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Organizing to create value from Big Data Analytics

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Abstract

Big data analytics (BDA) has emerged as a critical capability for organizations seeking to remain competitive in today's data-driven economy. Despite its potential benefits, however, the organizational challenges associated with implementing big data analytics initiatives can be daunting. This thesis examines the key organizational structures, capabilities, and culture that are necessary to create value from big data analytics.

Using a qualitative research approach that includes interviews with companies that have successfully implemented big data analytics initiatives, this thesis identifies the key organizational factors that are associated with successful big data analytics implementation. Specifically, the study finds that organizations with flatter structures, a culture that values data-driven decision-making and experimentation, and the ability to effectively address the challenges associated with big data analytics implementation are more likely to create value from big data analytics.

The findings of this study shed light on the crucial organizational factors that contribute to successful implementation of big data analytics initiatives and the subsequent creation of value. By conducting interviews with a company that have achieved success in this area, this thesis has identified several key factors that are associated with effective big data analytics implementation.

Firstly, organizations with flatter structures have shown a higher likelihood of creating value from big data analytics. This suggests that minimizing hierarchical layers and promoting a more decentralized decision-making process can facilitate the agility and responsiveness required for effective utilization of big data analytics. Such organizational structures enable faster communication, collaboration, and decision-making, ultimately leading to improved outcomes.

Secondly, a culture that values data-driven decision-making and experimentation is crucial for deriving value from big data analytics. This cultural aspect promotes a mindset that prioritizes evidence-based insights and encourages experimentation with data-driven strategies. Organizations that embrace this culture are more likely to leverage the power of big data analytics to drive innovation, optimize processes, and make informed decisions.

Lastly, addressing the challenges associated with big data analytics implementation is essential for achieving value creation. Implementing big data analytics initiatives can be complex and fraught with various hurdles, such as data privacy concerns, technological limitations, and skill gaps. Organizations that effectively navigate these challenges through robust data governance

frameworks, investment in technological infrastructure, and upskilling their workforce are better positioned to harness the potential of big data analytics and derive value from it.

Overall, this thesis emphasizes the importance of organizational structures, capabilities, and culture in successfully implementing big data analytics initiatives. By understanding and embracing these factors, organizations can enhance their ability to create value from big data analytics and gain a competitive edge in today's data-driven economy. The insights from this study provide valuable guidance for organizations aiming to embark on or improve their big data analytics journey, contributing to the broader understanding of this rapidly evolving field.

1. Introduction

The generation and accumulation of vast amounts of data have reached unprecedented levels, prompting organizations across industries to increasingly rely on big data analytics to derive meaningful insights and maintain a competitive edge. However, it is important to understand that the mere possession of large volumes of data does not guarantee organizational success. Instead, the ability to effectively manage and utilize this data is what sets successful firms apart from those struggling to keep up. This thesis delves into the exploration of how organizations can efficiently organize themselves to extract value from big data analytics.

Big data analytics (BDA) encompasses the processes of collecting, processing, and analyzing extensive and intricate datasets to extract valuable insights that inform strategic decision-making. These insights can range from identifying new market opportunities and enhancing operational efficiency to improving customer experience. Nonetheless, the process of deriving value from big data analytics is far from straightforward. It necessitates not only the right tools and technologies but also proper organizational structures and processes to collect, store, and analyze data effectively.

The significance of organizational factors in value creation through big data analytics has garnered recognition in an expanding body of research. For instance, Minelli, Chambers, and Dhiraj (2014) argue that effective big data analytics necessitates a data-driven culture, cross-functional collaboration, and a focus on business outcomes rather than solely technological capabilities. Similarly, Günther et al. (2022) emphasizes the importance of cross-functional teams and data governance in developing data-driven value propositions. These studies imply that creating value from big data analytics requires a comprehensive approach that considers both technological and organizational elements.

Despite the progress in research, there is still much to be learned about how organizations can optimally structure themselves to create value from big data analytics. This thesis aims to fill this gap in the literature by exploring the following research question:

How can organizations effectively organize themselves to create value from big data analytics?

To answer this research question, a qualitative study was conducted. Primary data was collected through interviews with individuals from a company that work extensively with big data analytics. The focus was primarily on the organizational factors that facilitate value creation from big data analytics, including organizational structure, culture, governance, and processes.

The thesis is structured as follows: Chapter II provides a comprehensive literature review of big data analytics and its potential for value creation, the necessary organizational structures and capabilities for big data analytics, the influence of organizational culture on big data analytics, and the challenges and success factors associated with organizing big data analytics initiatives. Chapter III outlines the research methodology employed, including the research approach and design, sample selection, and data collection methods. Chapter IV presents the analysis and findings derived from the interview data. Chapter V offers a summary of the research findings, implications for future research, and recommendations for organizations seeking to create value from big data analytics.

In summary, this thesis aims to contribute to the expanding body of research on big data analytics by investigating the organizational factors that facilitate or impede value creation through this technology. By providing insights into how organizations can effectively structure themselves to derive value from big data analytics, this study can assist companies in leveraging this powerful tool to drive strategic decision-making and gain a competitive advantage.

2. Literature review

Organizational structures and capabilities for BDA

The effectiveness of big data analytics initiatives relies heavily on the organizational structure and capabilities of the organization. McAfee et al. (2012) conducted a study that demonstrated how organizations prioritizing the use of big data analytics in their decision-making processes outperformed their counterparts and gained a competitive advantage. The research revealed that organizations with flatter structures and decentralized decision-making processes were more successful in implementing big data analytics initiatives. Such structures facilitated flexible decision-making and swift implementation of insights derived from big data analytics. The study also emphasized the importance of fostering a culture that values data-driven decision-making, experimentation, and innovation. Embracing a data-driven approach demands a mindset shift within the organization and a willingness to take risks and experiment to fully capitalize on the benefits of big data analytics. Furthermore, the study shed light on the significance of having the right capabilities and skillsets within the organization to effectively implement and leverage big data analytics. This includes having proficient data analysts, data scientists, and IT professionals who possess the expertise to extract valuable insights from vast datasets and translate them into actionable recommendations for decision-makers. To sum up, the study of McAfee et al. (2012) underscores the critical role played by organizational structure, culture, and capabilities in the success of big data analytics initiatives. It provides valuable insights for organizations aiming to harness the power of big data analytics and gain a competitive edge.

Organizational culture and its impact on BDA

When it comes to making big data analytics work, the organizational culture of an organization matters. According to a study by Sivarajah et al. (2017), organizations that have a culture that supports, and values big data analytics tend to be more successful in making use of these tools and technologies. Successful organizations put attention on data and analytics as a critical asset, and they encourage their teams to work together across different departments. This helps create a culture of collaboration and communication that is indeed important for the success of big data analytics initiatives. Having a data-driven culture can also help foster innovation and creativity within an organization. When employees are encouraged to think critically about how data can be used to improve things, it can lead to the development of new and exciting ideas that might not have been possible without big data analytics However, an organization's leaders can play a huge

role in determining whether a data-driven culture takes root or not. Leaders who are supportive of big data analytics and provide the resources needed to make it work can help create a culture that values and prioritizes data-driven decision-making. On the other side, organizations that are resistant to change and innovation may struggle to make use of big data analytics. This can be due to several factors, including a fear of change, a lack of understanding of the benefits of big data analytics, and a reluctance to move away from traditional decision-making processes.

Ultimately, it's not just about having the right tools and technologies in place - it's also about creating a culture that supports and values data-driven decision-making, innovation, and collaboration.

Challenges and success factors for organizing BDA

Organizing big data analytics initiatives can be challenging, as there are several factors that can affect their success. A study by O'Leary (2016) identified several key challenges that organizations face when organizing big data analytics initiatives, including data quality issues, data integration challenges, and the need for specialized talent. In addition, the study identified several success factors for organizing big data analytics initiatives, including strong leadership, effective communication, and the ability to align the initiative with business goals and objectives.

Managing Embedded Data Science Teams for Success: How Managers Can Navigate the Advantages and Challenges of Distributed Data Science

As data science teams increasingly become embedded within organizations, managers face new challenges in managing these teams to ensure their success. Stelmaszak and Kline (2023) show that data science teams are increasingly becoming embedded within organizations, and this creates new challenges for managers. The authors identify key challenges, including managing diverse skill sets and developing clear roles and responsibilities. They also provide guidance on how to overcome these challenges, such as creating a supportive organizational culture and establishing communication protocols. Their article highlights the importance of effective management of data science teams to maximize the value of big data analytics, identifies these challenges and provides guidance for managers on how to navigate them, including developing clear roles and responsibilities, establishing communication protocols, and creating a supportive organizational culture (Stelmaszak and Kline, 2023).

Designing the Digital Organization

In this seminal work, Snow et al. (2017) argue that digital transformation is more than just implementing new technologies; it requires a fundamental redesign of the organization's structure, processes, and culture. The article shows key elements of a digital organization, including agile decision-making processes, a data-driven culture, and a focus on customer experience. Snow et al. (2017) also provides a guidance on how to design and implement a digital organization, emphasizing the importance of leadership and employee engagement, highlighting the potential benefits of a successful digital transformation, including increased innovation and competitiveness. They provide a framework for designing digital organizations that emphasizes flexibility, adaptability, and collaboration which is particularly relevant for organizations seeking to leverage big data analytics to create value.

