to capture its full potential. It needs to be noted that literature provided vague specification on types of trainings necessary, and therefore the three levels of trainings are based upon empirical findings.

Shared Values

Shared values depict the practices, norms, and habits that dominates the manner in which the organization operates. Despite through coercion, a new practice may be adopted within an organization (Canato et al., 2013), if cultural characteristics support the new practice, adoption is far more fluid. Nonetheless, it is vital that the management evaluate on what is the predominant shared values in the organization and contrast it with the desired values for business analytics to flourish (Henderson & Clark, 1990). Research indicates two cultural values that if embedded in the organization, will help to accelerate the adoption of business analytics: ownership and healthy relationship with data.

As discussed in Section 6.1.2 ownership holds a vital role in the success of reaping the benefits of business analytics. Whereas the organizational structure and strategy should enable for ownership to emerge, the internal drivers dictate on whether ownership is taken or not. Secondly, the organization needs to adopt a culture where data becomes familiar for everyone, and there does not exist mistrust towards the data. Both familiarity and mistrust can be partially overcome through trainings and inclusion, however, both management's and employees' communication and action should reflect this accordingly.

6.3.Reflection of reviewed CMBAI against the case study

Literature findings on management's fragmented knowledge on the explanatory variables for successful business analytics implementation (Dominic & Court, 2012; Yeoh & Koronios, 2010) is also reflected in the case study. Despite the case study actively pursuing through organic and in-organic methods to become a data-driven organization, management intentionally focused

only on a handful of components that they sought to be crucial for successful business analytics implementation. Already by accounting the handful of components, the case study has been able to realize the benefits of BA to a certain extent. However, the case study management felt that full potential of business analytics remained untapped and that there are barriers hindering the organization from becoming truly evidence-driven. Contrasting the reviewed CMBAI against the case study not only allows pin-pointing certain components that need to be addressed by the case company, but also reveal a more in-depth illustration of the common barriers organizations might potentially face when implementing business analytics. Through reflecting the case study against the reviewed CMBAI, there is clear indication that the case study lacked a structured method of executing the BA strategy, leading to several hindrances such as strategy exclusiveness, low BAT end-user penetration, and lack of visible BA benefit realization.

Strategy exclusiveness indicates that the strategy is not incorporated throughout the organization. Whereas the case study did prove to have top management's support as literature suggests (LaValle et al., 2011; Watson & Wixom, 2007b), lack of structured strategy formulation in the case study, led to an imbalance between level of BA penetration within different functions and people. Due to the gradual implementation of business analytics by individuals within the organization, at no point was there contemplation on how to incorporate the initiative to the entire organization democratically. By configuring a structured strategical and operation communication, Case A's management could increase significantly its contextual support in the business analytics initiative and provide the organization with a clear roadmap on how the organization as whole can transform towards an evidence-driven one. A contemplated strategy would address all functions within Case A and consider restructuring resource allocation, enabling business managers to utilize certain percentage of their time in making analysis and taking decisions based on it.

Low BAT end-user penetration refers singularly that end-users were not utilizing BATs for decision-making. Literature in general proposed different solutions for increasing penetration level, from including end-users in the process (Bhawna, 2011; Dominic & Court, 2012; Sharma et al., 2014) to proposing a structured method for recommending and evaluating metrics (Gangadharan & Swami, 2004; Wang & Wang, 2008) to taking the design and technical aspects into special consideration (Wixom et al., 2013). Even though none of them are not wrong and have been incorporated to the CMBAI, the aspect of competency has been sided and not considered in literature as much as this research's findings indicate. Despite Case A not completely taking the different components of increasing BAT penetration into attention, lack

of organizational BA competency was seen to be the root cause hindering BAT adoption. As CMBAI suggests, by increasing organizational BA competency through different level trainings, Case A would be able to address proficiently the other components related to accelerating end-user BAT penetration level.

