International Master in Management

The client companies' awareness of Business Intelligence

From the perspective of a consulting firm

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Abstract

Endless data sources will open a promising development path for businesses in the current information technology era. However, how to process such a large amount of information into the necessary data? This dilemma will be handled by Business Intelligence (BI). This technology-driven process will help businesses take full advantage of the benefits that information on the Internet brings. Business intelligence is playing an increasingly important role in and is increasingly being applied across a wide variety of industries to help businesses improve their digital marketing performance. The research in this article was done to better understand the perception of businesses about the importance of Business Intelligence in this digital age. The author has conducted interviews with nine people who are consultants in a typical consulting firm in Paris, France, namely Equancy. These are people who work with many different clients across different tasks, functions, and industries. The findings show that businesses really have the first perception of this technology. Some companies have successfully applied and have had positive results, through which they satisfied and appreciated the importance of BI. At the same time, consulting firms also play a significant role to help client companies access this solution more easily and quickly, helping companies achieve the necessary KPIs in real-time and make data-driven decisions for digital marketing strategies, allowing them to target the right customers as well as save money on digital marketing campaigns. We recommend taking more qualitative approaches at more consulting firms and with more experienced consultants to improve the credibility of the information and increase the depth of the research paper.

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I. Introduction

The concept of Business intelligence (BI) is gradually becoming more popular and widely applied in the marketing industry. Business Intelligence is a technology-integrated process that businesses use to control massive amounts of data coming from a variety of sources and harness that data to help them make effective decisions. more in its business. BI is present in all businesses such as supermarkets, banks, telecommunications, etc., which are places that need to collect and process huge amounts of data. Therefore, BI has very high applicability when the enterprise's data source grows over time. It is no longer a strange term in the marketing industry in general and is gradually becoming an effective tool for marketers in particular. Supporting the processing of a lot of information quickly and accurately, BI has opened many opportunities for brands, helping them understand the habits, needs, and preferences of customers, so that it becomes easier to make suitable recommendations to each specific target customer group than before, helping to improve customer experience, and further, increase customer loyalty to the business. As a result, when a company becomes larger, in the context of more customers and larger data information to be processed, can deal with data processing problems, or gather data from various sources, to make real-time reports with greater reliability, thereby helping to make decisions that are logical and based on data (data-driven decision making) rather than feelings, revenue and profit could be also enhanced and improved and the cost could be reduced in the long run. This literature review will cover the concept of marketing, digital marketing. At the same time, it will also cover the concept of BI and how BI is applied in digital marketing, and the dynamic business intelligence capabilities model.

II. Literature review

1. Marketing, digital marketing

1.1. Marketing definition

Marketing is a broad industry and there are many definitions of it. Baynast et al. (2017) said that marketing is the strategy of adaptation of organizations to competitive markets, to influence in their favor the behavior of the public on which they depend, by an offer whose perceived value is durably superior to that of competitors. From another perspective, marketing is the activity, collection of institutions, and procedures for generating, communicating, providing, and exchanging valuable services for consumers, customers, partners, and society as a whole. “Marketing operations are focused on an organization's attempts to meet client demands and requirements with competitively priced products and services” (Green & Keegan, 2020, p. 26).

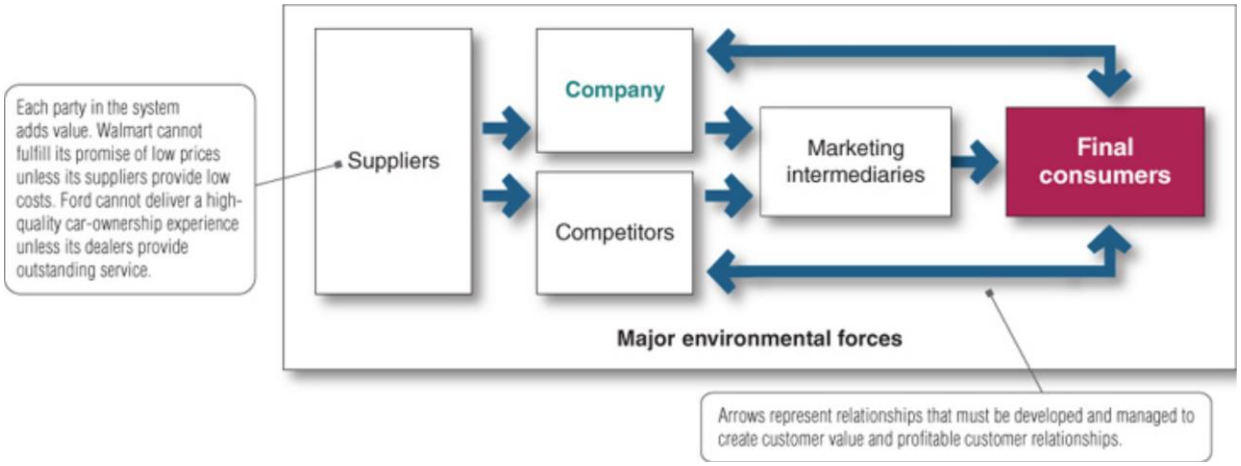

Figure 1: A model marketing system. Source: (Kotler & Armstrong, 2021)

From Figure 1, marketing includes servicing a market of final consumers. To do so, the firm and its rivals could conduct market research and engage with customers to learn about their needs (Kotler & Armstrong, 2021). Each party in the system contributes to the next level's value and relationships that must be formed and managed are represented by the arrows; As a result, a company's ability to engage clients and establish lucrative relationships is determined not just by its own activities, but also by how effectively the entire system meets the demands of end-users (Kotler & Armstrong, 2021). For example, “Walmart cannot fulfill its promise of low prices unless its suppliers provide merchandise at low costs. And Ford cannot deliver a high-quality car-

ownership experience unless its dealers provide outstanding sales and service” (Kotler & Armstrong, 2021, p. 29).

1.2. Digital marketing definition

Digital marketing is defined by Chaffey & Ellis-Chadwick (2016) as the use of digital technologies and media in conjunction with traditional marketing media to achieve marketing goals. It encompasses the use of paid, owned, and earned digital media platforms, as well as other technologies such as customer relationship management databases (Nagyová, 2020). Digital marketing is gradually playing an indispensable role in the marketing activities of a business, especially since its role is shown more clearly in the context of the digital age and the COVID-19 epidemic. With social distancing and the mass closure of physical stores, the internet and social media are among the only means that brands can use to reach their customers as well as advertise their products. “Only businesses that fully adopt digital marketing in its entirety can survive the coming marketing wave” (Nair & Gupta, 2020, p. 1139). The ability and convenience of two-way communication are one of the most fundamental aspects that distinguish the digital media marketing environment from a traditional media marketing environment, so that customers and businesses, as well as customers themselves, may communicate with each other (Rautela, 2021).

Many individuals misunderstand the concepts of digital marketing and online marketing by lumping them together. A type of advertising and marketing known as "internet marketing," usually referred to as "online marketing," utilizes the Internet to advertise goods and services to target markets and platform users (Alaimo & Kallinikos, 2018).

Online marketing and digital marketing share the same definition, although the latter goes much beyond just online advertising; Digital marketing utilizes a greater variety of promotional areas, whereas online marketing concentrates on content as well as advertising through the internet (Ivanov, 2022).

According to Kannan & Li (2017), the word "digital marketing" has developed over time and has been regarded as E-marketing, Internet marketing, and Web marketing by researchers, academics, and professionals in the previous literature. Although it can be seen that the usage of these terms has fluctuated over time, when looking at Figure 2, we can easily see that the term "Digital marketing" has been and is the most commonly used term worldwide, and the search interest for this term is increasing more and more.

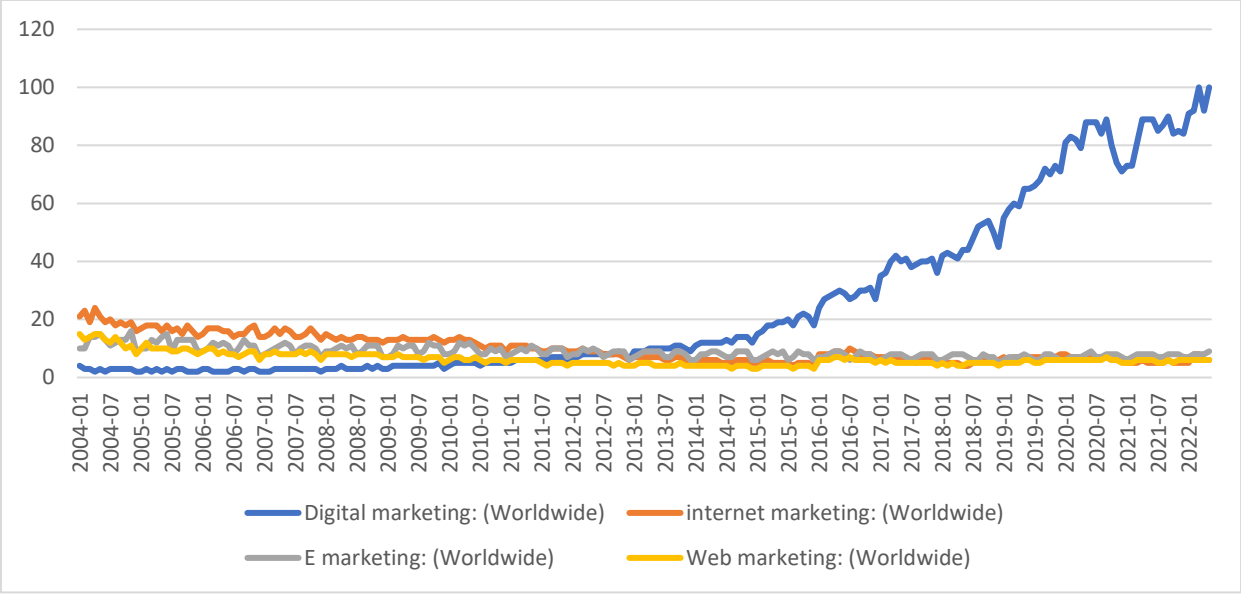

Figure 2: The popularity of different terms linked to digital marketing were used worldwide from 01/2004 to 01/2022. Source: (*Google Trends*, 2022)

Customers are able to continue following corporate information using digital marketing methods that have been simplified (Gangeshwer, 2013). Nowadays, many customers have access to the internet from anywhere at any time, and businesses are continuously updating information about their products or services; Customers are familiar with using the company's website to research products, make online purchases, and leave reviews (Sathya, 2015). Customers receive comprehensive information about the goods or services; They can evaluate other comparable products; Digital marketing offers consumers a 24-hour shopping experience (Sathya, 2015). In digital marketing, prices are transparent (Yulihasri et al., 2011).

2. Business Intelligence

2.1. Definition

Business Intelligence (BI) is a catch-all phrase that refers to the complete procedure of gathering, interpreting, compiling, evaluating, and extrapolating useful knowledge in a variety of business scenarios (Davenport, 2006). Business intelligence (BI) is a term for a group of procedures, structures, and tools that are used to transform unprocessed data into useful information (Vercellis, 2009). After that, the firm uses it to make decisions (Saeed, 2020). The BI process is used by organizations to compile information, enhance its value through analysis, and

provide the results to managers in order to address a variety of issues or respond to information requests; data on mergers and acquisitions, hiring, and competitive information about clients or competitors are all examples of BI projects (Park et al., 2010). Due to the expansion of corporate data and the extensive utilization of the Internet as a communication tool, BI research and industry advances have increased during the past few years (Chung & Tseng, 2012). A BI system helps knowledge workers or business owners better understand their industry or market and take timely, strategic decisions (Chaudhuri et al., 2011).