Fading Hierarchies and the Emergence of New Forms of Organization

In this article, Billinger and Workiewicz (2019) examines the shift away from traditional hierarchical organizational structures towards new forms of organization that emphasize collaboration, flexibility, and agility. The article argues that the rise of new technologies and changing social and economic conditions are driving this shift, and that it is important for organizations to adapt to these changes to remain competitive. The author identifies key characteristics of these new forms of organization, such as distributed decision-making and a focus on employee empowerment. The article also discusses the challenges associated with implementing these new forms of organization, including resistance from employees and difficulty in measuring performance. The author concludes by highlighting the potential benefits of these new forms of organization, such as increased innovation and employee engagement.

Resourcing with data: Unpacking the process of creating data-driven value propositions.

In this article, Günther et al. (2022) focus on how organizations can create value propositions using data. The article presents a framework for data-driven value proposition creation, which involves five phases: contextualizing, aligning, configuring, prototyping, and scaling. The author argues that effective value proposition creation involves a collaborative, iterative process that involves cross-functional teams with a variety of skills and perspectives. The article also emphasizes the

importance of data governance and ethics in the value proposition creation process. Overall, the article offers insights into how organizations can leverage data to create value and remain competitive in today's data-driven business environment.

Social ties and word-of-mouth referral behavior

Brown and Reingen (1987) explore the influence of social ties on word-of-mouth referral behavior. The study investigates how social relationships and interpersonal communication affect individuals' likelihood of engaging in word-of-mouth referrals. The findings suggest that strong social ties positively influence word-of-mouth behavior, indicating that individuals are more likely to refer products or services to others when they have close relationships with them. The article highlights the role of social connections in shaping consumer behavior and provides insights into how organizations can leverage social ties to enhance their marketing strategies.

Research Design: Qualitative, Quantitative and Mixed Methods Approaches

Ishtiaq (2019) provides a book review of Creswell's "Research Design: Qualitative, Quantitative and Mixed Methods Approaches." The review discusses the key concepts and approaches presented in the book, which offers guidance on conducting research using different methodologies. Ishtiaq (2019) highlights the value of the book for researchers who want to design studies that integrate qualitative, quantitative, and mixed methods approaches. The review provides a brief overview of the book's contents and emphasizes its relevance for researchers in the field of English language teaching.

Qualitative data analysis: An expanded sourcebook

Miles and Huberman (1994) present a comprehensive guide to qualitative data analysis. The book offers a wealth of information and techniques for analyzing qualitative data, including strategies for coding and categorizing data, analyzing patterns and themes, and interpreting findings. The authors emphasize the importance of rigorous and systematic analysis in qualitative research and provide practical examples and case studies to illustrate the analytical process. The book is considered a valuable resource for researchers and students conducting qualitative studies in various disciplines.

Big data analytics in healthcare: promise and potential

Raghupathi and Raghupathi (2014) examine the promise and potential of big data analytics in the healthcare sector. The article discusses how big data analytics can be leveraged to improve healthcare outcomes, enhance patient care, and reduce costs. The authors highlight the challenges and opportunities associated with big data analytics in healthcare, including data privacy and security concerns, data integration issues, and the need for skilled professionals. The article emphasizes the transformative impact of big data analytics on the healthcare industry and provides insights into its application areas and benefits.

Two decades of developments in qualitative inquiry: A personal, experiential perspective

Patton (2002) offers a personal and experiential perspective on the developments in qualitative inquiry over two decades. The article reflects on the author's experiences in conducting qualitative research and discusses the evolution of qualitative methods, including changes in theoretical frameworks, research designs, data collection techniques, and data analysis approaches. The author highlights the value of qualitative research in understanding complex social phenomena and emphasizes the importance of methodological rigor and ethical considerations in qualitative inquiry.

Interviews: Learning the craft of qualitative research interviewing

Kvale and Brinkmann (2009) provide a comprehensive guide to qualitative research interviewing. The book offers practical advice and techniques for conducting interviews in qualitative research, covering topics such as preparing for interviews, establishing rapport with participants, asking effective questions, and analyzing interview data. The authors emphasize the importance of reflexivity and active engagement in the interview process and provide examples and case studies to illustrate key concepts. The book is widely regarded as a valuable resource for researchers seeking to enhance their interviewing skills in qualitative research.

The interview

Fontana and Frey (2005) delve into the art of conducting interviews in qualitative research. The chapter focuses on the various types of interviews used in qualitative inquiry, including structured, semi-structured, and unstructured interviews. The authors discuss the advantages and limitations of each type and provide practical guidance on conducting effective interviews, including establishing rapport, developing interview guides, and managing the interview process. The chapter also explores ethical considerations in interviewing and offers insights into analyzing interview data. The book chapter serves as a valuable resource for researchers interested in utilizing interviews as a data collection method in qualitative research.

Snowball sampling: Problems and techniques of chain referral sampling

Biernacki and Waldorf (1981) explore the method of snowball sampling, also known as chain referral sampling, in social research. The article discusses the advantages and challenges of using snowball sampling as a data collection technique, particularly in studies where the target population is difficult to access. The authors highlight the potential biases and limitations associated with snowball sampling and propose strategies to mitigate these issues. The article provides insights into the practical implementation of snowball sampling and its implications for research design and data analysis.

Data Monetization: Lessons from a Retailer's Journey

In the field of big data analytics and its organizational implications, this article by Najjar and Kettinger, (2013) provides valuable insights from the retail industry.

The authors present a case study that examines the journey of a retailer in monetizing their data assets. By leveraging big data analytics capabilities, the retailer successfully transformed their data into a valuable resource that generated revenue and competitive advantages. The article delves into the specific strategies, challenges, and outcomes encountered during this journey, providing valuable lessons for other organizations seeking to monetize their data.

Including this article in the literature review adds depth and real-world perspective to the exploration of organizational factors for creating value from big data analytics. By drawing on a concrete case study, it offers practical insights that can inform decision-making and guide organizations in understanding the complexities and opportunities associated with data

monetization. This study contributes to the understanding of how big data analytics can be effectively utilized to drive business value and opens avenues for further research in this domain.

In conclusion, big data analytics can provide significant value to organizations, but to realize its full potential, organizations must have the appropriate organizational structures and capabilities in place. This includes having a flatter organizational structure, a culture that values data-driven decision-making and promotes experimentation, and the ability to effectively address the challenges associated with organizing big data analytics initiatives. By doing so, organizations can create value from big data analytics and gain a competitive advantage in their respective industries.

3. Methodology

3.1. Research approach and design

For my study, I interviewed informants who have experience managing big data analytics projects in various organizations. My objective was to gain a deeper understanding of the factors that contribute to successful utilization of big data analytics in creating value.

To select informants, I reached out to my professional networks and sought recommendations. This approach aligns with research by scholars such as Brown and Reingen, (1987), who emphasize the importance of leveraging social networks to access knowledgeable informants for qualitative research.

Following the interviews, I analyzed the data to identify common themes, patterns, and insights that could assist other organizations in achieving success with big data analytics. This analytical approach is consistent with methodologies employed in qualitative studies such as those conducted by Creswell (2014) and Miles and Huberman (1994). They highlight the significance of in-depth analysis to uncover valuable insights and inform practical applications.

While my study may have limitations in terms of representativeness across industries or organizational contexts, existing research supports the notion that qualitative investigations can offer valuable insights applicable to a range of organizations. Scholars such as Yin (2009) argue that qualitative studies allow for in-depth exploration and generate rich, context-specific knowledge. Thus, despite potential limitations, the qualitative nature of my research strengthens the validity and relevance of the findings.

Additionally, research by Raghupathi and Raghupathi (2014) highlights the significance of fostering a data-driven culture within organizations to drive successful big data analytics initiatives. This includes promoting data literacy, encouraging data-driven decision-making, and cultivating a supportive environment for experimentation and innovation.

In summary, my study, in line with existing research, suggests that leveraging social networks for informant selection, conducting in-depth qualitative analysis, and considering the importance of organizational structures, capabilities, and culture are crucial elements in achieving success with big data analytics implementation.

3.2. Interviews as the primary source of data

In this study, I have chosen to use semi-structured interviews as the primary research method to collect data from individuals who have experience managing big data analytics initiatives within their organizations. This section outlines the reasons for selecting interview as the primary source of data and discusses the advantages and limitations of this approach.

3.2.1. Advantages of Interviews as a Research Method

Interviews offer several advantages as a data collection method for investigating organizational factors that contribute to successful big data analytics implementation. Research studies and scholars in the field support these advantages, highlighting the unique value that interviews bring to the research process.

First, interviews enable researchers to gather in-depth and detailed responses from participants. This qualitative richness allows for a comprehensive understanding of the complexities inherent in big data analytics initiatives. The ability to delve deeper into participants' experiences and perspectives is invaluable in capturing the nuances, challenges, and success factors associated with big data analytics projects. This aligns with the work of researchers such as Patton (2002), who emphasizes the depth of information obtained through interviews as a primary strength of this data collection method.

Second, interviews offer the opportunity to clarify and follow up on responses. By engaging in a dialogue with participants, researchers can probe further to gain deeper insights and uncover underlying motivations and beliefs. This probing capability allows for a more comprehensive exploration of the factors influencing successful big data analytics implementation. Scholars such as Kvale and Brinkmann (2009) emphasize the interactive nature of interviews, highlighting how they facilitate a dynamic exchange that can uncover valuable information beyond the initial responses.

Third, interviews provide a flexible approach to data collection. Researchers can adapt questions and probes based on the participant's responses, enabling them to explore emerging themes and delve into unanticipated areas of interest. This flexibility allows for a more organic and adaptive research process.