Lack of visible BA benefit realization refers to the following two aspects; not being able to benefit in practice from business analytics and low visibility of benefits already realized. Even though literature highlighted the necessity of maintaining organizational structures that enable dynamic capabilities (Sharma et al., 2014; Sutano et al., 2008), structures alone do not lead an organization to implement insights extracted from business analytics. Despite Case A having low search-and-select capabilities, it had the necessary formal structures allowing asset orchestration. In-depth interviews revealed that even though development matters were brought up in formal occurrences, rarely were the development matters executed. Case A possessed the necessary structure, however lacked organizational culture promoting to take ownership. The cultural aspect of dynamic capabilities, were not accounted in any of the abovementioned literary references, despite its importance in benefit realization. By taking the cultural aspect into consideration and increasing search-and-select capabilities, Case A would have both structures to enable realizations from business analytics to occur, and people to execute them. In addition to BA benefit realization, Case A felt that benefits are not visible, despite through interviews several benefits directly related to BA had been already realized. As the model depicts, through showcasing, the organization will be able to both consolidate the strategy it has endeavored upon to different stakeholders and provide guidance to business managers on how translate business analytics into real-life decisions.

Reflecting CMBAI against the case study consolidates its applicability, as it provides clear rationality why Case A has not been able to fully tap the benefits of business analytics. Not only does the model offer clear components arranged in a rational manner for Case A to accelerate its business analytics initiative, but more importantly offers a holistic foundation for business analytics implementors to reference to when initiating business analytics in their organization.

7. Conclusion

The objective of this thesis was to identify the explanatory variables for successful business analytics implementation. As organization management members are the target audience of this thesis, the writing style of thesis is inclined towards management applicability, in contrast to many business analytics related literature, which either take a more abstract (Holsapple et al., 2014; Huber, 1990) or technical (Golfarelli et al., 2004; Negash, 2004) approach to business analytics. To identify holistically the explanatory variables, the objective was transformed into two research questions: identification of a holistic organizational model, and identification of business analytics related conformities for successful implementation. In parallel to the identification process, the identified conformities were translated into a conceptual model, which was subsequently assessed against a case study for establishing an intimate connection between theory and physical world. Through the third research question the original conceptual model was further developed and consolidated for general applicability. Changes between the original and refined CMBAI has been illustrated in Appendix 2.

A thorough literature review of common organizational model frameworks delineated Waterman and Peters' (1982) McKinsey 7S Framework (M7S) to be the most comprehensive framework for diagnosing an organization thoroughly when implementing a strategy. For an even more comprehensive understanding on the variables of M7S, the common organizational models' explanations of each respectable variable were integrated into M7S. Applying the findings of each M7S variable, business analytics literature was extensively gone through per variable, allowing to create a theory based conceptual model for business analytics implementation (CMBAI) (Figure 4). Although the field of business analytics has been extensively studied due to its emerging popularity amongst organizations, there lacks a unified and comprehensive view on what are explanatory variables for successful business analytics implementation. Subsequently, this became also apparent when categorizing literature findings into their respective M7S variables. Multiple business analytics related components had perspectives that were left untouched or vague by literature, increasing the necessity for the nature of research conducted in this thesis. Through a case study method, both the voids and vague components were aimed to complete, and additionally both develop and cement the CMBAI as a model for evaluating business analytics implementation. Based on the research, three overarching themes have been identified holding a critical role in the success of business analytics implementation: leadership, organizational BA competency, and ownership facilitation. The three themes illustrate in parallel illustrate the entangled nature of single M7S

variables, and highlight the importance on why a holistic model is desirable in contrast to for example

The final output of the conceptual model for business analytics implementation acts as evidence of critical and thorough responses to the three research questions. By answering to the three research questions, I argue that the original research objective has been met. The proposed conceptual model unifies the existing body of literature on business analytics and provides a holistic view on the explanatory variables of successful business analytics implementation for management and others to exploit. The developed model proposes tangible suggestions that can be hand-picked and evaluated by management during the implementation of business analytics within their respective organization. Practical implications of CMBAI for organization will be explored in Section 7.1, followed by limitations and avenues for future studies.