In fact, since the late 1990s, when BI was conceived of as a unified word, many brilliant researchers have undertaken the BI project by analyzing the important business data available (Chen et al., 2012). Early versions of business intelligence (BI) used a data-centric strategy for conventional data like patents, academic articles, or commercial data (Choi et al., 2020). Park & Yoon (2017) proposed a methodical approach as a representative analytical strategy to patent data that can suggest practical technology prospects to a technology-intensive company by extracting its technology capacity from its patents and trying to identify the technology portfolio of related firms through collaborative filtering. Their research is anticipated to be especially useful for small and medium-sized businesses with limited human capital and start-up funding by offering future paths in technology development that have been confirmed by major corporations (Choi et al., 2020). Additionally, Yoon & Kim's (2011) method can assist a variety of stakeholders, including researchers and R&D policymakers, to monitor the rapidly changing R&D trends by addressing the technical components explained in patents premised on their subject-action-object frameworks and visualizing a broad trend based on the network structure. Through the clustering of patents depending on their classification codes as well as the measurement of an emergence signal for each cluster word, Wang et al. (2019) suggested a patent-based approach to detect the emerging ideas in a target technology domain. In a similar vein, the majority of the analytical outcomes of the patent-based methodologies can assist the commercial firm's decision-making regarding R&D efforts or competitor surveillance (Choi et al., 2020).

It's interesting to note that traditional data, such as patents, are still used as the primary data, but some experts noted that the most recent trends in BI study are slowly moving their attention to evaluating customer-generated data (Choi et al., 2020). Additionally, Chung & Tseng (2012) added another dimension to the previous idea of BI by emphasizing the importance of online product reviews as a crucial data source for comprehending consumers and the industry. Indeed, by tracking client sentiments and determining their competitive position in the market,

numerous social media-based methodologies have given commercial enterprises or stakeholders access to a wealth of different and exciting business options (Pang & Lee, 2008).

A business intelligence system is composed of four main parts: a data warehouse with its source data, business analytics, a set of tools for manipulating, mining, and analyzing the data in the data warehouse, business performance management (BPM), for tracking and analyzing performance, and a user interface (such as a dashboard) (Mircea, 2012). 60 to 80 percent of the technical team's time is spent in the data warehousing environment. Its responsibility is to gather transaction information from one or even more operational databases, clean it up, model it, transfer it, and load it into the database system; Business users can query, report, mine, analyze, visualize, and most importantly take action on data stored in the data warehouse using analytical tools in an analytical environment; The technology team prepares them in advance and posts them on the company intranet because the bulk of business users only want to communicate with conventional reports (Eckerson, 2003). Using sophisticated technologies like neural computing, predictive analytics, or advanced statistical approaches, data mining is the act of looking for undiscovered links or information in huge databases or data warehouses, it may also be used to look for information in text or web data (Turban et al., 2011).

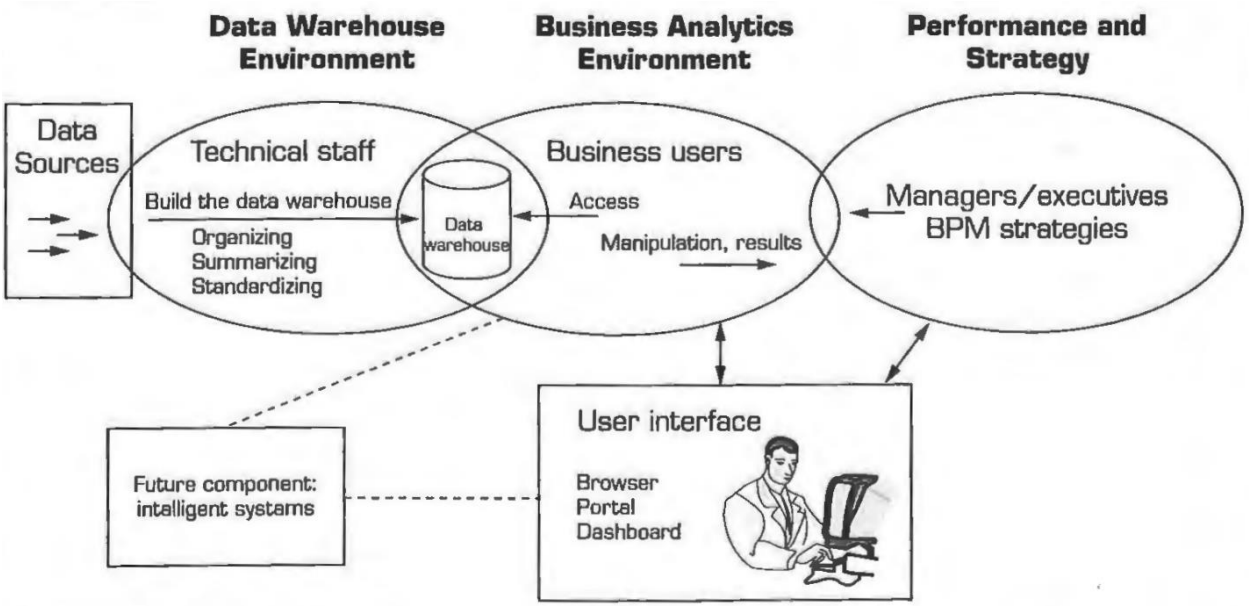

Figure 3: The Business intelligence's architecture. Source: (Turban et al., 2011)

2.2. Business Intelligence Tools

2.2.1. Business Intelligence tool categories

Organizations require several tools, programs, and technologies in order to implement BI, these aid in the collection, scrubbing, processing, and analysis of information. (Singer, 2001). The independence and distance of BI tools from many other operational systems is one of their main benefits, this segregation aids in preventing operating systems from having to process massive amounts of data that they aren't able to handle; Additionally, this enables businesses to pick the data they require from operational systems and add it to data warehouses; Furthermore, by providing knowledge about the outside environment that might aid in corporate strategy, it raises the strategic degree of the company (Fourati-Jamoussi & Narcisse Niamba, 2016). Moreover, BI technologies support analyzing financial data, predictions, and enable wiser decisions (Koupaei et al., 2016). BI tools come in a variety of forms today. The following are several of the most significant BI tool categories:

2.2.1.1. Data Warehouse

Data warehouses are used to store the vast amounts of data that organizations collect from their systems (Al-Hadad & Zota, 2016). Larson & Chang (2016) define a data warehouse as an “integrated, subject-oriented, non-volatile, time-variant data store”. According to Jukić et al. (2015), data warehouses are a type of storage that keeps analytical data isolated from operational databases. They are an essential component of the BI architecture, which serves as the organization's central repository for integrated data (Larson & Chang, 2016). In addition, they are utilized to examine and keep useful business-related transactional data (Etisalat et al., 2019). Data warehouses are used to help organizations achieve their strategic goals because they deliver real-time, pristine, and uniform data that is simple to access from a variety of sources (Al-Hadad & Zota, 2016; Jukić et al., 2015).

2.2.1.2. Data Mining

It is impossible to manually evaluate the amount of data that businesses have today, thus it is now essential for them to have database software that can assist in doing so (Etisalat et al., 2019). Data mining enables businesses to combine and unearth knowledge from a variety of integrated repositories, including data warehouses, databases, statistics, high-performance

computing, machine learning, pattern recognition, data visualization, neural networks, information retrieval, signal and image processing, temporal or spatial or data analysis, and others (Abdullah H et al., 2011). Additionally, data-mining tools employ algorithms to find patterns that can be used for predictive analysis, hypothesis formation, forecast testing, and reporting, as well as for the examination of complex data (Aschbacher et al., 2009; Mihai & de Jos, 2014).

2.2.1.3. Online Analytic Processing (OLAP)

The shortcomings of operational databases are resolved by online analytic processing (OLAP), which offers an aggregated solution that enables businesses to build and manage corporate data from warehouses for the analysis of data from several prospects (Cabibbo & Torlone, 1998; Ceci et al., 2013; Rouhani et al., 2012). OLAP is sometimes referred to as a cube or hypercube because it enables users to "query, browse and summarize" multivariate information in an engaging, effective, and dynamic way (Al-Hadad & Zota, 2016; Shariat & Hightower, 2007). Information that could be utilized later is stored in OLAP cubes, OLAP cubes are simple to use while being sophisticated in nature; Additionally, the two essential characteristics of OLAP cubes are hierarchy and linking in the network of cubes (Cristescu, 2016).

2.2.1.4. Dashboards and Scorecards

Digital dashboards assist in the examination of an organization's performance indicators and give enterprises a complete picture of the massive amounts of data that are gathered from various sources (Chen et al., 2012; Dagan, 2007; Lia, 2015). Skorka (2017) claims that dashboards are an "intuitive communication platform" that help an organization and the decision-making process because they contain gauges, dials, and alerts that indicate how the organization is performing concerning specific parameters at particular times so that corrective measures can be taken (Dagan, 2007).

Scorecards, on the other hand, are similar to report cards that display the KPIs for every division of the company; This enables management to get a comprehensive picture of how each division is performing relative to predetermined KPIs (Etisalat et al., 2019). Additionally, it assists in identifying the areas that fall short of the goals and shows the relative degree to which they are falling short of their objective (Dagan, 2007). The software uses models like the Balanced Scorecard, created by Kaplan and Norton, as well as "Total Quality Management, Six Sigma, or other methodologies" to build KPIs that analytically account for all the important aspects of the

organization (Dagan, 2007). So as a result dashboards and scoreboard allow business to collate, analyze and visualize data, which helps to make better business decisions and strategic plans.

2.2.2. Business Intelligence tools and software

2.2.2.1. BI tools software

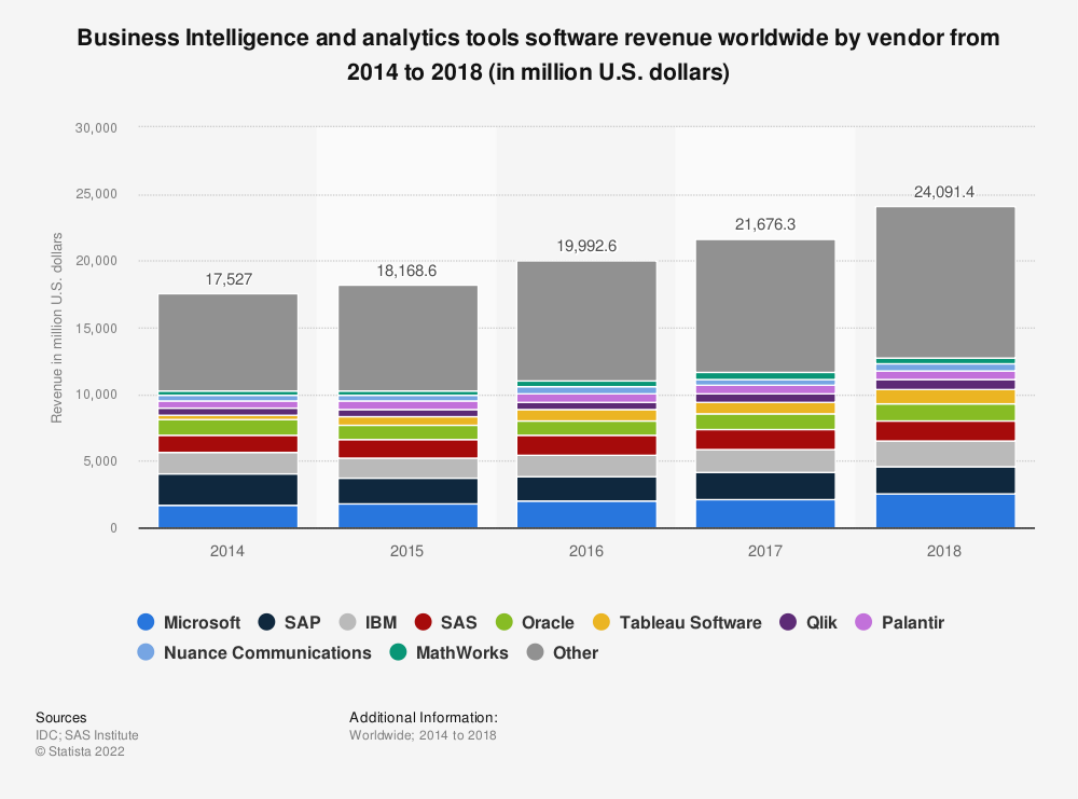

Figure 4: Business Intelligence and analysis tools software revenue worldwide by vendor from 2014 to 2018 (in million U.S. dollars). Source: (SAS Institute, 2019)

This statistic displays the worldwide revenue for business intelligence and analytics tool software from 2014 to 2018. According to the chart, it is evident that Business Intelligence and analytics tools are playing an more and more important role in the business operations of almost enterprises. Many companies are willing to pay for the BI which can be. The total revenue was recorded at more than 24 billion dollars in 2018, over two-thirds more compared to 17.5 billion dollars in 2014.