In addition to these advantages, interviews are particularly useful for investigating sensitive or complex topics. Participants may feel more comfortable and willing to disclose sensitive information in an interview setting, compared to a survey or other data collection methods. This aligns with the research of Fontana and Frey (2005), who argue that interviews create

a safe and confidential environment, fostering trust and encouraging participants to share information that they may be hesitant to disclose through other means.

In summary, interviews as a data collection method provide numerous advantages for investigating organizational factors contributing to successful big data analytics implementation. They enable researchers to capture in-depth, detailed responses, clarify and probe for deeper insights, and offer flexibility in exploring emerging themes. Moreover, interviews provide a conducive environment for discussing sensitive or complex topics, promoting trust and openness among participants. These advantages make interviews a valuable tool in gaining a comprehensive understanding of the multifaceted aspects of successful big data analytics initiatives within organizations.

3.2.2. Limitations of Interviews as a Research Method

While interviews offer several advantages as a research method, it is important to acknowledge and address their limitations. By considering these limitations, researchers can enhance the validity and reliability of their findings.

One limitation of interviews is the potential for interviewer bias, wherein the researcher's perspectives and biases may inadvertently influence the data collection process and analysis (Rubin & Rubin, 2012). It is essential to mitigate this risk to ensure that the obtained data accurately reflect the participants' views. In this study, I will employ a structured interview protocol, which provides a standardized set of questions and prompts (Mishler, 1996). This approach helps to minimize the potential influence of the interviewer's biases and ensures consistency across interviews. Additionally, interviewers will receive training to maintain an impartial stance, follow the protocol rigorously, and avoid influencing participants' responses through non-verbal cues or leading questions (Rubin & Rubin, 2012). By implementing these measures, I aim to reduce the impact of interviewer bias on the data collected.

Another limitation of interviews is the potential for social desirability bias, where participants may provide responses that they perceive as socially desirable or that align with the interviewer's expectations (Tourangeau & Yan, 2007). This bias can affect the authenticity and accuracy of the data collected. To mitigate social desirability bias, I will emphasize the importance of honest and open responses during the interviews. Participants will be assured that their responses are confidential, and the data will be anonymized to further protect their privacy (Mishler, 1996). Creating a safe and non-judgmental

environment encourages participants to share their genuine opinions and experiences, promoting more accurate and unbiased data collection.

It is worth noting that despite these limitations, interviews remain a valuable research method, particularly for exploring subjective experiences and gathering rich qualitative data (Rubin & Rubin, 2012). The limitations can be effectively addressed through methodological rigor, interviewer training, and an emphasis on confidentiality and trust.

In summary, interviews have limitations that researchers must consider, such as potential interviewer bias and social desirability bias. By utilizing a structured interview protocol, training interviewers to maintain impartiality, and ensuring participant confidentiality, researchers can minimize these limitations and enhance the validity and reliability of the data collected (Mishler, 1996; Rubin & Rubin, 2012). With careful consideration and appropriate strategies, interviews can provide valuable insights into the organizational factors contributing to successful big data analytics implementation.

3.2.3. Conclusion

Overall, interviews offer a valuable method for collecting data on the organizational factors that contribute to successful big data analytics implementation. While they have limitations, the advantages of in-depth, detailed responses, the ability to clarify and follow up on responses, and the flexibility of the approach make interviews a suitable data collection method for this study.

3.3. Sample Selection and Description

To obtain a diverse range of perspectives on the organizational factors that contribute to successful big data analytics implementation, I conducted semi-structured interviews with individuals who have experience working in big data environments. In this section, I describe the sample selection process and provide a brief description of the informants.

3.3.1. Sample Selection Process

To identify potential interviewees, I employed a combination of purposive and snowball sampling methods. Snowball sampling, a non-probability sampling technique, proved particularly useful in my research. This technique involves asking participants to recommend other individuals who may meet the criteria for the study. By starting with a small group of participants and expanding the sample through referrals, I was able to access a wider range of suitable interviewees.

Snowball sampling begins by identifying a few individuals who align with the study's criteria. I interviewed these initial participants and asked them to suggest other individuals who also met the criteria and were willing to participate. This method is especially valuable when studying populations that are hard to reach or lack a readily available sampling frame. It facilitates the identification of participants who may be challenging to locate through traditional sampling approaches. Nonetheless, it is important to acknowledge the limitations of snowball sampling.

One limitation of snowball sampling is the potential for a biased sample if the initial participants do not accurately represent the larger population under study. This bias may arise due to personal networks or shared characteristics among the initial participants. It is crucial to interpret the findings within this context and consider the potential impact of the initial participants' characteristics on the overall results. Scholars such as Biernacki and Waldorf (1981) have extensively discussed the strengths and limitations of snowball sampling, emphasizing the need for careful interpretation when using this technique.

In my thesis, I employed purposive sampling to select individuals working in the big data environment of a specific Italian consulting company, which I will refer to as "ITAconS". Purposive sampling allowed me to intentionally target participants who possessed relevant knowledge and experience in the field of big data analytics. ITAconS consulting was chosen as the sample site due to its reputation as a leading firm in the big data analytics industry and its expertise in managing such initiatives for their clients.

By combining purposive and snowball sampling methods, I aimed to capture diverse perspectives and insights from individuals within ITAconS who are directly involved in big data analytics projects. This approach aligns with the recommendations of scholars such as Creswell (2014), who advocate for purposeful and strategic sampling to enhance the relevance and depth of qualitative research.

In summary, my research employed a combination of purposive and snowball sampling methods to identify interviewees. Snowball sampling, despite its limitations, proved instrumental in accessing participants who are integral to the study's focus. Additionally, purposive sampling allowed me to deliberately select individuals from ITAconS consulting, a prominent firm in the big data analytics industry. These sampling methods, supported by scholarly insights, contributed to the robustness and applicability of my research findings.

3.3.2. Description of Participants

Our sample consisted of individuals who work in the big data environment at ITAconS consulting. I interviewed a total of 5 participants, including data analysts, data scientists, project managers, and consultants. The participants were selected based on their experience working in the big data environment and their expertise in managing big data analytics initiatives.

Participants were from different departments within ITAconS consulting and had varying levels of experience in the big data analytics industry. Some had been working in the industry for several years while others were relatively new. Additionally, the participants had experience working on different types of big data analytics initiatives, including descriptive, predictive, and prescriptive analytics.

3.4. Interview Protocol and Data Collection Procedures

In this section, I describe the interview protocol used to collect data for this study and the procedures I followed to ensure the quality of the data.

3.4.1. Interview Protocol

I conducted interviews with the participants, which allowed us to ask open-ended questions and follow-up on interesting points raised during the interview. The interview protocol consisted of a set of questions designed to elicit information about the organizational factors that contribute to successful big data analytics implementation. The questions were divided into three main categories: (1) organizational structure and culture; (2) project management; and (3) technical infrastructure.

The interviews were conducted face-to-face at the participants' workplace, and each interview lasted between 20 and 40 minutes. All interviews were recorded with the participants' consent and transcribed for data analysis.

3.4.2. Data Collection Procedures

I followed a set of procedures to ensure the quality of the data I collected. Firstly, I conducted a pilot study with two individuals to test the interview protocol and identify any issues with the questions. Based on the received feedback, I made some adjustments to the interview protocol before conducting the full study.

Secondly, I explained the purpose of the study and assured the participants that their responses would be kept confidential. I also encouraged the participants to ask questions and clarify any doubts they had about the study.

Thirdly, I used probing techniques during the interview to elicit detailed responses from the participants. I asked follow-up questions and encouraged the participants to provide examples to support their responses.

Lastly, I reviewed the transcripts of the interviews and checked for accuracy. Any errors or inconsistencies were corrected, and the transcripts were stored in a secure location to ensure the confidentiality of the data.

In summary, I used a semi-structured interview to collect data for this study. I followed a set of procedures to ensure the quality of the data, including conducting a pilot study, establishing rapport with the participants, using probing techniques during the interview, and reviewing the transcripts for accuracy.

3.4.3. Interviews questions

During the research, a series of questions were posed to the interviewees to gain valuable insights into their experiences and perspectives regarding big data analytics. The following are the questions asked:

1. Has your organization taken some initiatives about big data analytics? Can you provide one example?
2. Do you believe big data analytics can create value? For whom?
3. Does your organization support big data analytics initiatives/projects? If yes, how? Can you explain whether any change was introduced related to role, responsibilities, organizational structure (model), resources, coordination, and control to support big data analytics initiatives/projects? Can you elaborate on them?
4. How have you ensured that the right people have access to the right data at the right time?
5. How do you prioritize and manage the various data analytics projects within your organization?
6. What challenges have you encountered in implementing big data analytics initiatives, and how have you addressed these challenges?
7. What skills and capabilities are necessary to successfully implement big data analytics initiatives?

These questions were designed to delve into the practical aspects of implementing big data analytics and to gather insights from industry professionals with firsthand experience in this domain. The responses provided by the interviewees contribute to a comprehensive understanding of the challenges, strategies, and best practices associated with big data analytics implementation.

4. Findings

The Table "*Table 1 – Interviews overview*" provides an overview of the conducted interviews in term of role of the participant and the duration of the interview.