7.1. Practical implications

Although though data is being considered the oil of tomorrow (Parkins, 2017), the distinctive difference between the two sources is that one is reusable another not, thus multiplying the value of data. Being in the era when there is more data available for use than any time before in history, it is no surprise that organizations are taking enormous steps in aim to utilize the vast amount of both internal and external data for competitive advantage in the dynamic and globalized economy (Dominic & Court, 2012; LaValle et al., 2011). Despite organizations trying to replicate the success-stories of data-driven management organizations, there exists an enormous variance in ROI on business analytics investments (Negash, 2004). Much of the variance can be explained by the competitive and low leeway nature of organizations' environment, but much can be explained by the fact that management currently have fragmented and differentiated knowledge on what variables needs to be focused upon (Dominic & Court, 2012; Yeoh & Koronios, 2010). This thesis has taken a stance as to propose a conceptual model that would aid management in identifying the explanatory variables, allowing management to lead the organization's business analytics initiative with a holistic knowledge.

The reviewed conceptual model for business analytics implementation (Figure 15) provides management with a wholesome visualization of the explanatory variables that increase the potential for successful business analytics implementation. Despite the explanatory components have been categorized into their respective variable, the interconnected nature of the variables require management to consider each component if willing to increase the potential of reaping

the fruits of business analytics. Amongst the variables, three overarching themes were identified: leadership, organizational BA competency, and ownership facilitation.

The primary responsibility of leadership is to communicate effectively the high-level strategy to motivate employees to strive for the same cause. Communication does not require to extensively cover all the perspectives related to business analytics, but should cover at minimum the objective, rationality of the initiative, and high-level execution plan. In accordance to the strategic communication, operational communication enabling the strategy in detailed level needs to be taken into consideration. Taking practical steps to enable the strategy, relieves the risk of strategical communication from being superficial and consolidates the importance of the strategy initiative to the organization. Three subcomponents were identified under operational communication: setting objectives to projects within the BA initiative; allocating additional resources for staff to analyze the analytics and implement insights; and showcasing processes and outputs of success stories. Apart from strategy expressed in various forms by management, four distinct leadership style components were identified to specifically promote business analytics within the organization; changing management model from managing to enabling; becoming role-models to the initiative; establishing structured data governance model; and enforcing employees to increase their competency through trainings.

Under the theme organizational BA competency, the focus is on providing the organization with the necessary business analytics related competency in a system and human level. As business analytics is commonly associated with business analytic tools (BAT), comprehending the cornerstones of successful BAT development process will ensure quality and pervasive BATs for the organization to utilize. From the human perspective, staff is expected to have an entrepreneurial and data-oriented mindset towards business analytic, due the individualistic nature of BA insight generation process. Not only are staff expected to include qualities for sufficient competency, but the organization requires to support competency development by providing different levels of trainings, ranging from holistic processual knowledge to data management to BAT-specific knowledge.

The very individualistic nature of BA leads to the final theme of facilitation of ownership both from an organizational structure and shared values perspective. Whereas it was identified that for the benefits of business analytics to be reaped, dynamic capabilities are needed, however, prior to dynamic capabilities, the organization needs to have an established infrastructure for

receiving continuous data inputs of its subprocesses' performances. Both the components search-and-select and asset orchestration of dynamic capabilities enable the organization for taking ownership, nonetheless, if ownership is not embedded in the organization's culture, enabled structures alone will not be enough for reaping the benefits. Analysis needs to be followed by actions for BA investments to realize, thus obligating the organization to embed a culture of ownership and close relationship with data.

7.2.Limitations and directions for further research

The findings and conclusions of this research does not, unfortunately, come without limitations. Four limitations have been identified, each followed by a potential manner to overcome the limitation in future research, thus opening new avenues for the continual of this paper. The four identified limitations are as follows: generalization, scope, research, and replicability. The third limitations, regarding research method limitation, will not be discussed here further as it has been discussed in Section 4.6. In the mentioned Section, a total of five research methodology related and two interview process related limitations were identified. Each limitation was however followed with recommended procedure to either nullify or minimize the impact of the research method related limitation.