In the researched period, Microsoft was the market leader (with around 2.5B dollars in 2018) and followed by SAP (over two billion dollars in sales came from business intelligence and

analytics products in 2018 for SAP) and IBM (around 2B dollars in the same year). The tools took charge of significant revenue parts in the market including SAS, Oracle, Tableau Software, Qlik, Palantir, Nuance Communications, and MathWorks. Around half of the revenue of this industry was contributed by other tools.

2.2.2.2. Data source of BI

Data Format	Data Sources
Files	Excel, Text/CSV, XML, JSON, Folder, Share Point Folder
Database	SQL SERVER, ACCESS, ORACLE, IBM DB2, IBM INFORMIX, IBM NETEZZA, MySQL, Postgre, Sysbase, Teradata, SAP, Google Bigquery, etc.
Azure	Azure SQL database, Azure SQL Data Warehouse, Azure Blob Storage, Azure Table Storage, Azure HD Insight(HDFS), etc.
Online Services	Power Bi service, Share point online list, Dynamics 365, Microsoft Exchange Online, Salesforce, Google Analytics, Facebook, Github, etc.
Other	Web, SharePoint list, OData Feed, Active Directory, Microsoft Exchange, Hadoop File(HDFS), R Script, ODBC, OLE DB, etc.

Table 1: Details of Data sources. Source: (Bhargava et al., 2018)

Table 1 compares the BI tools that have been installed and tested, taking into account resource limitations like computer platforms, licensing, data sources, and pricing. According to Gowthami & Kumar (2017), those BI tools are widely used in enterprises to develop dashboards or data visualization. In conclusion, they advise to use fully open source or partly open source where the service provider handles the training, deployment, and ongoing maintenance, taking into account the size of the organization and initial investment costs.

BI Tool	License	Trail	Ease of Use	Training/ Forums	Platform	Data Integration	Pricing model	Price
Power BI	Commercial	Yes	Easy to install Simple to Use Security for data Live connections	Tutorials Videos Demo/Webinar Training and Document	Windows Android Iphone/I pad Web based	All	Free/Monthly Payment	$9.99
Qlik Sence	Commercial	Yes	Easy to install and import data	Tutorials Online Forums	Windows8 (Not on earlier versions)	All	Free/Monthly Payment/One-time payment.	$20
Tableau	Commercial	Yes	Importing data is easier.	Videos Tutorials Demos	Windows	All	One-time payment/Annual subscription	$500
Jasper Reports	Commercial	Yes	Simple preparation of visualizations	Demos Tutorials	Windows Android Web based	All	Quote based	By quote
SpagoBI	Fully Open source	Full version	Bit tricky	Forums Training and documents	Windows Linux	All	Quote based	By quote

Table 2: Comparison of BI tools. Source: (Gowthami & Kumar, 2017)

2.3. Benefit of Business Intelligence

Numerous tangible and intangible advantages are mentioned by organizations that have implemented BI solutions.

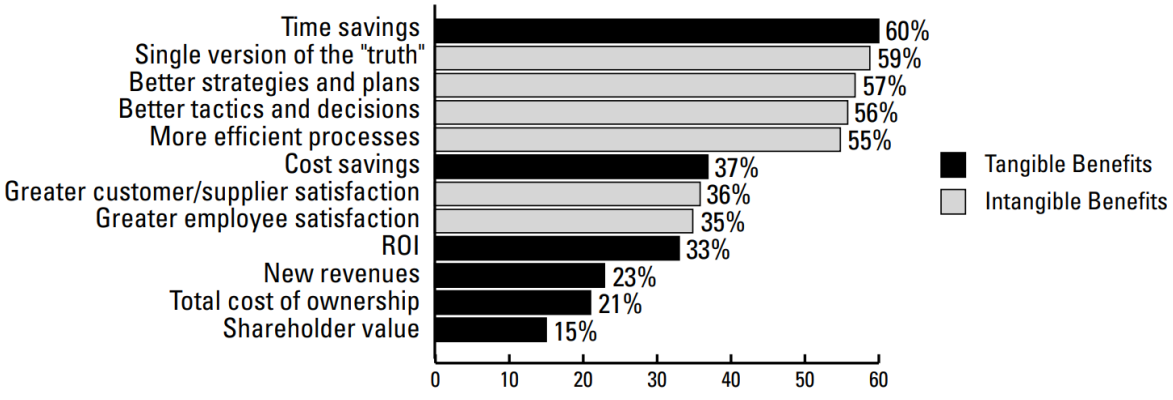

Figure 5: Value of Tangible and Intangible Benefits. Source: (Eckerson, 2003)

According to 510 participants who ranked the advantages' worth as "very high" or "high," a BI solution often provides benefits that are more intangible than tangible. Some of the benefits include being a “single version of the truth”, providing better strategies, more efficient processes or improving stakeholders’ satisfaction (customer, supplier, or employee).

The main advantage of BI to a business is its capacity to deliver precise information when required, including a real-time vision of the overall performance of the organization and its constituent elements (Turban et al., 2011).

It might be contended that the advantages of businesses embracing BI are:

- Collecting data from various sources and places, and conducting intelligent analysis for the business (Saeed, 2020).
- Better decision-making, increased effectiveness, productivity, sales, and profitability; Performance is positively correlated with how quickly a company can respond to shifts in the marketplace and customer behavior (Pang-Ning et al., 2016).
- Risk mitigation (Wu et al., 2014).

2.4. Application of BI in Digital marketing

An incomplete comprehension of the subject and loss-making activities are invariably consequences of having to manually digest a lot of information (Bhosale et al., 2020). Those processing frameworks of structured data handling structures, more commonly referred to as business intelligence, could be employed in everyday digital marketing operations as the best practice to prevent this and maintain an ordered workflow (Bhosale et al., 2020).

Business intelligence (BI) transforms valuable information into insight, making it possible to carry out a variety of tasks for an organization, including strategic insights, "what if" analyses, projections relying on historical data, evaluations of past and present performance, and projections of future trends (Negash, 2004).

Customer sales research is one of the primary functions of marketing analytics. Performing difficult forecasting, segmentation, and collaborative analyses of accounting data, as well as data from the internet, mobile, and geographic systems (GIS), is necessary to determine a marketing campaign's efficacy (Přikrylová, 2016).

The length of time a potential consumer stays in a marketing environment, the advertisements they are most likely to click on, the click-through rate (CTR), and consequently the cost per click

(CPC), may all be flexible studied by business intelligence tools; However, a few guidelines that establish the concept of this merger in succession can be described by Bhosale et al. (2020):

1) Managing the gathered data: The gathered data can be roughly divided into structured and unstructured categories. An advertiser receives raw data that must be processed from a variety of sources. The majority of this data may be organized, analyzed, and visualized utilizing BI tools, social media, analytics engines, and multiple analytical operations including cube and slice, drill through, drill down, sifting, and other analytical processes. The content created and written by individuals on different social media channels is not structured, so a business must utilize semantic analytics to access and analyze this data in order to extract measurable information from this unstructured data as well as make well-informed decisions.

2) Source and Segregation: After the data has been compiled, it is crucial to go back to its original location and determine what it is attempting to say. For instance, not every piece of information collected through a social platform's feedback form is worthwhile. As a result, not every piece of data must be processed. To determine the necessary instruments that will divide it up in subsequent cycles of research, segregation is crucial.

3) Determining metrics of judgment: To reflect on the topic at hand, each form of evidence must be analyzed using a set of criteria that assesses its veracity. To evaluate data from social media networks, statistical information from page clicks, visits, shares, likes, comments, and feedback is analyzed.

4) Creating a dashboard: Businesses employ dashboards that can respond and offer the executive a wide range of modification options in order to analyze patterns in the parameters specified earlier. An executive can properly align all the indicators and make inferences from them with the aid of a dashboard.

Modern BIS visualization tools, such as Scorecards and Dashboards, give decision-makers a helpful method to view information and data. Graphical trend analysis, single metrics, percentage share, capacity gauges, geographic maps, variance comparisons, and stoplights are just a few of the outcomes that can be seen. Complicated relationships and performance indicators can be presented in a way that is simple to grasp and digestible for time-pressed managers using a "Dashboard" type user interface design. More particular, these interface designs dramatically reduce the learning curve, increasing the likelihood that they will be used effectively (Hall, 2010).

5) Establishing Correlation: Here, it is important to note that a variable was required within that particular period. An ordinarily important factor might occasionally have no bearing on the outcome we're going for. If correlations are not managed with the utmost care, inappropriate modeling between a number of unclear variables may result.

3. Dynamic capabilities

3.1. Definition

Dynamic capabilities theory seeks to explain organizational performance as a function of the ability of the firm to alter its resources. Teece et al. (1997) have defined dynamic capabilities as “the firm's ability to integrate, build, and reconfigure internal and external competencies to address rapidly changing environments” (p. 516). When discussing capabilities, several authors point out some distinctions between competency, capability, and capacity (Vincent & Gannon, 2008). The attribute of being functionally sufficient or having enough knowledge, skill, and strength is known as competence (Olszak, 2014). Capability is a trait, faculty, or method that may be enhanced or developed. Individual competencies may be utilized and implemented via capability, which is a cooperative effort that can be deployed (Olszak, 2014). The ability to store, accept, or accommodate is known as capacity. (Olszak, 2014).

The phrase "core competence" was developed by Prahalad & Hamel (1990) to differentiate those skills essential to a firm's success and strategy. The activities that a company excels in above others and through which it consistently provides value to its products and services over time are known as core competencies. They develop gradually as a result of an organizational process that involves acquiring and learning to use organizational resources and skills.

Zollo & Winter (2002) also distinguish between ordinary or operational capabilities and dynamic capabilities. While dynamic capabilities (as all processes are) are employed to preserve the status quo, operational capabilities allow businesses to carry out their daily activities (Helfat et al., 2009). Dynamic capabilities, on the other hand, allow a company to continuously update its operational capabilities and, as a result, gain a long-term competitive edge (Olszak, 2014). Dynamic capabilities are the high-order capabilities and thus can be disaggregated into different capacities, such as the capacity for improving quality, the capacity for managing human resources, and the capacity for utilizing technologies (Chae & Olson, 2013).