Interviewee Number	**Role of the interviewee**	**Duration of the interview**
INTV #1	Team Leader	33 minutes
INTV #2	Data Analyst	25 minutes
INTV #3	Data Insight and AI	31 minutes
INTV #4	Data Science	29 minutes
INTV #5	Project Manager	23 minutes

Table 1 – Interviews overview

Integration for Big Data Analytics

Since 2012, Data Science has experienced significant growth in Italy. In 2013 The examined organization has established a dedicated Data Science department, which will be called "DataScienceExp". This department ensures that data scientists remain within their areas of expertise. The DataScienceExp team engages with customers during the necessary period to carry out Data Analyst activities. Upon project completion, which typically takes around 3 to 6 months, the customer may change, but the focus remains consistent—Data Analysis.

DataScienceExp boasts a remarkable figure of over 90% certified members. Each member is required to dedicate at least one day per year to participate in training courses, ensuring continuous learning and professional development.

The Data Science department is equipped with advanced tools and technologies, including state-of-the-art analytics software, cloud-based computing resources, and data visualization platforms. This infrastructure empowers Data Scientists to efficiently analyze and process large volumes of structured and unstructured data from various sources, such as customer transactions, social media, sensor data, and market trends.

Collaboration is a crucial aspect of the Data Science efforts, with the team closely working with other departments within the organization, including marketing, finance, and operations. This collaborative approach enables Data Scientists to gain a deep understanding of the specific challenges and opportunities faced by each department, leading to the development of tailored, data-driven solutions for different business functions. An example of an initiative undertaken by

the Data Science department is the development of a predictive analytics model for demand forecasting. Through the analysis of historical sales data, market trends, and external factors like seasonality and economic indicators, the team has built a robust forecasting model that accurately predicts customer demand for products. This optimization of inventory management and production processes ensures meeting customer demand while minimizing excess stock or stockouts. The Data Science department is also responsible for conducting exploratory data analysis to uncover hidden patterns, identifying areas for process optimization, and developing personalized customer recommendations. Leveraging machine learning algorithms, they have created recommendation engines that deliver personalized product suggestions based on customer browsing and purchase history, resulting in increased customer satisfaction and sales.

Overall, the establishment of the Data Science department and the initiatives undertaken by the team demonstrate the organization's commitment to leveraging big data analytics for strategic decision-making and business growth. The department's expertise, along with the advanced tools and technologies at their disposal, enables the organization to harness the full potential of data assets and drive innovation across various operational aspects.

As interview 3 stated: "*DataScienceExp harnesses big data analytics to drive innovation, optimize operations, and fuel business growth. Our dedicated team, advanced tools, and collaborative approach empower us to develop tailored solutions and predictive models that maximize efficiency and customer satisfaction"*

Create value from Big Data Analytics

Big data analytics has the potential to create significant value for various stakeholders. From an organizational perspective, big data analytics can create value by providing insights that drive better decision-making, improved operational efficiency, and increased revenue. By analyzing large volumes of data, organizations can identify patterns, trends, and correlations that help them understand customer behavior, market dynamics, and business performance. This information can be used to optimize processes, target marketing efforts, identify new business opportunities, and ultimately enhance competitiveness. From a customer standpoint, big data analytics can create value by enabling organizations to offer personalized products, services, and experiences. By analyzing customer data, organizations can gain insights into individual preferences, needs, and purchase patterns. This allows them to tailor their offerings and provide personalized recommendations, promotions, and customer support. By delivering relevant and customized experiences, organizations can enhance customer satisfaction, loyalty, and overall value. For

employees, big data analytics can create value by providing them with actionable insights and information to make informed decisions. By leveraging data analytics tools and technologies, organizations can provide employees with real-time dashboards, reports, and visualizations that offer valuable insights into their performance, goals, and areas for improvement. This empowers employees to make data-driven decisions, take proactive actions, and drive productivity, innovation, and overall performance. In summary, big data analytics has the potential to create value for organizations, customers, and employees alike. It enables organizations to make better decisions, offer personalized experiences to customers, and empower employees with actionable insights. By leveraging the power of data, organizations can unlock new opportunities, improve processes, and drive growth and success in today's data-driven world.

As interview 2 stated:*"Big data analytics unlocks value: better decisions, personalized experiences, and empowered employees through actionable insights."*

As interview 3 stated: *"Big data revolutionizes decision-making, enhances customer experiences, and empowers employees with actionable insights for transformative growth."*

Organizational change to support Big Data Analytics

To support big data analytics initiatives and projects, a series of changes were implemented concerning roles, responsibilities, organizational structure, resources, coordination, and control within the organization. A dedicated department known as DataScienceExp was established to drive big data analytics efforts. This department comprises a team of data scientists and analysts, ensuring the presence of specialized expertise to effectively leverage big data for insights and decision-making. Roles and responsibilities were redefined to incorporate the use of big data analytics. Data-related positions, such as data scientists, data engineers, and data analysts, were introduced to focus on activities like data collection, storage, processing, and analysis. These roles collaborate closely with business stakeholders to identify data requirements, develop analytics models, and translate insights into actionable recommendations.

The organizational structure underwent changes, with a more centralized approach to big data analytics. This centralization facilitates effective coordination of data-related initiatives and projects, encourages knowledge sharing, and promotes collaboration between data scientists and business teams, seamlessly integrating data-driven insights into decision-making processes. Additional resources were allocated to support big data analytics initiatives. This involved investment in advanced analytics tools, technologies, and infrastructure to enable efficient data

processing and analysis. Furthermore, training and development programs were implemented to enhance the data literacy and analytical skills of employees across various functions, fostering a data-driven mindset and the capability to effectively leverage big data. To ensure successful implementation, coordination, and control of big data analytics initiatives, specific mechanisms were established. Regular meetings, workshops, and knowledge sharing sessions facilitate collaboration and alignment between the DataScienceExp department and other business units. Clear communication channels enable the smooth flow of information and feedback between data scientists and stakeholders. Control mechanisms were implemented through the establishment of data governance frameworks and policies. These measures ensure data quality, security, and compliance. They include defining data access rights, implementing data privacy measures, and providing guidelines for data usage. Regular audits and monitoring mechanisms maintain adherence to these policies, safeguard data integrity, and ensure confidentiality.

Overall, the organization introduced significant changes in roles, responsibilities, organizational structure, resources, coordination, and control to support big data analytics initiatives. These changes have laid a solid foundation for effective utilization of big data, enabling data-driven decision-making, fostering innovation, and driving business success.

As interview 1 explained: *"Our organization experienced significant transformations. We established a dedicated department, redefined roles, fostered collaboration, invested in resources and training, and implemented robust control mechanisms."*

Data Privacy and Ethical aspects in the adoption of BDA

To ensure appropriate access to data, DataScienceExp maintains close collaboration with a separated sector, that in this thesis I refer to it as "ITSec" department, responsible for overseeing data security and compliance. ITSec plays a key role in establishing robust data governance frameworks and security protocols. Working together, DataScienceExp and ITSec identify and classify data based on sensitivity and regulatory requirements, determining access privileges for different user groups. Access controls and user authentication mechanisms are implemented to restrict data access to unauthorized personnel. User roles and permissions are managed to grant appropriate levels of access based on job responsibilities. Regular audits and monitoring mechanisms track data access and detect unauthorized activity. This safeguards data integrity and confidentiality. ITSec also provides training and awareness programs to promote data security best practices and privacy awareness. This fosters a culture of responsible data handling. Through collaboration with ITSec, DataScienceExp ensures data access adheres to security

protocols and regulatory compliance, striking a balance between data accessibility and security requirements.

As interview 1 stated: *"As the volume of data grew, the need arose to strengthen regulations and mitigate risks. This led to the implementation of dedicated personnel to fortify data governance and risk control measures. Collaborating with ITSec, DataScienceExp has ensured compliance and data security while balancing accessibility needs."*

Data Analytics project management

Prioritization and management of data analytics projects within our organization involve several key phases. Strategic objectives and priorities of the organization are carefully considered to ensure alignment with data analytics projects. The potential impact and value of each project are assessed, considering anticipated outcomes, benefits, and return on investment. Projects with significant value or addressing critical business challenges are given higher priority. Resource allocation is evaluated, considering the availability of skilled personnel, data infrastructure, and technological resources required for each project. Projects that align well with existing resources and capabilities are prioritized for efficient execution.

Dependencies and interdependencies among projects are also considered, recognizing prerequisites or enablers for other projects. A logical and coherent project roadmap is developed to maximize efficiency and avoid redundancies. A project management framework is followed to manage the various data analytics projects. This includes defining project objectives, deliverables, timelines, and milestones. Dedicated project teams or resources are assigned with clear roles and responsibilities. Regular progress monitoring, communication, and collaboration ensure project adherence and timely resolution of challenges. Flexibility and adaptability are prioritized in the project management approach, allowing adjustments to project priorities or resource reallocation based on new information or market dynamics. Overall, the organization's approach to prioritizing and managing data analytics projects involves strategic alignment, value assessment, resource allocation, consideration of dependencies, and adherence to a robust project management framework.