Despite the objective of creating a generalizable conceptual model for business analytics implementation, due to utilizing only a single case company, the thesis is not generalizable as it is. A quantitative or deductive approach would have allowed to make this thesis more generalizable however, due to the necessity of both bridging literature with reality and completing the voids appeared in literature, a quantitative approach was not feasible. Despite the number of interviews (20) allowed to eliminate the individual interviewee's biases, organizational biasness exists. Organizational biasness was aimed to minimize through Dubois and Gadde's (2002) systematic combination, however, there lies the risk of quasi-deductive theory testing, where the line between what is theory and what is case specific is vague (Dubois & Gadde, 2002). Despite the limitation regarding generalization, my position as a researcher in the case company, allowed me to ask in-depth follow-up questions, thus unraveling insights which an outsider researcher may have challenges in. Nonetheless, the limitation to generalization can only be overcome if future similar studies are conducted. In contrast to my study method, I propose a similar study, where multiple case companies are utilized. By increasing the quantity of case studies, the in-depthness will of the findings per case study will

suffer, however, combined with the findings of this study, may allow to further iterate the conceptual model. This research method would, however, be abductive by nature and not generalizable to the desired extent. Another avenue for generalization would be to utilize this thesis' conceptual model as reference point for a quantitative-based deductive research. Through quantitative measurements, a definite proof will emerge as to which components act as explanatory variables for successful business analytics implementation.

The scope limitation refers to both the in-depthness of each component discussed in this thesis and accounting external factors in the conceptual model. Firstly, although the constant objective of limiting the scope of the thesis as much as possible, simultaneously projecting to provide a holistic view on a broad issue such as strategy implementation, will inevitably harm the depth analysis of each component. By defining the scope, the purpose was to balance the in-depth analysis of each components. However, due to some of the components having brought up in both literature and empirical findings more often, they received a higher value in this thesis. Therefore, components such as incentivization were brushed over briefly. To overcome this particular limitation, I propose three avenues for future studies: in-depth analysis of a single M7S variable in the context of business analytics implementation, utilization of another organizational model framework, and choosing a completely different approach for creating a conceptual model for business analytics implementation. All these abovementioned approaches, would most either elaborate the findings of thesis or take another perspective to the issue at hand. Secondly, as I have disregarded in the Section 1.3. (Scope and structure) the impacts of external environment, they have not been accounted in the analysis in this thesis. From a real-world applicability perspective, this not desirable, as organizations commonly operate in an open system, in contrast to the used closed-system theory (Katz & Kahn, 1978). As the external environment dictates the limits of potential efficiency and value creation gains an organization achieve through business analytics, it would be incredibly fascinating to extend the CMBAI to incorporate the external environment as well.

The replicability limitation refers to the challenge in replicating the executed research. Despite the intention of full transparency in literature, empirical research, and systematic combination process, replication of the research would be challenging for an "outside" researcher. The case company holds a significant influence over the outcome of this research, and therefore the findings are to some extent both context and time specific. Furthermore, the study is longitudinal by nature meaning that the case company was in a transition position when it comes to business analytics implementation. For future studies, I would propose to analyze

organizations that can be categorized as organizations with mature business analytics capabilities (LaValle et al., 2011), and identify on what were the artifacts that allowed the organization to become successful in reaping the benefits of business analytics.

Despite the limitations illustrated in this Section, I believe this study is a valuable contribution to business analytics related literature and provides management with practical suggestions on what variables to consider when implementing business analytics. Despite the vast and diverse literature regarding business analytics, this thesis belongs to the few papers aiming to unify literature. Although leadership related to business analytics has been studied a lot, the concepts of competency and especially ownership have been untouched and need to be explored further. I sincerely hope that this study not only motivates to explore the field of business analytics but also is challenged in the objective of unraveling a more unified, improved and applicable model for business analytics implementation.