3.2. Conceptualization of dynamic Business Intelligence capabilities

The definition of BI capacity, which is derived from the idea of dynamic capabilities, is an analytical dynamic, IT-enabled capability for enhancing decision-making and business performance (Chae & Olson, 2013). Various organizational traits and strategic objectives could necessitate the use of various BI capabilities. The relationship between BI capabilities and an organization's decision-making style relates to information availability and analysis (Hostmann et al., 2007). Isik et al. (2011) specify access to information and analysis capabilities as well as link them to the success of BI as a whole. According to Davenport & Harris (2017), an important component of the company strategy is analytical aptitude. BI capacity, according to Wixom et al. (2011), is a journey across extended periods of time during which basic capabilities are created.

Teece et al. (1997) has based his notion of dynamic capabilities on three clusters of actions: sensing opportunities, seizing opportunities, and transforming organizations (continued renewal). "**Sensing**" in the context of BI and business process management mostly refers to the recognition of the necessity to alter an organization's business processes, relationships with customers, and supplier relationships; “**Seizing**” refers to the search for and selection of change-related opportunities; The sociotechnical adoption of new business procedures within an organization is what is meant by "**transformation**" (Ortbach et al., 2012).

A company can improve two initiatives to increase its BI capacity. The first relates to the well-known concept of data exploration, whereas the second deals with data exploitation (Lavie et al., 2010). The limit of real knowledge and its abilities can be surpassed by an organization through data exploration, this could be interpreted as referring to new environmental relationships, commercial experiences, or technical capabilities; The investigation also involves the deliberate search for new knowledge sources, the enlargement of already-existing resources, the adoption of new behavioral orientations, and the development of new competences; Advanced web mining, data mining, intelligent agents, text mining, and search-based applications are some of the methods that can help with this; The use of available knowledge bases is part of data exploitation, it only discusses actual materials and refers to their in-depth study (Olszak, 2014).

Davenport & Harris (2017) define five levels of analytical capability: analytically impaired, localized analytics, analytical aspiration, analytical companies, and analytical competitors; According to the first stage, organizations have some ambition to grow more analytical, but they lack both the determination and the skill to do so at this time, they encounter some significant obstacles, both technical and human and could not have the necessary tools, software, or

expertise to conduct thorough analysis; reporting with areas of analytical operation characterizes the second level, or "localized analytics". Localized analytics companies disagree that the technologies they have access to are simple to understand (Smith et al., 2019). While those operations bring about economic gains, they are insufficient to have an impact on the competitive strategy of the organization. Executives engage in analyses at the third stage, known as "analytical aspirations", by coordinating resources and establishing a timeline to develop a robust analytical capability (Tan et al., 2011). The development of world-class analytical abilities at the corporate level is the main goal of the "analytical firms" stage; the organizations carry out the strategy created in the earlier stage, significantly advancing the development of the culture, sponsorship, skills, data, strategic insights and technology required for analytical competitiveness (Olszak, 2014). At the highest level of BI maturity, BI permeates every aspect of corporate culture and every aspect of the business; BI offers adaptability for coping with the rapid changes in company and information needs (Olszak, 2014). Users get access to data and analysis required to develop company value and have an impact on performance (Olszak, 2013). Clients, suppliers, and other company partners can all use BI (Tvrdíková et al., 2012).

BI CAPABILITIES MATURITY MATRIX

BI capabilities area	Analytically impaired	Localized analytics	Analytical aspiration	Analytical companies	Analytical competitors
Governance	Lack of vision and plan	Businesses plans for limited departments	Integrated business strategy	Have an enterprise BI strategy	BI strategy oriented on customers, suppliers etc.
Culture	No flexibility and agility	Low support from senior executives	Users are encouraged to collect, process analyze and share information	Establishing a fact-based and learning culture, skill training in BI	Learning from customers, suppliers, communities of practice, social media
Technology	Missing/poor data, Unintegrated systems	Missing important data, Isolated BI efforts	Proliferation of BI tools	High- quality of data, integrated knowledge repositories	Enterprise-wide BI architecture largely implemented
People	Users do not know their own data requirements or how to use them	The users take the first BI initiatives	Users try to optimize the efficiency of individual departments by BI	Users have high BI capabilities, but often not aligned with right role	Users have capabilities and time to use BI
Processes	Users do not know business processes	Identification of basic business processes	Standardization of business processes, and building best practices in BI	Business process management based on facts	Broadly supported, process-oriented culture based on facts
Change & Creativity	Fear of change, no creativity	Risk management for selected business process, poor and limited creativity	Building the best practices for change management, individual and team creativity	Integrated risk management, team and organizational creativity	Cooperation with competition, organizational creativity, creative environment

Table 1: BI capabilities maturity matrix. Source: (Olszak, 2014)

Six capability domains, including governance, culture, technology, people, processes, and change management & creativity, are included in the framework for dynamic BI capabilities (Olszak, 2014). These areas were formerly provided separately and utilized for various tasks and goals.

Governance is the system for regulating BI resource use within an organization and the allocation of BI ideas with organizational goals; additionally, to adapt to shifts in dynamic contexts and reduce resistance to change, it needs ongoing renewal of organizational skills and BI resources (Cosic et al., 2012).

The assumptions, values, standards, and behavioral cues shared by an organization's members make up its culture, which is frequently referred to as the "personality of the organization", they develop over time and result in methodical approaches to data collection, analysis, and dissemination, it has an impact on how decisions are made (Cosic et al., 2012).

People are all employees who use BI as a component of their activity inside the corporation; Initiatives utilizing business intelligence are considered as knowledge-intensive and need technical, business, managerial, and entrepreneurial qualities (Cosic et al., 2012).

Technology is defined as the creation and application of data, software, and hardware throughout BI operations; It involves the management of integrated, high-quality data resources, the smooth connectivity of BI systems with the other organizational information processes, the transformation of data into insights through reporting or visualization systems, and the utilization of more sophisticated statistical analysis tools to identify patterns, forecast trends, and improve business processes (Cosic et al., 2012).

Information gathering, selection, aggregation, analysis, and distribution activities make up a process; while some of these tasks fall under the purview of the BI team, others are shared by the BI team and the business divisions (Davenport, 2006). Both internal and external procedures are two categories into which processes can be separated; the first category mostly deals with accounting, finance, production, and human resources, while the second group focuses on overseeing and addressing supplier and customer interactions (Davenport, 2006).

Organizations' capacity for change management and creativity allows them to adapt to changing situations, organizations now more than ever must adapt quickly; As a result, managing and adapting to organizational change is a crucial skill needed in the modern workplace (Olszak, 2014). An strategy for guiding people, teams, and organizations toward a desirable future state is called change management; BI necessitates ongoing growth and adaption to meet changing demands and organizational expectations; While organizational creativity refers to a company's capacity to come up with fresh and practical solutions to handle fast evolving opportunities and challenges through prompt, market-focused decisions and to conceptualize radical shifts in its resource base (Olszak, 2014).

III. Research question

The way companies approach their customers has also changed and is changing constantly in the digital age. Digital marketing is now becoming an integral part of a business to be able to promote the brand and market it through media, helping to convert target customers into buyers. The important goal of Digital Marketing is to build a brand, and target conversion into potential customers, thereby achieving the goal of increasing revenue for the business. Besides, along with the trend of digital transformation across the globe, business intelligence is becoming an important assistant for marketers to help digital marketing activities become more effective, accurate, and faster than ever, creating a competitive advantage for businesses. Standing as a consulting firm working with many large and small companies and corporations from many different industries, the discussed question is:

From the perspective of a consulting firm to what extent are company clients aware of the importance of BI to improve their marketing performance?

Sub-questions:

How are customers recognizing the recent emergence of BI in digital marketing?

How do customers react to this emergence of BI in digital marketing?

How do customers seek a way to integrate BI into digital marketing in their business?

What applications of BI have been, are, and will be applied by customers in their digital marketing strategy?

How do customers see the results of applying BI in digital marketing?

IV. Subject under empirical investigation

Jean-Paul Lafaye founded Equancy, an independent consulting firm, in 2000. Charlotte Weill has been in charge of the company's operations since 2010. The company, which has more than 100 consultants working for it in France, India, and Dubai, blends data science and strategic marketing expertise in its teams, which also include engineers and data analysts (Trocadero Capital Partners, 2019) The Group assists Key Account clients (CAC 40 groups or global industry leaders) in developing and implementing their growth strategies by utilizing extensive industry expertise and data in all of its forms. In recent years, activities have become more focused on five key commercial sectors: consumer goods, distribution & e-commerce, tourist & entertainment, and banking & insurance. The missions center on four subject-matter experts: Strategy advice, Information Technology, Customer Service and Experience, and Transformation of HR. Equancy additionally stands apart as a result of an internal R&D facility run by Chief Data Scientist Hervé Mignot, as well as the team's proficiency with technology and data under the direction of Didier Richaudeau, who is responsible for Data-Driven activities Together, they tackle important technology problems like machine learning, robotic process automation (RBA), blockchain, and data science. In 2018, Equancy's operations generated a gross margin of €13 million. The company's management anticipates steady growth in 2019. In the upcoming months, the group intends to bring on new partners and quicken the implementation of its operations in Dubai and India. Strategic investments include The emergence of new economic sectors, The creation of new business knowledge in areas like pricing and advertising, The pursuit of new value-enhancing levers related to artificial intelligence, assisting businesses in the transformation of their data and customers by creating a "Data Acceleration" program for Comex and business lines.

V. Research methodology

1. Research design and method

Today, all business activities are focused on customers and digital technology, especially digital marketing activities. Therefore, to avoid information overload, many managers are urgently looking for solutions to gain control and make more effective use of organizational data. One of the best solutions to the above problem is to use Business Intelligence (BI) tools. But in fact, many businesses do not fully understand how BI helps the organization's operations, so they have not yet exploited the maximum efficiency that this tool brings. Therefore, the research paper was created to observe the awareness and maturity of businesses about Business Intelligence to help improve the performance of digital marketing activities.

This research will focus on and follow the Dynamic Capabilities model (Teece et al., 1997) including three phases of sensing, seizing, and transforming. Based on this model, the study will show the general situation of corporate customers' awareness of Business Intelligence and how they apply it to improve the performance of digital marketing, from the perspective of a consulting firm.

To achieve the goal of the thesis which is to understand the corporate customers' awareness of the importance of Business Intelligence to improve the performance of digital marketing, from the perspective of a consulting firm, a **qualitative** rather than quantitative methodology will be developed to answer the research questions. Qualitative research is the study of the nature of the phenomenon, including their quality, various incarnations, the circumstances in which they exist, or the viewpoints from which they can be observed, but excluding their scope, frequency, and position in an unbiased route of cause and effect (Philipsen & Vernooy-Dassen, 2004). The reason to choose qualitative research is that this is a fairly new and future-focused topic so there hasn't been much research on it yet, so a qualitative approach would allow for more exploratory approaches, and even bring up more different perspectives. This method is frequently used to answer unmeasurable and in-depth questions, such as what, why, and how. This method will also help to fully understand the thoughts of the interviewees, thereby helping to gather more in-depth information.

In this thesis, the design type will be selected as **a case study**, specifically at Equancy, a consulting company on digital and data transformation with headquarter in Paris, France. A case study can be defined as a type of research methodology that produces a thorough, multifaceted

comprehension of a complex problem in its actual setting; It is a well-known research strategy that is widely applied in a range of fields, especially the social sciences (Crowe et al., 2011).