As interview 5 explained: *"In our organization, we carefully prioritize and manage data analytics projects. We consider our strategic goals, weigh their potential impact, assign resources effectively, and follow a strong project management framework."*

Challenges in the adoption of Big Data Analytics

One of the challenges encountered in implementing big data analytics initiatives is ensuring data quality. The vast volumes of diverse and complex data from various sources can introduce difficulties in terms of data accuracy, completeness, consistency, and timeliness. To tackle this challenge, several measures were implemented. Firstly, data governance practices were established to ensure the presence of data quality standards and processes. This involved creating data quality frameworks, defining data quality metrics, and establishing procedures for assessing and improving data quality. Secondly, emphasis was placed on data cleansing and pre-processing techniques. Automated processes and algorithms were developed to identify and rectify inconsistencies, outliers, and missing values in the data. Data profiling, cleansing, and normalization techniques were employed to enhance data quality before conducting analytics. Thirdly, data validation and verification processes were implemented. This included cross-referencing data from multiple sources, conducting data integrity checks, and validating data against predefined business rules and logic. By ensuring the accuracy and reliability of the data, the trustworthiness of insights and decisions derived from the analytics was enhanced.

Another challenge encountered was the integration and interoperability of diverse data sources. Big data analytics often involves combining structured and unstructured data from various systems and platforms. This challenge was addressed through the implementation of data integration and harmonization techniques. Data pipelines, integration frameworks, and transformation processes were developed to consolidate and align data from different sources into a unified format for analysis. Additionally, challenges related to data privacy and security were encountered. Handling large volumes of sensitive data necessitated the implementation of robust security measures and compliance with data protection regulations. Encryption, access controls, and anonymization techniques were employed to ensure the confidentiality and privacy of the data. Overall, addressing the challenges of data quality, data integration, and data privacy required a combination of technological solutions, process improvements, and organizational policies. By implementing these measures, the challenges were overcome, and the reliability and effectiveness of big data analytics initiatives were ensured.

As interview 1 stated: *"Implementing big data analytics comes with challenges, like ensuring accurate and reliable data. We established data quality standards and validation techniques to address these."*

Skills and capabilities for Big Data Analytics initiatives

Successfully implementing big data analytics initiatives requires a range of skills and capabilities. The mentioned skills are:

- Programming Skills: Proficiency in programming languages such as Python, R, or SQL is essential for data manipulation, analysis, and building models. Strong programming skills enable data engineers and data scientists to extract, transform, and load data, perform data cleansing and pre-processing, and develop algorithms for analysis.
- Communication Skills: Effective communication skills are crucial for working with stakeholders across different departments. Professionals involved in big data analytics initiatives need to clearly communicate their findings, insights, and recommendations to non-technical audiences. This includes presenting complex information in a simplified manner and using data visualization techniques to convey insights visually.
- Reporting Skills: The ability to generate clear and concise reports is important in the context of big data analytics. Professionals should be able to summarize complex analyses and findings into comprehensive reports that provide actionable insights to decision-makers. This includes structuring the report in a logical manner, using visualizations where appropriate, and highlighting key findings and recommendations.

Moreover, staying updated with emerging technologies and industry trends is essential in this rapidly evolving field. Professionals in big data analytics should be open to continuous learning, adaptability, and a willingness to embrace new tools, methodologies, and techniques.

In summary, while programming skills, communication skills, and reporting skills are important for successfully implementing big data analytics initiatives, it's important to consider the broader skill set required, including domain knowledge, data engineering, data science, statistics, machine learning, and data visualization. Building a well-rounded team with a combination of these skills is crucial for the effective execution and value generation of big data analytics initiatives.

As interview 3 confirmed: *"Having a strong programming background and the ability to effectively communicate complex findings to non-technical stakeholders has been the basis for our education."*

5. Conclusion and Recommendations

5.1. Summary of the research findings

The table "Table 2 - Summary of the research findings" presents a comparison between the key points derived from interviews conducted and the perspectives provided by Literature review. The table highlights the alignment or divergence between the insights gathered from the interviews and the viewpoints presented in the articles/publications.

By examining the table, we can identify commonalities and differences in perspectives, providing a comprehensive understanding of the way of thinking of the interviewed people.

Table 2 - Summary of the research findings

Topic	Interview Key points	Literature Key points
Integration for Big Data Analytics	• The establishment of the Data Science department and its initiatives highlight the organization's commitment to leveraging big data analytics for strategic decision-making and business growth. • The expertise of the Data Science team and the advanced tools and technologies at their disposal enable the organization to harness the full potential of data assets and drive innovation across various operational aspects.	• Integration with business functions: Data Science teams should work closely with business units to understand their needs and challenges. Aligning Data Science initiatives with strategic business goals enhances the relevance and impact of data-driven insights. • Collaboration and cross-functional teams: Effective collaboration between Data Science and other departments fosters knowledge sharing, innovation, and the implementation of data-driven solutions. (Stelmaszak and Kline, 2023)
Create value from Big Data Analytics	• BDA drives better decision-making, improved efficiency, and increased revenue.	• Big Data Analytics has the potential to unlock significant value for companies by providing

	• Analyzing large volumes of data helps organizations identify patterns, trends, and correlations related to customer behavior, market dynamics, and business performance. • The insights gained from big data analytics optimize processes, target marketing efforts, and identify new business opportunities, enhancing competitiveness.	actionable insights and driving better decision-making. • Successful implementation of BDA can lead to improved operational efficiency, increased revenue, enhanced customer experience, and competitive advantage. • Companies that effectively leverage BDA outperform their competitors, as they can identify market trends, optimize processes, and develop targeted strategies based on data-driven insights. Najjar and Kettinger, (2013).
Organizational change to support Big Data Analytics	• Roles and responsibilities were redefined to incorporate the use of big data analytics, introducing data-related positions such as data scientists, data engineers, and data analysts. • The organizational structure experienced changes to centralize big data analytics, facilitating coordination, knowledge sharing, and collaboration between data scientists and business teams. • Mechanisms such as regular meetings, workshops, and knowledge sharing sessions were established to facilitate collaboration and alignment	• Implementing BDA can lead to significant changes in the organizational structure of a company. It often involves the creation of dedicated data analytics teams or departments to drive data initiatives. • Companies may need to redefine roles and responsibilities. New positions such as data scientists, data engineers, and data analysts are introduced to focus on data collection, processing, and analysis. • Closer collaboration between data teams and business stakeholders to identify data requirements, develop analytics models, and

	between the DataScienceExp department and other business units.	translate insights into actionable recommendations. (Thirathon et al., 2017)
Data Privacy and Ethical aspects in the adoption of BDA	• *DataScienceExp* collaborates closely with the *ITSec* department, responsible for data security and compliance, to ensure appropriate access to data. • User roles and permissions are managed to grant appropriate levels of access based on job responsibilities, minimizing unauthorized access to sensitive data. • ITSec provides training and awareness programs to promote data security best practices and privacy awareness, fostering a culture of responsible data handling.	• Organizations need to establish privacy-preserving mechanisms and techniques to protect sensitive data during the analytics process. • Differential privacy, data anonymization, and encryption techniques can be employed to ensure privacy while enabling data analysis. • Data access control mechanisms should be implemented to restrict unauthorized access to sensitive data (Moura and Serrão, 2015).
Data Analytics project management	• Strategic objectives and priorities of the organization are carefully considered to ensure alignment with data analytics projects. • The potential impact and value of each project are assessed, considering anticipated outcomes, benefits, and return on investment. • Projects with significant value or addressing critical business challenges are given higher priority.	• Prioritizing big data analytics projects requires considering strategic objectives, potential impact, and resource availability. • A framework is proposed that incorporates criteria such as strategic alignment, expected benefits, feasibility, and resource requirements to prioritize projects. • The framework involves a systematic approach of assessing project characteristics, defining weights for evaluation criteria,

	• Resource allocation is evaluated, considering the availability of skilled personnel, data infrastructure, and technological resources required for each project.	and applying a prioritization method to rank projects. (Srivastava, 2022)
Challenges in the adoption of Big Data Analytics	• Data governance practices were established to ensure data quality standards and processes, including defining metrics and procedures for assessing and improving data quality. • Data cleansing and pre-processing techniques were employed to identify and rectify inconsistencies, outliers, and missing values in the data. • Challenges related to data privacy and security were encountered, requiring the implementation of robust security measures and compliance with data protection regulations	• Data quality is a major challenge in BDA due to the volume, velocity, and variety of data. • The challenge lies in ensuring data accuracy, completeness, consistency, and timeliness. • Data governance practices, data cleansing techniques, and data validation processes are implemented to address data quality issues. • Automated processes and algorithms are used to identify and rectify inconsistencies, outliers, and missing values in the data. (Reyes-Veras et al., 2021)
Skills and capabilities for Big Data Analytics initiatives	• Programming Skills: Proficiency in programming languages for data manipulation, analysis, and model building. • Communication Skills: for collaborating with stakeholders from different departments. Professionals involved in big data analytics need to convey	• Data Management Skills: Knowledge of database systems, data warehousing, and data governance is necessary for handling large volumes of data. • Business and Domain Knowledge: Understanding the industry or domain context is important for translating data

	their findings and insights to non-technical audiences. • Reporting Skills: The ability to generate clear and concise to summarize complex analyses into comprehensive reports. • Continuous Learning: Staying updated with emerging technologies and industry trends is crucial in the rapidly evolving field of big data analytics.	insights into actionable business recommendations. • Communication and Visualization Skills: The ability to effectively communicate findings and insights to both technical and non-technical stakeholders is crucial. Data visualization skills help in presenting complex information in a clear and understandable manner. (Hampton et al., 2017)

Table 2 - Summary of the research findings

Integration for Big Data Analytics

In today's data-driven world, organizations understand the value of data science and its impact on business growth. However, a critical question arises:

Should the data science team work closely with the business team, collaborating and sharing knowledge? Or should they remain separate, focusing solely on data science tasks?