8. Resources

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Appendix 1: Interview guide

During the arrangement of interview time

In addition to confirming time, place and duration of the interview, I briefed the interviewee with a short mail on the objective of the interview. To ensure a fruitful discussion the interviewee received a PowerPoint slide indicating the primary and secondary themes of the interview.

Before the start of the interview

I briefed again the interviewee on the objective of the research and the interview. For an honest and open discussion, the I told the interviewee that the interview will be analyzed anonymously, having categorization only by developer of business analytics tools, business manager, and management. Additionally, the interviewee was requested to be recorded, so that the interview could be transcript and processed with time.

Interview

Background

Q1. Could you tell me about your position and responsibilities at [Case A]?

McKinsey 7S alignment

Q2. When discussing about the strategy of applying business analytics in an organization, what variables would you consider in being important?

Q3. Has the initiative's objective been realized yet to a certain extent? What do think are the drivers for realization/ not being realized yet? What could accelerate benefit realization?

According to theory, the development process of BAT is a continuous one with role differences between the developer and business manager (show Figure 3).

Q4. How are currently business analytic tools being developed and does it resemble to the development process I just illustrated? Do you feel your involvement level in the development process is aligned with the amount you currently utilize it?

Q5. How should competency imbalance be overcome? What measures do you take to overcome competency related issues?

Q6. What sort of decisions are currently made in formal situations versus informal situations?

Q7. Has there been any change in your working habits? Do you see it being necessary for previous working habits to change?

Theory identifies dynamic capabilities as being an essentiality when pondering how to effectively reap the benefits of business analytics. Essentially dynamic capabilities require the organization to have search-and-select and asset orchestration capabilities (terms were elaborated further if they were unknown to the interviewee).

Q8. How would you describe [Case A]'s capabilities in regard to the dynamic capabilities I have just mentioned?

Q9. What characteristics would you think employees should be affiliated with for reaping the benefits of business analytics? Do you think that [Case A] employees possess the characteristics you have mentioned?

Q10. Has there been training on the usage of business analytics tools? How have the trainings been?

As our discussion has perhaps indicated, investing in business analytics is not a simple investment to a new technology, but rather an investment to a new method of working. The practice can in many ways be in contrast with previous working and leading habits.

Q11. What are the cultural aspects management needs to account when initiating a new practice? Has there been a clash between the new practice and past habits?

Q12. How would you describe [Case A]'s overall culture? Do you think there is a necessity for change towards a direction or another?

Q13. How can the penetration level of business analytics tools be increased in decision-making? What practical activities may increase this?

Framework validation

The questions I have asked were based on McKinsey 7S framework and the identified contextualized variables related to business analytics (show Figure 4).

Q14. Are there any other factors that you see in being prominent when pondering the essential variables for successful adoption of business analytics?

Q15. How would you suggest [Case A] to develop for a more efficient use of business analytics in evidence-based decision-making?

Additional Questions Developed Due to Framework Reiteration

Q16. What do should communication of business analytics consist of ?

Q17. In general, what are the elements that you see hinders [Case A] from adopting business analytics?

Q18. What different levels of training is necessary for [Case A] to have a greater BAT penetration.

Appendix 2: Changes in CMBAI during systematic combination process

Variable	Original component(s)	Change	Refined component(s)
Strategy	Strategic communication	Elaboration	Subcomponents (Objective, Rationality, Execution plan)
Strategy	-	Addition	Operational communication with subcomponents (Objectives of projects, Resource allocation for analysis, Showcasing)
Systems	Inclusiveness	Division	Competency of participating parties, Product ownership balance between participating parties
Structure	Decentralized and loosened departmentalization	Removal	-
Structure	-	Addition	Process datafication
Style	-	Addition	Enabling leadership
Style	Data Governance	Elaboration	Subcomponents (Terminology unification, Connection between actions and data, Master data management)
Shared Values	Change between previous dominant culture and the desired future culture	Elaboration	Subcomponents (Ownership embedded in the culture, Relationship with data)
Staff & Skills	Training (Skills)	Elaboration	Subcomponents (Holistic processual knowledge, data management knowledge, BAT-specific knowledge)