Why did we choose to study at a consulting firm? Because in a consulting company, people will be working with many companies of different sizes, coming from many different industries and fields, such as banking & insurance, auto & mobility, distribution & e-commerce, tourism & entertainment, and consumer goods. Consulting firms also have the opportunity to work with a wide variety of cases, varying in complexity and scope. From there, it can be seen that they are the ones who will have a fairly general and broad view of the awareness and maturity of companies today about Business Intelligence, as well as the importance of Business Intelligence to improve the performance of Digital Marketing. This is a consulting firm specializing in data science, BI, digital analytics, and performance marketing optimization, and they also have projects with many different large and small companies, even with global companies.

As far as the sampling approach is concerned, the sampling size is 9 people, along with the sampling method of non-probability which is mostly used in qualitative research and case studies. They are consultants from the consulting firm Equancy. **Convenience and purposive sampling** are chosen to perform because it is easily available to gather the sample (the author is currently doing the internship here) and because this is a typical consulting firm which is not unusual in some way. When a researcher is working with extensive programs, typical case sampling is helpful since it helps establish the norm or what is "typical"; Candidates are typically selected based on their propensity to act in a way that everyone else does (Etikan, 2016).

Here are some concepts about the sampling methods used in this study:

Convenience sampling also referred to as accidental or haphazard sampling is a form of nonprobability as well as nonrandom sampling in which individuals from the target population satisfy certain qualifying conditions, such as ease of accessibility, ty, proximity to the study site, availability at a specific time, or willingness to participate, are included for the study's goal (Dörnyei, 2007). It can also apply to demographic research participants that are simple for a researcher to obtain (Given, 2008). Convenience samples are frequently referred to as "accidental samples" since components may be chosen for the sample because they are administratively or physically close to the location where researcher is collecting data (Etikan, 2016).

Convenience Sampling is inexpensive, simple, and the themes are widely accessible; It is required of the researcher to explain how the sample will vary from the one chosen at random; Convenience sampling's primary goal is to get data from people who are readily available to the

researcher, such as recruiting providers who are visiting a team meeting for the study (Etikan, 2016). Despite being widely utilized, it is neither intentional nor strategic (Palinkas et al., 2015). Convenience sampling's primary presumption is that the target population's members are homogeneous (Etikan, 2016).

Gathering data for research is essential since it will help researchers better comprehend a theoretical framework (Bernard, 2017). When this happens, it becomes crucial to make wise decisions about how and from whom to gather data. This is especially important because incorrectly collected data cannot be corrected through analysis (Tongco, 2007). The judgment sampling method, also known as purposive sampling, is a nonrandom sampling methodology that does not require underlying theories or a predetermined number of participants; It is the purposeful selection of a participant based on the traits the participant possesses (Etikan, 2016). To put it simply, the researcher selects what information is necessary and then searches for sources of that information who are able and willing to do so due to their knowledge or experience (Bernard, 2017). Typically, it is applied to qualitative research to find and pick the instances with the most information to make the most use of the resources at hand (Patton, 2002). Identification and choosing of people or organizations who are knowledgeable and skilled about an interesting phenomenon are required (Creswell & Plano Clark, 2011). Availability and desire to engage, as well as the capacity to articulately, expressively, and reflectively share experiences and ideas, are important in addition to experience and knowledge, according to Bernard (2017) and Spradley (2016). Purposive sampling aims to focus on persons with certain traits who will be better able to help with the relevant study, as opposed to random studies, which intentionally incorporate a varied cross-sectional area of ages, ethnicities, and cultures (Etikan, 2016).

2. Data collection method

In this research, **semi-structured** interviews are applied. Nine consultants who have worked on business intelligence-related projects in digital marketing are interviewed individually in a closed room. An interview guide consists of two parts: quantitative questions and qualitative questions. The purpose of quantitative questions is to know the profile information of respondents, including time working in consulting, position title, number of clients they consulted, hours, and frequency of meeting with clients. The second part will consist of 11 open-ended questions that aim to delve deeper into issues such as how their clients perceive BI technology, how they deal with it, how they apply it with the consulting firm, results as well as how BI technology is integrated into the client's business in digital marketing activities.

Semi-structured interviews, which are typically organized in advance at a specific time and place outside of daily activities, are frequently the only source of data for something like a qualitative research study; They are typically structured around a set of open-ended questions that have been established, with more questions coming up during the interviewer-interviewee discussion; The most popular interviewing approach for qualitative research is the semi-structured in-depth interview, which can be conducted either individually or in groups; Most frequently, they are performed once for a person or group and might take anything from 30 minutes up to several hours (DiCicco-Bloom & Crabtree, 2006).

A guide is used in semi-structured interviews, outlining the questions to ask and the subjects that need to be covered; The order in which the questions are asked during the interview is somewhat up to the interviewer, although the questions are predetermined, and inquiries may be offered to make sure the researcher addresses the right topic; This particular interview kind gathers thorough information in a rather conversational manner; When a researcher wishes to fully comprehend the responses given and go deep into a subject, semi-structured interviews are frequently used (Harrell & Bradley, 2009).

3. Interview guidelines

Introduction: " Hello, thank you for accepting my invitation to interview today. The purpose of this interview is to help better understand a part of customers' perception of Business Intelligence technology to improve digital marketing performance, from the perspective of a consultant like you. First, before starting the interview, please select answers from the following list of questions.**"**

3.1. Quantitative questions

Question	Choices
1. Your time of working in the consulting field	A. <1 year B. 1- <2 years C. 2 - <5 years D. 5 - <10 years E. ≥ 10 years
2. Your position title	A. Consultant B. Senior Consultant C. Manager D. Director of department E. CEO
3. Total number of clients that you have worked with	A. ≤2 clients B. 3 - 5 clients C. 6 - 10 clients D. >10 clients
4. How often do you meet the clients	A. 3-5 days/week B. 2 days/week C. 1 day/week D. 1 day/2 weeks E. 1 day/month F. 1 day/>2 months

Table 2: Qualitative question list

3.2. Qualitative questions

1. What field do clients work in? And how big are those companies?

2. How are your clients recognizing the recent emergence of BI in digital marketing?

3. How do your clients react to the emergence of BI in digital marketing? Do they think that they need to apply BI to improve their digital marketing performance?

4. How do your clients seek a way to integrate BI into digital marketing in their business? How do they seek the support of your consulting company?

5. What did you do to help them? How do your clients implement BI technologies? Is the consulting mission effective or not, why/where is effective, and why/where is not effective?

6. How long have they implemented BI in digital marketing? From the perspective of your clients, what things make it challenging to implement BI in digital marketing? What things make it easy to implement the BI in digital marketing?

7. What applications of BI have been, are, and will be applied by your clients in their digital marketing strategy?

8. What are the current main tools or technologies that your clients use to work when applying business intelligence in digital marketing?

9. What is the result of those implementations? Why? How do your clients feel the results after applying BI in digital marketing?

10. How can your clients measure the result? Are all the results measurable? If not all, which is the area that businesses cannot measure?

11. Is there any change in those companies after the application of BI in their teams? *(In terms of 6 factors: 1. Governance, 2. Culture, 3. Technology, 4. People, 5. Process, 6. Change & creativity - See table 2 below for more information)*. Do your clients have any desire, intention, or plan to continue to apply BI to improve other parts in their digital marketing activities?

Thank you so much for your answer.

4. Data analysis method

We use thematic analysis to analyze the data from the interview process. Thematic analysis (TA) is a technique for methodically locating, compiling, and providing an understanding of meaning patterns (themes) within a data collection; TA enables the researcher to recognize and make sense of common or shared ideas and experiences by concentrating on meaning along a data collection; The goal of TA is not to pinpoint particular and peculiar meanings and experiences that can only be discovered in a single data item; Therefore, using this approach might help to find commonalities in the manner that a subject is discussed or written about as well as interpret them (Braun & Clarke, 2012). The opinions and views of the consultants will be saved as transcripts and the data will be coded based on these transcripts. Data is manually coded through Excel software. According to the interviews, the perception of the customer business will follow 3 factors: sensing, seizing and transforming, each factor will include themes and subthemes to help have a better understanding of the customer business.

VI. Results

The results of the report will follow the dynamic capabilities model by Teece et al. (1997) which is mentioned in the literature review. Accordingly, the first part will introduce the demographic information of the interviewees. The identities of these people are kept confidential, and these people will be numbered from participant 1 (P1) to participant 9 (P9). The next part will be the results for the three factors analyzed according to the dynamic capabilities model including sensing, seizing and transforming

1. Profile of participants

Participant	1. Your time of working in the consulting field	2. Your position title	3. Total number of clients that you have worked with	4. How often do you meet the clients
P1	1 - <2 years	Consultant	6 - 10 clients	2 days/week
P2	1 - <2 years	Consultant	≤2 clients	1 day/2 weeks
P3	5 - <10 years	Manager	>10 clients	3 - 5 days/week
P4	1 - <2 years	Consultant	3 - 5 clients	3 - 5 days/week
P5	1 - <2 years	Consultant	3 - 5 clients	1 day/month
P6	1 - <2 years	Consultant	3 - 5 clients	1 day/week
P7	<1 year	Consultant	≤2 clients	1 day/2 weeks
P8	<1 year	Consultant	≤2 clients	1 day/week
P9	<1 year	Consultant	3 - 5 clients	3 - 5 days/week