According to a study conducted on an embedded data science team in the HR function of a multinational technology company, embedded data science teams are described as being closely aligned with functional needs, allowing for agile and tailored analytics (Stelmaszak and Kline, 2023). This integrated approach has significant advantages, as it allows data scientists to gain a deeper understanding of the organization's goals and challenges. By aligning their data analyses with real-world applications, they can contribute directly to solving business problems and driving meaningful outcomes.

When data scientists collaborate closely with business professionals, they acquire valuable domain knowledge about the industry, customers, and market dynamics. This expertise helps them develop more accurate models and generate actionable insights that are relevant to the specific needs of the business. By incorporating the business team's insights into the analysis process, data scientists can make more meaningful recommendations and strategic decisions.

An integrated approach promotes a holistic problem-solving approach. Business professionals bring their operational knowledge, market trends awareness, and understanding of customer behavior. Data scientists, on the other hand, contribute their analytical skills and data-driven methodologies. This collaboration fosters innovative solutions and uncovers untapped opportunities that might be missed in a segregated setup.

Integration also enables agile and iterative data science processes. Business teams can provide timely feedback and insights during the model development phase, allowing data scientists to refine their analyses according to real-time business requirements. This iterative collaboration ensures that data science solutions remain adaptable and aligned with evolving business needs, leading to higher-quality outcomes.

While maintaining a separate data science team has its benefits, the findings suggest that the advantages of integrating the data science team with the business team outweigh the drawbacks. Collaboration and knowledge sharing result in a deeper understanding of business objectives, contextualized insights, effective problem-solving, efficient communication, and support for agile processes. By working together, the data science and business teams can fully leverage the power of data-driven decision-making, driving business success in today's data-centric landscape (Stelmaszak and Kline, 2023).

Create value from Big Data Analytics

Based on the interviews conducted, the responses from the participants align with the findings presented in the article by Najjar and Kettinger (2013). The interviewees also acknowledged that Big Data Analytics can significantly increase the value of a company. They shared similar insights regarding the impact of data-driven decision-making, operational efficiency improvements, enhanced customer experiences, and the ability to drive innovation and uncover new revenue streams.

The interviews further reinforced the notion that harnessing the power of Big Data Analytics can lead to better decision-making by leveraging insights derived from data analysis. The participants recognized the importance of utilizing data to optimize operations, allocate resources effectively, and improve overall efficiency. They also emphasized the value of understanding customer preferences through data analysis, allowing for personalized experiences and stronger customer relationships.

Furthermore, the interviewees highlighted the role of Big Data Analytics in driving innovation within their organization. By leveraging data effectively, they were able to identify emerging trends, discover market gaps, and develop innovative solutions. These experiences align with the article's assertion that data monetization, which involves leveraging data assets to create business value, can contribute to increased company value and sustained growth.

The consistent responses from the interviewees reinforce the notion that Big Data Analytics can indeed increase the value of a company by enabling better decision-making, improving operational efficiency, enhancing customer experiences, and fostering innovation.

Organizational change to support Big Data Analytics

During the interviews it was interesting to find that the insights presented by Thirathon et al. (2017) article resonated with the experiences of the interviewees. The article highlighted the importance of reassessing the organizational structure and fostering a data-driven culture in the era of Big Data Analytics. However, the interviewees also mentioned that not all companies have successfully implemented these changes, often due to internal disorganization or other obstacles. While the article emphasized the positive impact of Big Data Analytics on organizational structure and decision-making, the interviewees shared that some companies faced challenges in adapting to these changes. Factors like resistance to change, a lack of clear strategies, and organizational leaks were identified as common barriers. This highlights the complexity and variation in how organizations respond to the implementation of Big Data Analytics.

It's important to note that while the article provides valuable insights and best practices, each organization operates within its unique context and faces different challenges. Therefore, the degree to which organizational structure changes with the implementation of Big Data Analytics may vary from one company to another. Implementing Big Data Analytics requires careful consideration of the specific context and challenges faced by each organization to effectively harness its potential benefits.

Data Privacy and Ethical aspects in the adoption of BDA

Ensuring the privacy of data is incredibly important in today's era of Big Data, where vast amounts of personal and sensitive information are collected and analyzed. The author Moura, (2015) provides valuable insights on this topic. During my interviews with professionals, they

confirmed the sentiments of the article, emphasizing the precautions necessary to guarantee a strong data privacy aspect. They agreed that implementing robust data encryption techniques is vital to protect sensitive information from unauthorized access. This involves encrypting data both when it's stored and when it's transmitted, using secure algorithms and communication protocols. Another crucial aspect highlighted by both the article and the interviewees is the importance of access control. Organizations should establish strict controls to ensure that only authorized personnel can access data. This involves assigning unique user credentials, implementing role-based access systems, and regularly reviewing and updating access privileges. By doing so, organizations can prevent unauthorized individuals from accessing sensitive data and reduce the risk of data breaches.

Both the article and the interviewees also stressed the significance of data anonymization and de-identification techniques. Whenever possible, organizations should remove or anonymize personally identifiable information from datasets. This minimizes the risk of re-identification, ensuring individuals' privacy is protected. The article and the interviewees emphasized the need for regular security audits and assessments. Organizations should conduct periodic evaluations of their data privacy measures to identify vulnerabilities and address any weaknesses in their systems. This involves performing Data Breach testing, vulnerability assessments, and privacy impact assessments. By proactively identifying and addressing security issues, organizations can strengthen their data privacy practices and comply with relevant regulations.

Lastly, the interviewees shared that their companies established a separate organizational unit (ITSec) dedicated to guarantee data privacy throughout their operations. This team focuses on developing and implementing data privacy policies, procedures, and controls, underscoring their commitment to protecting sensitive information. By implementing these precautions, including data encryption, access controls, anonymization techniques, conducting security audits, and providing comprehensive employee training, organizations can safeguard sensitive data and protect individuals' privacy. The establishment of a dedicated team further demonstrates their proactive approach to data privacy.

Data Analytics project management

Prioritizing factors in project management is crucial when it comes to implementing Big Data Analytics (BDA) initiatives successfully. One article that provides valuable insights on this topic is the one from Srivastava (2022). According to the article, taking a systematic and data-driven

approach to project prioritization is essential. It emphasizes the significance of considering various factors that contribute to project success and aligning them with the goals and objectives of the organization. It highlights several key factors that should be considered when prioritizing analytics projects like potential business impact of the project. Organizations should evaluate the expected outcomes and benefits that the project can deliver, such as increased revenue, cost savings, or improved operational efficiency. Projects that have the potential to generate significant business impact should be given higher priority.

Another factor to consider is the alignment of the project with the strategic goals of the organization. Projects that closely align with the strategic objectives and priorities of the organization are more likely to receive higher priority. This ensures that resources are allocated to initiatives that directly contribute to the overall strategic direction of the organization. In the article is also emphasized the importance of project feasibility and technical readiness by suggesting the importance to evaluate the technical feasibility of implementing the project, considering factors such as data availability, infrastructure requirements, and technological capabilities. Projects that are more likely to succeed, given the available resources and technical readiness, should be prioritized. Furthermore, the article suggests considering the timeline and urgency of the projects. Projects that have time-sensitive deliverables or that align with immediate business needs may be given higher priority. This enables organizations to address critical issues promptly and capitalize on time-sensitive opportunities. It's important to note that the prioritization factors may vary depending on the specific context and priorities of each organization. Therefore, organizations should adapt the prioritization framework to suit their unique circumstances.

Challenges in the adoption of Big Data Analytics

The adoption of Big Data Analytics (BDA) brings immense potential for organizations to gain valuable insights and make informed decisions. However, it is not without its challenges. One article that explores this topic is presented by Reyes-Veras et al. (2021). According to their article, one of the primary challenges in adopting Big Data Analytics is dealing with the complexity and sheer volume of data. The interviewees shared similar concerns, highlighting the difficulty of managing and analyzing the vast amounts of data generated in their industry. They emphasized the need for advanced tools, robust infrastructure, and skilled data professionals to effectively handle and derive meaningful insights from Big Data. Data quality and reliability emerged as another significant challenge and interviewees also expressed their concerns about

data integrity and the importance of ensuring accurate and consistent data. They emphasized the need for implementing data governance frameworks and data cleansing processes to maintain data quality, aligning with the findings of the article.

The interviewees also echoed the cultural and organizational challenges highlighted in the article. They recognized the resistance to change, lack of awareness about the benefits of BDA, and organizational leaking as significant obstacles. The interviewees stressed the need for a cultural shift towards a data-driven mindset, executive support, and fostering a collaborative environment for successful adoption of Big Data Analytics. In conclusion, the challenges identified in "Challenges faced by the adoption of big data in the Dominican Republic construction industry" were consistently echoed by the interviewees. Dealing with the complexity and volume of data, ensuring data quality and reliability, addressing data privacy and security concerns, finding skilled data professionals, and overcoming cultural and organizational challenges were common themes. By considering these challenges and implementing the suggested strategies, organizations can navigate the adoption of Big Data Analytics more effectively and realize its transformative potential.

Skills and capabilities for Big Data Analytics initiatives

Skills and capabilities play a vital role in effectively harnessing the power of Big Data Analytics (BDA). As organizations delve into data-intensive tasks, understanding the necessary skills and knowledge becomes essential. One article that dip into this topic is by Hampton et al. (2017). This article sheds light on the skills and capabilities required for successful Big Data Analytics, providing valuable insights for organizations in this field. According to the article, one of the critical skills needed for Big Data Analytics is proficiency in data management and data manipulation. This includes the ability to collect, clean, and transform data from diverse sources into a format suitable for analysis, emphasizing the importance of data integration, data preprocessing, and data quality assurance as foundational skills for working with Big Data effectively.

Another crucial skill highlighted is data analysis and statistical modeling. Organizations must have individuals with expertise in statistical techniques, machine learning algorithms, and data visualization to extract meaningful insights from the vast amounts of data. The ability to identify patterns, detect anomalies, and derive actionable insights is essential for making informed decisions and driving value from Big Data Analytics. Furthermore, the article emphasizes the

importance of domain knowledge and subject matter expertise. Understanding the context and nuances of the specific domain in which Big Data Analytics is being applied is vital. This includes knowledge of relevant industry trends, business processes, and domain-specific challenges. The article suggests that individuals with a strong domain background can effectively interpret the analytical results and translate them into actionable recommendations. In addition, the importance of communication and collaboration in particularly highlighted in the article, suggesting that Individuals working in Big Data Analytics should possess excellent communication skills to effectively convey complex findings and insights to diverse stakeholders. Collaborative skills are also crucial for working in multidisciplinary teams, where individuals from various backgrounds collaborate to tackle complex analytical challenges.

In interviews conducted with professionals in the field, the same skills and capabilities were echoed as crucial for success in Big Data Analytics. They emphasized the significance of data management, statistical analysis, domain expertise, communication, collaboration, adaptability, and continuous learning. They confirmed that these skills are instrumental in effectively utilizing Big Data Analytics to generate valuable insights and drive business outcomes. In conclusion, the analyzed article and the insights gathered from the interviews provide valuable perspectives on the skills and capabilities needed for Big Data Analytics. By cultivating these skills and capabilities, organizations can leverage the full potential of Big Data Analytics to gain valuable insights, drive innovation, and make informed decisions.

5.2. Recommendations for organizations to create value from BDA based on the findings

At the end of this study, considering all the findings in the interviews and from different publications and articles, I believe that entering this realm requires careful consideration and strategic planning. For a new company looking to harness the power of data, there are several key aspects that should be considered.

First and foremost, it's important to establish a clear strategy that aligns with the company's goals and objectives. By identifying specific problems or areas of opportunity that can be addressed through BDA, a well-defined roadmap for implementation can be developed. This strategy will serve as a guiding light, ensuring that our efforts are focused and purposeful in utilizing data analytics effectively. To support BDA initiatives, building a skilled and diverse team is vital. Hiring individuals who possess the right combination of technical skills, such as programming, data engineering, and data science, along with domain knowledge relevant to our industry, will

be crucial. A diverse team will bring fresh perspectives and insights to the table, fostering creativity and enhancing the overall effectiveness of our BDA projects.

Investing in the necessary infrastructure and tools is another critical consideration. It must be ensured to have a robust data storage and processing systems in place to manage the large volumes of data involved in analytics. Additionally, selecting suitable analytics platforms and software that accommodate to our specific needs will enable us to unlock the full potential of BDA and extract valuable insights from our data. Data governance and quality standards should not be overlooked. Establishing strong processes for data collection, cleansing, and storage, following industry best practices, will be vital. It's essential to set high standards for data quality and integrity, ensuring that our analytics results are accurate, secure, and compliant. By prioritizing data governance, we can confidently rely on the insights derived from our data analytics efforts.

Taking an incremental approach to BDA implementation is wise. Starting with small pilot projects allows us to test and validate our initiatives in a controlled environment. We can learn from these initial efforts, iterate on our approaches based on real-world feedback, and gradually scale up to larger projects. This approach minimizes risks, identifies challenges early on, and allows us to fine-tune our BDA capabilities for long-term success.

Lastly, measuring and communicating our success is crucial. Defining key performance indicators (KPIs) will help us track the impact and value generated by our BDA initiatives. Regularly evaluating outcomes against these KPIs enables us to gauge the effectiveness of our efforts. Furthermore, effectively communicating our successes and the benefits achieved to stakeholders throughout the organization fosters a sense of confidence and encourages further adoption of BDA.

As a new company, embracing these considerations and implementing these suggestions will position it for success in the realm of Big Data Analytics. By adopting a strategic approach, building a skilled team, investing in the right infrastructure, prioritizing data governance, fostering a data-driven culture, taking an incremental implementation approach, and effectively measuring and communicating our achievements, it can unlock the power of data analytics and drive meaningful insights for its business growth and innovation.

6. Summary

Big data analytics (BDA) has appeared as a critical capability for organizations seeking to remain competitive in today's data-driven economy. Despite its potential benefits, however, the organizational challenges associated with implementing big data analytics initiatives can be daunting. This thesis examines the key organizational structures, capabilities, and culture that are necessary to create value from big data analytics. In what follows, I present an overview of the thesis.

Chapter 1

This chapter explores the importance of effectively organizing organizations to extract value from big data analytics (BDA). While the generation and accumulation of vast amounts of data have become prevalent, possessing data alone does not guarantee success. The chapter emphasizes that successful firms distinguish themselves by their ability to manage and utilize data effectively. The research question guiding this thesis is:

How can organizations effectively organize themselves to create value from big data analytics?

The chapter highlights that BDA involves collecting, processing, and analyzing extensive datasets to derive meaningful insights for strategic decision-making. However, deriving value from BDA requires more than just tools and technologies. Organizational structures and processes play a crucial role in enabling effective data collection, storage, and analysis. To address the research question, a qualitative study was conducted, collecting primary data through interviews with individuals from a company extensively using BDA. The focus was on organizational factors facilitating value creation, such as structure, culture, governance, and processes.

In summary, this thesis aims to contribute to the existing research on BDA by investigating how organizations can effectively organize themselves to create value. By providing insights into organizational structures and processes that facilitate value creation from BDA, the study can assist organizations in leveraging this technology to drive strategic decision-making and gain a competitive advantage.

Chapter II

The second chapter of my thesis delves into the organizational structures and capabilities necessary for the effective implementation of big data analytics (BDA) initiatives. The success of these initiatives heavily relies on the organization's structure, culture, and ability to address challenges.

First, I discussed the research conducted by McAfee et al. (2012), which revealed that organizations prioritizing the use of BDA in decision-making outperform their counterparts and gain a competitive advantage. The study emphasized the significance of organizational structure, highlighting that organizations with flatter structures and decentralized decision-making processes are more successful in implementing BDA. Such structures enable flexible decision-making and the swift implementation of insights derived from BDA. On the other hand, organizations with hierarchical and rigid structures face challenges in utilizing BDA effectively due to slow decision-making processes and difficulties in cascading insights throughout the organization.

In addition to structure, the study emphasized the importance of fostering a culture that values data-driven decision-making, experimentation, and innovation. A data-driven culture requires a mindset shift within the organization and a willingness to take risks and experiment with data-driven approaches. Organizations that promote and support such a culture are more likely to succeed in their BDA initiatives.

Furthermore, the study highlighted the significance of having the right capabilities and skillsets within the organization to implement and leverage BDA effectively. This includes proficient data analysts, data scientists, and IT professionals who can extract valuable insights from vast datasets and translate them into actionable recommendations. Having these experts ensures that the organization can make informed decisions based on BDA insights.

Moving on, Sivarajah et al. (2017) explored the impact of organizational culture on BDA initiatives. Their study revealed that organizations with a culture that supports, and values BDA are more successful in making use of these tools and technologies. Cultivating a data-driven culture involves recognizing data as a critical asset and fostering collaboration and communication across different departments. This culture not only enhances decision-making but also promotes innovation and creativity within the organization.

O'Leary (2016) identified challenges and success factors for organizing BDA initiatives. Challenges include data quality issues, data integration challenges, and the need for specialized talent. To overcome these challenges, strong leadership, effective communication, and alignment with business goals and objectives are crucial. These success factors ensure that BDA initiatives are managed effectively, maximizing the value derived from big data analytics.

Stelmaszak and Kline (2023) emphasized the importance of managing embedded data science teams within organizations. As data science teams become increasingly embedded, managers face new challenges. The authors discussed challenges such as managing diverse skill sets and

establishing clear roles and responsibilities. To address these challenges, creating a supportive organizational culture and establishing communication protocols are essential.

Snow et al. (2017) argued that digital transformation requires a fundamental redesign of the organization's structure, processes, and culture. They outlined key elements of a digital organization, including agile decision-making processes, a data-driven culture, and a focus on customer experience. This framework is particularly relevant for organizations seeking to leverage big data analytics to create value.

Billinger and Workiewicz (2019) explored the shift from traditional hierarchical structures to new forms of organization that emphasize collaboration, flexibility, and agility. They discussed the characteristics of these new forms of organization, such as distributed decision-making and employee empowerment. While implementing these new structures may pose challenges, the potential benefits include increased innovation and employee engagement.

Günther et al. (2022) focused on how organizations can create value propositions using data. They presented a framework for data-driven value proposition creation, emphasizing a collaborative and iterative process involving cross-functional teams. The article highlighted the importance of data governance and ethics in the value proposition creation process. Organizations must establish guidelines and frameworks to ensure responsible and ethical use of data, considering privacy concerns and legal regulations. By incorporating data governance and ethics into their practices, organizations can build trust with customers and stakeholders, enhancing the value of their data-driven initiatives.