Figure 6: Demographic information of participants

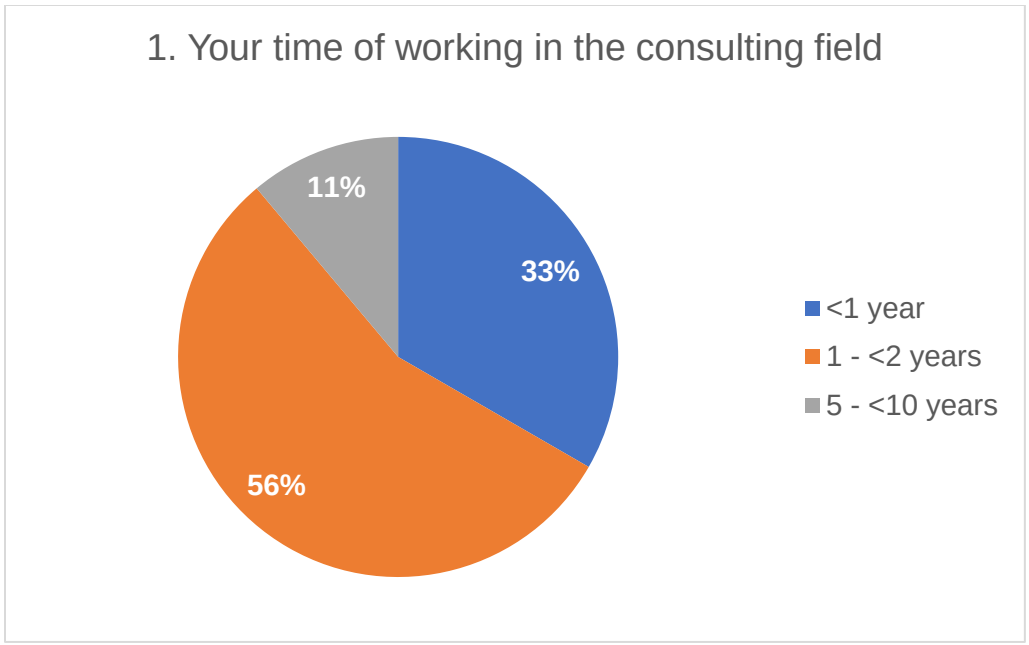

Figure 7: The time of working in the consulting field of participants

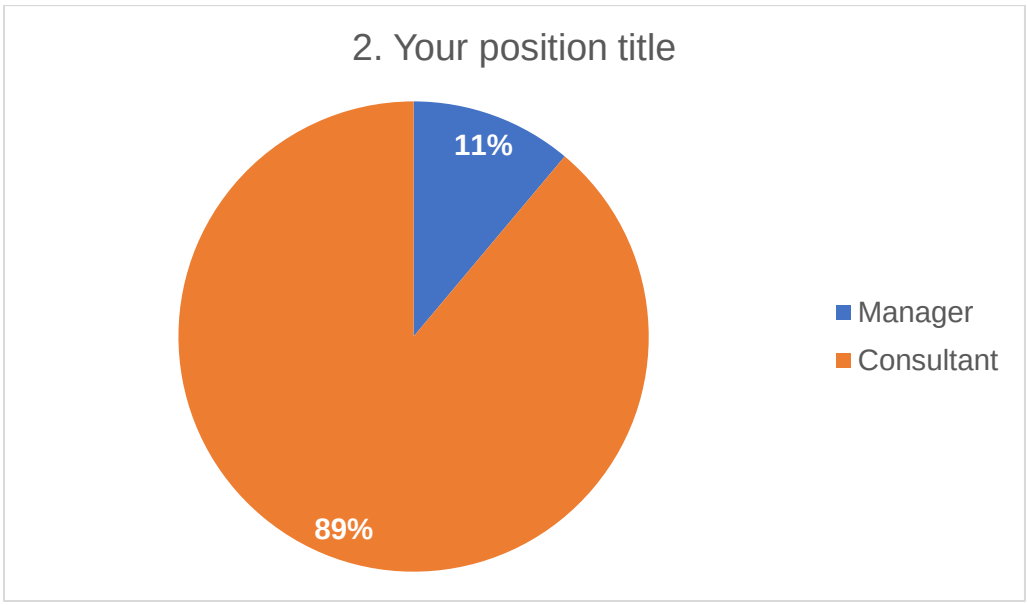

Figure 8: The position title of participants

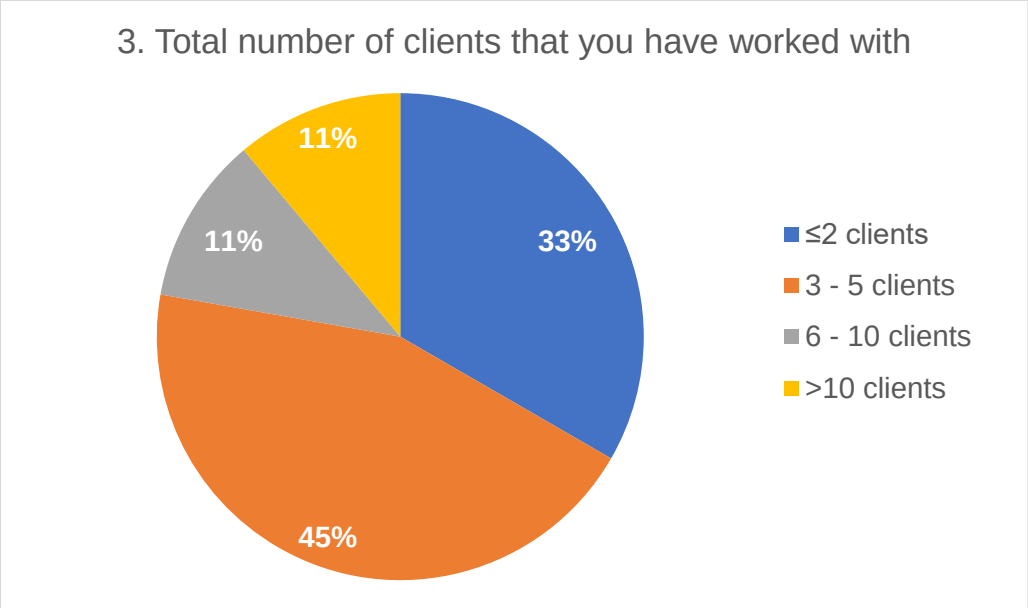

Figure 9: The total number of clients that the participants have worked with

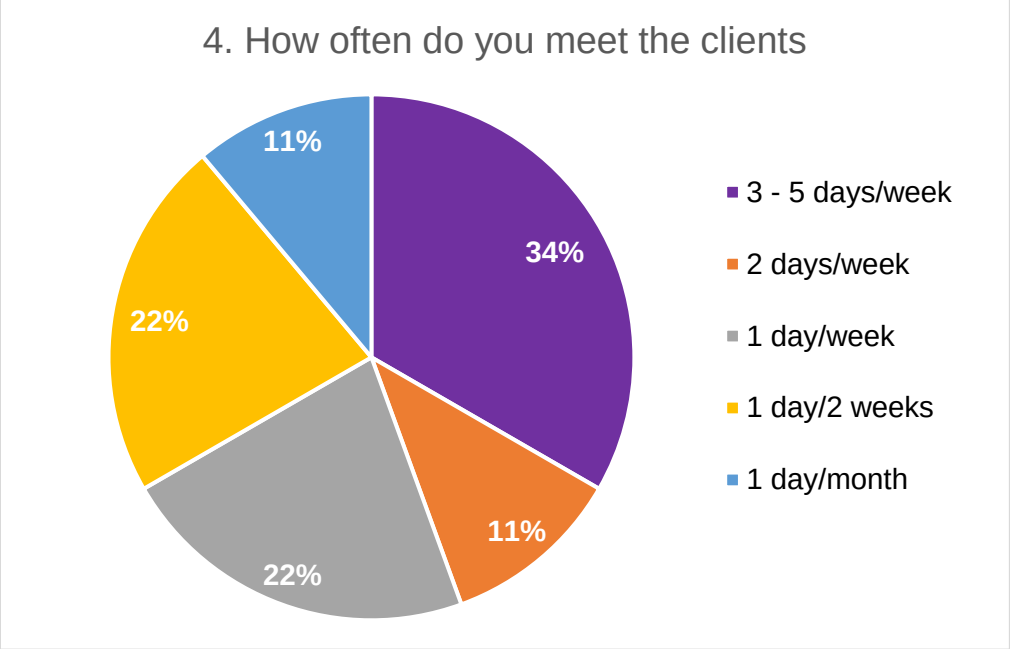

Figure 10: The frequency of meeting with clients of the participants

First, it can be clearly seen from figures 7, 8, 9, and 10 that most of the interviewees in Equancy are not seniors in the consulting field. There is only one person who has worked for at least 5 years and is a manager, the remaining people who currently have the position name "Consultant" and are not yet called "Senior consultant". This is also a limitation of this study, which will be discussed in a separate section. However, two-thirds of the interviewees have had the

opportunity to interact and work with at least 3 or more customers, and even a quarter of the interviewees worked with at least 6 clients or more. This still helps to ensure a diverse number of customers as well as the quality of information and data collected from them.

Next, we can see that the frequency of meeting and chatting with their customers is also dense when there is only one person who does not often meet customers (with a frequency of once a month), the rest still have regular meetings with business customers. Even one-third of consultants have a very dense frequency of meeting with corporate clients when they meet with clients almost daily out of 5 working days a week (3 - 5 days/week). This helps to ensure that they can keep a close eye on their customers, and that meeting and talking regularly will help them understand the psychology, thoughts and behavior of customers, thereby helping them understand what is happening in their clients' businesses, as well as their perceptions, visions, and attitudes about the development and evolution of technologies, including business intelligence. Therefore, the information and data collected are still guaranteed to be profound and detailed to a certain extent.

2. Sensing

Table 3: Comment of participants toward the sensing phase of dynamic capabilities model

Themes	Subthemes	Comments
Digital scouting	External factors (Market, Competitor, Internet, Consulting firms)	- P1: “They know it from the market, they will always seek new technology on the internet, news.... In some cases, they are informed by the agents of the consulting firms.” - P2: “They can recognize from the market...” - P7: “I think they have seen it because they tried to work with another agencies 1 and a half year ago. They've tried to make a dashboard. I think they did it on Power BI, but in another way.” - P9: “Some of them realized that this was the technology their competitors were using. Others know this technology from the advice of consulting companies through some tech events or expositions. Some of the companies get this emergence directly from the ads of the companies who make those tools like Power BI, they do the marketing to sell their tools and licenses.”
	Internal factors (internal need, employees, problem with big data)	- P1: “…They can also see from their employees because they will have internal meeting with them to see the working methods and procedures, and they will see issues and limits when they work with a huge data which are from a lot of kind of data sources…” - P3: “The need for the data-driven decision in the digital marketing, the need of valorization from the clients and the offers which highly push the BI. They need to connect better with the data to get a higher performance. The objective is a better connection with the consumers, so the client companies can do better targeting, for example customize the promotion for each segmentation of their consumers.” - P4: ”They realize that they need to be able to access data and display digital marketing data. Therefore, if you get data from Google Analytics regularly from tools with a few ticks like that, it will be easier than relying on someone who doesn't know how to use all the functions in Google Analytics to get insights from web marketing

		campaigns, or and relies on a lot of people working together to get insights." - P5: "In the digital marketing department, because it's a "digital", so they have more awareness of BI. And when they usually work with Google Analytics and Adobe Analytics, they really want to make it in another level, a higher level, so they are going to try BI to automate all these things (data...)." - P7: "Moreover, the people in the company talked to them about it and presented the beneficial stuff. I guess they slowly recognize it but more from the employees." - P6: "BI is the new things that we need to know but basically, they already recognize the need of doing data analysis, they are just not aware of these BI tools that allow them to save time and get a better analysis. Sometimes they have more and more data that needed to be analyzed but they just don't know how to solve it." - P2: "They can recognize ... from their employees."
Reaction	Open	- P2: "I think that they have a positive reaction toward BI..." - P3: "They are more and more excited, I can say that." - P1: "Some companies feel excited and interested in it, but there is no more than that because they are still "innocent" towards this technology, and they still cannot the whole benefit that it could bring to them." - P5: "They are excited, but it really depends on clients but usually they have a wow effect, and they want to take it to the next level, like, "Ok this is good, next we want to have more information in this dashboard". At first, they were quite indifferent to this technology, especially in some departments. But then they had problems working with large amounts of data, and they had to ask for help. That's why they became more open after that." - P6: "They can be very excited because they discovered a new tool and it shows a lot of advantages…" - P7: "They are excited and hopeful about it. We come from a consulting firm that has a BI branch, we are the expertise in this

		field, and they see what we can bring to them is a good match, and they are excited with the BI.” - P9: “...But generally, in most cases, I see that they accept the BI very well because once you show them the use case, they will say "Oh it's great".”
	Necessary	- P2: “They have tried to develop seriously their internal tool and the mission that we work with them is about giving the numbers and analysis so the clients can fill it on their dashboard.” - P4: “It is necessary because some managers need it for weekly reports or they need a quick check, so it must have.” - P3: “On the beginning it was just a trend, but now they started to apply it and saw the real value of BI. they became the official users of that solution of BI on a daily basis.” - P5: “... but especially for the digital marketing team, most of them are quite open to this new technology.” - P4: “It is necessary because some managers need it for weekly reports or they need a quick check, so it must have.” - P5: ”For customers who adopt this technology. At first, they just saw it as an extra element in their projects, but over time it became an integral part of their work. But for them, BI won't be vital, like "without BI, the company will go bankrupt", that won't happen, but it's still essential.” - P9: “I would say it depends on the size of the companies. If it is a very big company with a big amount of traffic on the website or a lot of data about their customers, they will think that it's useful and necessary for them to have this BI technology to make the decision.” - P9: “On my own experience, I would say that not many people would say it unnecessary, and some of them say it's vital, we can't continue without it.” - P3: “Everyone considers it essential, even vital, because it helps connect data together, standardize data so that we can offer the

		best adaptive solutions, thereby helping to better understand customers.”
	Not prioritized	- P1: “Yes, they feel that it is important and useful. But it is still nice to have, not a vital thing, and in terms of the cost, they still invest but not a lot of money in this technology.” - P6: “...But if it's a small company that doesn't have so much traffic on the website or data, I'm not sure they will think that it could be useful for them to integrate the BI solution, it could be nice to have, but Excel still can do it perfectly in terms of the visualization of the data.” - P4: “I think in some way they still think that it is nice to have because in some parts, up to now, they still have like acceptable results without BI, you know that without the BI they still could follow the performance, the different topic and scope. But now they slowly start to see that other companies have the BI projects. And instead of manually getting the data to get the insight, they realize that they just need a bunch of people putting the data together and then they have a bunch of experts like us who know how to use that final data, they can get more. But I don't think that they will have the mindset that "we need it". Because if they really need it, they will try it sooner.” - P6: “It could be useful, but the thing is that it’s so slow moving that why we need to create proof of value that people don’t really see what they can gain from it. So it could be that be interesting, something to explore, be curious/ not curious they can do it by themselves.” - P9: “People talk about it but they don’t really do that much, maybe they don’t have a complete vision of BI yet, and only consider it optional.” - P1: “It depends on the companies, sometimes some companies just see it as a "trend", and they follow that trend superficially without taking it seriously or treating it as a necessity....”