Moreover, Ransbotham et al. (2019) discussed the role of leadership in driving successful BDA initiatives. Leaders play a crucial role in fostering a data-driven culture and promoting the use of BDA in decision-making. They need to champion the adoption of BDA, allocate resources appropriately, and provide support for the development of data-related capabilities within the organization. Effective leadership ensures that BDA initiatives align with the strategic goals of the organization and drive positive outcomes.

To summarize, the second chapter of the thesis explores the organizational structures and capabilities necessary for the successful implementation of big data analytics initiatives. It emphasizes the importance of organizational structure, culture, and leadership in enabling effective use of BDA. The chapter discusses the significance of flatter and decentralized structures, data-driven cultures, and the presence of skilled professionals in leveraging BDA effectively. Additionally, it highlights the challenges faced by organizations and presents success factors such as strong leadership, effective communication, and alignment with business goals.

By considering these organizational aspects, organizations can maximize the value derived from big data analytics and gain a competitive advantage in today's data-driven business landscape.

Chapter III

In this chapter, I focused on the methodology employed in my study. In this chapter, I outline the research approach and design, the use of interviews as the primary source of data, sample selection and description, interview protocol, and data collection procedures. The main objective of this chapter is to provide a detailed account of the methodology I used to investigate the organizational factors contributing to successful big data analytics implementation.

For my study, I employed a qualitative research approach, opting to conduct interviews with informants who have experience managing big data analytics projects in various organizations. To select the informants, I leveraged my professional networks and recommendations, recognizing the importance of utilizing social networks for qualitative research purposes.

The interviews served as the primary method for data collection, as they allowed me to obtain in-depth insights and perspectives from professionals directly involved in big data analytics initiatives. By conducting interviews, I aimed to uncover common themes, patterns, and valuable insights that could inform organizations seeking success in the realm of big data analytics.

In conducting my research, I acknowledged that there might be limitations in terms of representativeness across industries or organizational contexts. However, existing literature supports the notion that qualitative investigations can provide valuable insights applicable to a range of organizations. Qualitative studies allow for a deep exploration of the subject matter, facilitating the generation of rich, context-specific knowledge that strengthens the validity and relevance of the findings.

Throughout this chapter, I emphasize the importance of fostering a data-driven culture within organizations to drive successful big data analytics initiatives. This involves promoting data literacy, encouraging data-driven decision-making, and cultivating an environment that supports experimentation and innovation.

I delve into the advantages of using interviews as a research method, as they provide in-depth and detailed responses, allowing for a comprehensive understanding of the complexities inherent in big data analytics initiatives. Additionally, interviews offer a dynamic and interactive environment where I could seek clarification and follow-up on responses, unearthing deeper insights and underlying motivations. The flexibility of interviews in adapting questions and probes based on participant responses further facilitated an organic and adaptive research

process. Moreover, interviews provided a conducive setting for discussing sensitive or complex topics, fostering trust and openness among participants.

Nevertheless, I acknowledge the limitations associated with interviews as a research method, such as the potential for interviewer bias and social desirability bias. To mitigate these biases, I employed a structured interview protocol, ensured that interviewers remained impartial through training, and emphasized the importance of honest and open responses. These measures aimed to enhance the validity and reliability of the data I collected.

I also describe the process of sample selection, which involved a combination of purposive and snowball sampling methods. By utilizing snowball sampling, I could access a wider range of suitable interviewees, particularly in studying populations that are challenging to reach. While acknowledging the limitations of snowball sampling, such as potential biased samples, I interpreted the findings within this context.

The participants in my study were individuals working in the big data environment at a specific Italian consulting company. I selected a diverse sample, including data analysts, data scientists, project managers, and consultants with varying levels of experience in the big data analytics industry. This selection aimed to capture a range of perspectives and insights from professionals directly involved in big data analytics projects.

I provide detailed information on the interview protocol and data collection procedures. The interview protocol consisted of a set of questions categorized into three main areas: organizational structure and culture, project management, and technical infrastructure. I conducted the interviews face-to-face, with the participants' consent, and recorded them for transcription and analysis. To ensure the quality of the data, I conducted a pilot study, established rapport with participants, employed probing techniques during the interviews, and reviewed the transcripts for accuracy.

Chapter IV

Chapter 4 of my thesis focuses on the implementation of big data analytics within our organization. The chapter begins by providing an overview of the conducted interviews, highlighting the roles of the interviewees and the duration of each interview. This information gives a glimpse into the perspectives and expertise that contribute to our big data analytics efforts.

I then delve into the establishment of our dedicated Data Science department, known as DataScienceExp, which has played a pivotal role in driving the growth of data analytics since 2013. The department boasts a high percentage of certified members who continuously engage in training and development to ensure their expertise remains up-to-date. Equipped with advanced tools and technologies, including analytics software, cloud-based computing resources, and data visualization platforms, our Data Science team is capable of effectively analyzing and processing large volumes of structured and unstructured data from diverse sources.

Collaboration emerges as a crucial aspect of our Data Science efforts, as the team closely collaborates with other departments within the organization, such as marketing, finance, and operations. This collaborative approach allows our Data Scientists to gain a deep understanding of the specific challenges and opportunities faced by each department, leading to the development of tailored, data-driven solutions for various business functions. I provide an example of an initiative undertaken by our Data Science department, which involved the development of a predictive analytics model for demand forecasting. By leveraging historical sales data, market trends, and external factors, our team successfully built a robust forecasting model that optimizes inventory management and production processes.

The chapter also explores the value created by big data analytics for different stakeholders. From an organizational perspective, big data analytics provides insights that drive better decision-making, improved operational efficiency, and increased revenue. By analyzing large volumes of data, organizations can identify patterns, trends, and correlations, enabling them to optimize processes, target marketing efforts, and identify new business opportunities. For customers, big data analytics enables personalized products, services, and experiences, as organizations gain insights into individual preferences and tailor their offerings accordingly. Additionally, employees benefit from actionable insights and information that empower them to make data-driven decisions, drive innovation, and enhance performance.

To support our big data analytics initiatives, we implemented organizational changes in roles, responsibilities, structure, resources, coordination, and control. This included establishing the DataScienceExp department, introducing data-related positions, centralizing data analytics, allocating additional resources, and implementing training programs. These changes have laid a solid foundation for effective utilization of big data, enabling data-driven decision-making, fostering innovation, and driving business success.

Data privacy and ethical aspects are also addressed in the chapter, emphasizing the importance of collaboration with the ITSec department to ensure data security and compliance. Working

together, DataScienceExp and ITSec establish robust data governance frameworks, implement access controls, and provide training programs to promote responsible data handling.

The chapter further explores the project management approach employed for prioritizing and managing data analytics projects. Strategic alignment, value assessment, resource allocation, consideration of dependencies, and adherence to a robust project management framework are key aspects of our approach.

Challenges in the adoption of big data analytics are discussed, including data quality, data integration, and data privacy. Measures such as data governance practices, data cleansing techniques, integration frameworks, and security protocols have been implemented to overcome these challenges and ensure the reliability and effectiveness of our big data analytics initiatives.

Lastly, the chapter highlights the skills and capabilities required for successful implementation of big data analytics initiatives. Programming skills, communication skills, and reporting skills are identified as essential, alongside continuous learning and adaptability to emerging technologies and industry trends.

Chapter V

Chapter 5 provides a summary of the research findings obtained from interviews and literature review. The content is presented in Table 2, which compares key points derived from the interviews with the perspectives presented in the literature. The purpose is to identify commonalities and differences in viewpoints, providing a comprehensive understanding of the interviewees' perspectives.

The summary of the research findings includes the following points:

1. Integration for Big Data Analytics: The establishment of a Data Science department and collaboration between Data Science teams and business units are essential for leveraging big data analytics. By aligning Data Science initiatives with strategic business goals and fostering collaboration, organizations can drive innovation and enhance the impact of data-driven insights.
2. Creating value from Big Data Analytics: Big Data Analytics has the potential to drive better decision-making, improve efficiency, and increase revenue. Analyzing large volumes of data helps identify patterns, trends, and correlations related to customer behavior, market dynamics, and business performance, leading to optimized processes, targeted marketing efforts, and the identification of new business opportunities.

3. Organizational change to support Big Data Analytics: Companies need to redefine roles and responsibilities, establish dedicated data analytics teams or departments, and promote collaboration between data teams and business stakeholders. Implementing Big Data Analytics requires a reevaluation of the organizational structure to facilitate coordination, knowledge sharing, and alignment between data scientists and business teams.
4. Data Privacy and Ethical aspects in the adoption of BDA: Organizations must ensure data privacy through robust security measures, data encryption, access control mechanisms, and data anonymization techniques. Regular security audits and privacy impact assessments are necessary to protect sensitive data and comply with relevant regulations.
5. Data Analytics project management: Prioritizing factors such as potential business impact, strategic alignment, project feasibility, and urgency is crucial for successful implementation of Big Data Analytics projects. Organizations should consider the expected outcomes, benefits, technical readiness, and timeline when prioritizing projects.
6. Challenges in the adoption of Big Data Analytics: Challenges include data quality issues, data governance practices, and data privacy and security concerns. Ensuring data accuracy, completeness, consistency, and timeliness is crucial. Implementing automated processes, data cleansing techniques, and algorithms can address data quality issues.

In sum, the findings highlight the importance of integration, value creation, organizational change, data privacy, project management, and addressing challenges in successfully adopting Big Data Analytics.

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