	Conservative	- P5: “However, not everyone is open to it...” - P5: “On the other hand, some customers, they don't really see the added value and BI brings, they are satisfied with the visualizations available on analytics sites like Adobe Analytics. That's because they haven't seen the real use of BI to save time.” - P6: “...Sometimes they can be stressful or afraid because they don't feel comfortable with IT tools, and they just use Excel for a year by year and feel difficult to move to the others. So, what we can do is to help them and teach them, explain step by step why it could be a useful tool, why it could help them.” - P9: “...Not everybody is using them, because besides BI, they have different kinds of tools. They use old tools or undeveloped tools. Some customers still use it because it still works, and they don't care about the new tools. Some people already knew about BI, but they still work with their old tools...” - P9: “...But some of them said that "It's good to have but...". Maybe it's a bit cliché but they think that BI is just "visual" aspect, and they don't see that BI is more than just visual things, like centralizing the data, getting interactive, having user-friendly interface, making the filter...everyone can use it and just not only us. Moreover, sometimes it could even help you to find some problems with the data. Because when you show a graph, and there's an error or something, you can identify that it’s because they didn’t do well on data engineering because the data is not good.”

3. Seizing

Table 4: Comment of participants toward the seizing phase of dynamic capabilities model

Themes	Subthemes	Comments
Approach	Seeking outside help (Consulting firm, meeting with other tech companies)	- P1: “There are many ways, sometimes they will find some consulting firms like us, sometimes it's us who will find them to present to them the benefit of implementing the BI.” - P2: “They will seek our support.” - P3: “...But normally they will start to look forward to some consulting companies, the expert, raise their use case to us. And the consultants will say yes or no, applicable, feasible or not. They need consultants to accompany them to apply the BI solution in terms of implementation and strategy making.” - P4: “In my case, the client companies will turn to the consulting firms first to seek help. Therefore, the most common way is that they will find and recruit external teams to develop reports or something like that.” - P6: “The last company that I worked for, I was the only one who was working on BI. And it was much more difficult because I am the only expertise on this solution. So for the companies who just have the basic knowledge with this technology, they have to meet a consulting company that have all the resources and skills to realize the projects because as a consulting company, we already worked with a lot of companies from different industries so we know what is the most appropriate solution in which industry or in which type of company.” - P5: “...But most of the time they will hire a third party to do it for them because they don't really know what they want. The biggest advantage of having a consulting firm to work with is that the consulting firms have worked on a lot of projects, so they can easily find out what their clients need. Even if the company has a team working on BI, sometimes that team must consult consulting firms. - There are many ways, because some of them approach the

		consulting companies, some of them can go to some events like data meeting day and big data events where the companies show their technologies...”
	Seft approach	- P3: “They have tried a lot on their own, some of them escaped, and it depends on the results that they will decide to continue this game or not...” - P7: “They have tried to integrate it is to make an overview of the performance in the different scopes like analytics, traffic data, lead data (or potential clients), sales data, target stuff... but at the same time, they cannot see what works. Their architecture of data is very big. It's not just one table of sales, one table of customers' information, one table of products' info and you link it together, that's a basic thing, but in this case, they have some problem like the duplicate of the lead data, or there are a lot of data source or info to match and connect that they wouldn't be able to do it by themself. So, from that extent they will need us to do it. We've been used to working with different data sources, they need us to automate it.” - P5: “Usually, it depends. Sometimes they may have tried to build it themselves...” - P9: “...Some of them can make a review in their internal team and it's like "We don't see clearly and easily the insights from the data", because the manager cannot just looking at the code, they need to the something easy to understand which is not the technical part of the data. And BI tools can help you to better know the insights through the data like "Who are my customers, potential customers?" and from that they can have new approaches to improve the marketing strategy. There are some cases where the marketing team told their manager that we need to have a better analysis tool, and the manager will think, decide and give a budget to them to buy a project related to BI tools.”
Reallocating	Fully outsourced	- P4: “...But most of them will outsource, because they don't need to hire someone to work for them for a long time, they just

		outsource to help them implement a project in a few months or design them a dashboard and that's it, so they don't need a full-time developer." - P4: "It is completely up to the customer. There were a few missions that I had to develop from start to finish..." - P5: "It depends. Some companies will let us do the work from start to finish. We gather, collect the data, we use SQL to query the data from scratch, then we organize everything, we work with them to define goals and KPIs to achieve, as well as calculation methods or formulas... and build the dashboard...." - P7: "Honestly, I would say it's a full implementation because the whole team is planning to do the whole implementation. But at the end, we will give them not only insights, but guide them on how to do it or what they need to do it, we will make the whole product and at the same time help their BI team do their tasks." - P1: "Usually with the projects that I work on, we will do 100% and they are only the final decision-makers." - P3: "The clients are always the final-decision makers. But in terms of implementation, they can do it partially autonomously or fully outsourcing."
	Partially outsource	- P5: "...Others just let us design dashboards or advise on BI strategies, so you don't have to work too hard with data collecting. - We are still working and building it, but at the end of the project, I can say that it's still outsourced work. As the consultant, we use the BI at the first part to get the insight. But the final goal is they could use it autonomously themselves. They can log in to the report, the things that we have uploaded to the BI, have access to the dashboard and get their own info. So instead of asking us the insights, they just need to go on it to get that info directly. But then as much as they could use it autonomously, it wouldn't be full because they still need consultants like us to get deeper insights or for the maintenance, so I think it's partially autonomous." - P6: "Normally they will outsource what they need us to build the

		dashboards which are ready to use, so they just want the fully built dashboard so they can click and access the data. But they need to be autonomous as well because the data is changing every day, so they need to know how it works so they can integrate new data sources for example. At the end of the project, they need to be partially autonomous." - P9: "It depends, some of them want something partially autonomous but still, they need our company to treat the data to have good data, some of them want something which is fully autonomous from the inside. It depends on the project, but generally the purpose in the long term is to make the clients to be able to use it autonomously, and at the end of the project, the clients don't have to ask us to automate."
	Consult and get advice	- P4: "...I also know some companies, instead of hiring people from outside like that, they will ask those people to teach the employees on their team how to use BI..." - P4: "...But at the same time there are missions where I'm just a "consultant" who gives the advice, I'll get into their software, analyze what just happened, give context looking at how BI is integrated, quote, inform the time, resources and staffs to complete that project for the client and let them consider if it is possible, it takes a lot of time. And then they will take this information and find another company to do it. It's consulting work, sometimes they will find a company that offers cheaper rates than our company." - P4: "It depends on the complexity of the job. Sometimes we offer them service packages such as consulting and project implementation. And they just accept the consulting service first, and then they decide to let us do it or not. Then we had to work for 2 months, we presented and showed them our vision and how to do BI. In that case, they just pay us for the consultation." - P6: "My first step is to explain to the clients why we need to use Business Intelligence, and how we can help the clients' companies with the daily tasks. So, it depends, sometimes we need to make a

		benchmark of different BI solutions to the clients because they don't know the different tools so they can be aware about the new tools...” - P5: “...It depends on the customer, but the ultimate goal is for the customer to become autonomous with Bi or dashboard related work, and we will only be advisors.”
Application area	Data warehouse environment	- P1: "We collect data from various sources such as Google Analytics, Adobe Analytics, Data studio, Excel files, PDF files. From there we will collect website traffic, conversions..." - P2: "I have a reporting committee every month about the performance of the past months like lead, which shows potential customers. And Power BI is used to group all of those data..." - P3: "I really work with the data of order acquisition in a mobile application. When you book a hotel, you can make a booking. And the BI will collect the data, sometimes the real-time data for example adding the service to cart, booking, the population type which use the application according to the region, so we can identify the groups of consumers who have the similar behaviors, which is helpful for the segmenting and customization of the promotion or ads to them. BI is used to prepare the data in advance: connect from different sources, extract the data and put it in the data warehouse or data lake. The idea is to transform, standardize, aggregate the data so it could be ready to use...BI will help us to gather data from different data sources, such as Google Analytics and Adobe Analytics, combine and make reports in real time." - P5: "It depends. Some companies will let us do the work from start to finish. We'll gather, collect the data, we use SQL to query the data from scratch, then we organize everything and build the dashboard..." - P6: "...So I will try to centralize all the data of the company to make a measure, to create the KPIs about the this data, and build the dashboard by visualizing the those KPIs..."

		- P7: "...And then it comes to my work, my work is like implementing some of the sources, all the lead stuff, link the data together, figure out how we can merge the data, clean them a bit because they can overlap. We don't have to clear a lot of data, but we still need to manipulate it and transform it in a way to be usable for the results. Honestly, I would say it's a full implementation because, as a whole the team is planning to do the whole implementation. But at the end we will give them not only the insights but guide them how to do it or what they need to do it, we make the whole product and at the same time help their BI team doing their tasks..." - P9: "First of all, the clients will give us the data, it could be clean data or unclean data. In the case of unclean data, we have to treat it to make it usable to put them in the dashboard, it depends on the clients. But generally, as a consulting company, we have to treat the data. Sometimes based on the need of the clients that you have to ask them what data you need to get..."
	Business analytics environment	- P1: "...Then we help them process data, as well as create dashboards to visualize the data..." - P2: "They need us to calculate, analyze and provide the insights so they can put it on their internal dashboard. The mission is effective and mostly the performance...There are a lot of calculus parts. I also use Adobe Analytics which helps to measure the on-site traffics, lead, and the data which show how many leads who transform to sales (lead-to-sale conversion rate). I also collaborate with another agency who implements digital marketing campaign..."
	Business performance management	- P5: " then we organize everything, we work with them to define goals and KPIs to achieve, as well as calculation methods or formulas..." - P6: "So it depends, sometimes we need to make a benchmark of different BI solutions to the clients because they don't know the different tools so they can aware about the new tools." - P7: "We did a full overview of what result what kind of info we

		need to see at the end to help them and then we identify all the data source that we use, and it's like 10 different data sources... ...The main thing is to follow the performance of the marketing campaign, to do the dashboard, data governance, and keep the data "healthier"."
	User interface	- P1: "....Like I mentioned, it is designing the dashboard, visualizing the data, standardizing the data with Tableau, Power Bi, Qlik Sense...The final goal is to replace their entire existing workflow, which takes a lot of time, with a new process that integrates with BI and they will work directly with BI software instead of traditional software." - P4: "Usually dashboards, data visualizations. They will try to extend this technology to other departments." - P5: "...Others just let us design dashboards or advise on strategies to apply BI, or how to set KPIs, so you won't work too much with data collecting, because some of them already have a team to do that job..." - P6: "...But normally, my main mission is to build the dashboard, with Power BI - a tool created by Microsoft. So I will try to centralize all the data of the company to make a measure, to create the KPIs about the this data, and build the dashboard by visualizing the those KPIs. Our mission is also help them how to use this tool or even integrate this tool within their companies. Most of my project processes, the clients will send me a dataset, and based on that you can build some KPIs, some graphs that you will show to the clients. If they don't like the design, they will tell you why, then we will correct and choose the other design. And it depends on the clients that you can have the right to build your own KPIs or not... ...The dashboard, it will help to target the right customer, get the alert if you spend a lot of budgets to run the campaigns. Moreover, you can restrict access to the data to the specific people. For example, only someone who works in the HR can get the data of

		their employees instead of someone in another departments." - P8: "...They clearly depend on our company to build the dashboard or other stuffs..." - P9: "...Then I will in charge of creating the dashboard and put it to PowerPoint to see, it's more UX parts. You have to show the parts that clients need or the parts that you think useful for the clients, like which filter to use, which columns, tables to show. what role of those clients, "is it only for the marketing team? Or is it for the business manager? ". You need to make sure the purpose of the dashboard is, who is the user? So, to resume, I can say that there are 2 kinds of face of work when applying BI in digital marketing, the 1st thing is, all the scope, the people we can address, all the data which are ready or not and the 2nd is the creation of the dashboard."
Application software	Third-party software	- P1: "Normally we work with Google Analytics, Adobe analytics, AT internet (a competitor of Google Analytics which is creates by French people), Google tag manager, Adobe Target et Adobe launch, Google data studio...Like I mentioned, it is designing the dashboard, visualizing the data, standardizing the data with Tableau, Power Bi, Qlik Sense." - P1: "It's GA, Adobe, Excel..." - P3: "We use Tableau, Power BI, mostly BI, Adobe Analytics for the acquisition and modernization of the data. I also use the tools of ETL "Extract Transform Load" like Talend or Snowflake. The clients also use some platforms like Google Cloud Platform (GCP). Yes, but it's rare that the clients are applying in their principal activities, but the digital marketing department is the area which is most applied. But they are more and more evolving in this technology...BI will help us to gather data from different data sources, such as Google Analytics and Adobe Analytics, combine and make reports in real time." - P4: "We work with Google Analytics, Excel, Tableau, Power BI, and also Dataiku, which is a French software for data science as

		well as data exploration, Qlik Sense. Customers want automatic reporting, KPIs with just a few clicks." - P5: "The main tool is Power BI. We also use Adobe Analytics, Tableau, Snowflake, Excel, Datama..." - P7: "One of the main tools that they use in my account is Adobe Analytics, and then they also use Excel. Some of the stuff that they sent to us is the reporting of the sales. Power BI is used as well in some operations...The company are starting to apply BI and implement it." - P9: "In terms of tools, in the data aspect, which is more technical to code, it could be Python, SQL. In terms of BI tools, I can say Power BI, Tableau, Qlik Sense. BI is used to help customers to do better segmentation: BI can help people to aware of the data, to see which population, what are the different kinds of population to adapt to the marketing strategy. BI could also help them to see some tendances in the long term, demographic and geographic information. And from that, the clients can customize the campaign of the marketing strategy which fits with each region, each kind of customer, each period of the day, week, month or season..."
	Internal software	- P2: "It's ... and internal software...The internal tool just helps us to get easily data instead of going to search the data." - P5: "...Some already have internal tools, but sometimes it's not so developed, for the new department..." - P7: "...Moreover, they also have their internal software and platform which is VWContact which has all the lead data. They also have some databases, for example the sales and those data match with the lead data..."
Challenge	Data-related problem	- P1: "Difficulties for customers now can be the price of service, standardization of data, training of employees." - P4: "Another problem encountered is data governance. Team members will have different concepts or methods for defining the KPIs they want, such as revenue or profit figures, and it will be difficult for them to agree easily on which method of calculation

		should be. The last thing they want, whether those numbers should be taken or not, the data be taken from this data source or not. On the other hand, if the source is good, it will be easier." - P5: "In my opinion, data collection is always a huge challenge in a project. Sometimes the design work also takes a long time. You have a lot of people working on the dashboard and they really have different visions of the information they want to see and the design they want to see." - P7: "The difficulty could be from the source of data. It's not centralized. The clients don't have to vision on working with data, and not a lot of data is ready to be used. They always have to gather and merge them from many sources, from everywhere." - P8: "We have so many data resources..." - P9: "The data of the customers is the biggest challenge to implement."
	Change resistance	- P1: "Difficulties for customers now can be the price of service, standardization of data, training of employees." - P2: "We have some difficulties during the project, like there are a lot of internal tools and it's complicated and not user-friendly to work with all of them at the same time." - P3: "The pain points are change management. People are used to old software, and the new tool is so complicated, so to be able to apply new software, it will take a lot of time for training, recruiting and changing work processes. By contrast, it's a bit paradoxical, although facing many obstacles in change management, compared to other fields such as sales and human resources, digital marketing is the field where BI technology is easiest to be applied and everyone is easy to get used to it. Most of all, changing management will not be as difficult as other departments." - P6: "There are difficulties for the customer's staff switching to new software, discovering the new interface while working on the project."

4. Transforming

Table 5: Comment of participants toward the transforming phase of dynamic capabilities model

Themes	Subthemes	Comments
Result	Data quality improvement	- P1: “The results is good. For my current project, we are still in the process of working on the project, so I won't be able to say anything in advance, but everything is under control and in the immediate future this implementation also brings positive results like the first numbers of KPIs...” - The result is positive and effective, and they feel satisfied with that because they can get the insights that they want... - P4: “...Normally, the whole process goes well from start to finish, they greatly appreciated it. They know the KPIs they need, they are satisfied with the services we provide them. It's almost impossible for them to not use it and feel like it's a waste of money, because we've had to go through a lot of testing, testing, a lot of meetings, discussions, we also gradually improve the versions through each such test. And our consulting company also explains and gives them very detailed information...” - P9: “...It can be KPIs, the numbers, rate that they want to see. Some KPIs that you cannot measure are like to better understand their customers, or to get a better performance. Sometimes it is ambiguous, and you cannot see it...” - P5: “The results are mostly positive as far as I can see. Of course, sometimes it is also very challenging when the amount of data is increasingly large and complex. We have greatly improved the accuracy and time to find KPIs and insights in digital marketing campaigns... Missions are generally effective and bring a lot of value to customers. With the help of consulting firms, clients are better oriented and thus it better meets their real needs, sometimes it's not what they want, but it's what they need…”

		- P7: “...The results cannot be measured right now because it will bring the long-term value. And there are some intangible values like you can identify the issues easier, and you can get a KPI easier, like the transformation rate of the lead...” - P9: “Normally those are good results, because it helps customers. What can make the negative result is sometimes, the clients just want to see the results that they want, but BI will show the real results, the reality, and they said that is not normal because normally it is not like that. They are not satisfied sometimes but they have to accept the reality...”
	Time saving, automating and high performance making	- P3: “We usually get good results, with operational efficiency. We reduce the workload, analyses, tasks, and we industrialize the operation and facilitate the sharing of information. Normally the clients appreciate the results...They will see a decrease of working time and workload, but it's not easy to measure, because it won't bring the turnover immediately, so we are rather going to reduce the cost of operation than to create turnover...” - P4: “...Overall, it will help the business team to be leaner, with less resources to work on. Everything is now automated with the BI solution in a very short time. Work has also become easier, and it is easier to use as well...I guess some tools can measure the time someone can export the data from the dashboard, and from that you can measure the performance.” - P5: “...We have greatly improved the accuracy and time to find KPIs and insights in digital marketing campaigns...” - P4: “...Everything is now automated with the BI solution in a very short time. Work has also become easier, and it is easier to use as well...” - P6: “It's difficult to measure the result because it's not like when you produce a physical product, but most of the time you will have an overview of the data thanks to the visualization of BI and it helps you to save time as well during your daily task.

		The time is not easy to measure so I can say that it's intangible. But in the long term when they have more and more data, this solution can help to improve their overall time, add new KPIs, new data sources easier." - P7: "...The results are positive because BI helps to gather the data from different resources, so it will be easier for us to get the right insights. Before they needed a week to get the insights of a day, but now it's just 5 minutes, so of course they are happy with it. Not only that, but they can also be able to identify the issues easier..." - P1: "...BI helps to increase work productivity and reduce working time..." - P8: "...We spend less time on the manually activities, more time on generating value, higher return over investment..."
	Cost saving	- P9: "...Customers are also satisfied with what's going on because they see results, they didn't see before or spend more resources to get there." - P4: "...Overall, it will help the business team to be leaner, with less resources to work on..." - P1: "...It also helps to reduce costs because everything is now automated and you don't need to hire more people to do manual work..." - P7: "...And it would help to reduce the cost, because in the long run they won't need a lot of people to do the operation to get the results. Another thing is time efficiency, but it's like there are a lot of things that are not measurable..."
	Real-time decision	- P2: "Actually, I don't know clearly, because normally BI doesn't bring a clear result, and we cannot see it right now. But it can help to make a better data-driven decision and strategy." - P5: "...The result is that they can track the KPIs they want in real time. Main goal: visibility action, real visual measure, save time."

Area	People	- P9: “...There is a change in the people, because they have to have a high quality of skills or knowledge to work with it after their project without needing someone to help them...” - P7: “...People, maybe because they might help employees to prevent from manual work but with BI, and from then, their people will have more time to do another task like analysis, putting the people from doing useless stuff to do useful stuff.” - P6: “I would say People. Employees need to improve their IT skills because when you have more and more data, or tools, you need to know those tools and technology and so on.” - P3: “Mainly it's culture and technology, for people, there is always training and recruitment...” - P2: “I'm not sure that I know because it's an internal stuff and we are still implementing the project. But maybe after that, they will train their people to work with new insights...”
	Technology	- P9: “Yes, in technology, because they have to invest in new tools and the way that they work is not in traditional marketing....” - P7: “...In terms of technology, yes because they will invest money to buy the BI licenses, servers to hold all the data together, the data storage...” - P4: “...Change management, data governance, leaner processes, technology, use cloud- friendly solution, cloud-based structure combine with BI...”
	Process	- P9: “...In the process, yes, for example there is a change in the process of putting new campaigns, they will go first to the dashboard to see the data and insights, and then to use it to have the appropriate strategy.” - P5: “...The process will also change more or less because they will also integrate this technology in the working process and consider it as an important thing. And at first, they'll be quite unfamiliar or scared to work with it, but then they find out that they don't have to do so much manually, and everything is

		automated, they will appreciate it and see it as an important part of the process.”
	Governance	- P7: “In terms of governance, yes, because they will have a better vision of the data that they work with...”
	Culture	- P7: “...Secondly with the culture, I think it's great, because once they understand the way of using the BI, gaining more control of the data, it will make them use and rely more the data for the insights, they will not say "Oh yeah I think I works well so I'm going to do it." but "Yeah, even if it is a great idea that we can do, let me check how it happens every time". Like if they have a reflection of checking the data every time so it's going to be better rather than just asking us when they make a big move. This way even when they want to do a small thing, they can go gather the insights without having to ask us, because obviously the more you ask us, the more you have to pay us...” - P5: “Yes, sure, culture and governance will change a lot, because they will have a new "BI culture" where they will tend to think of this technology to solve their problems. Technology and software will also change. If before they only used basic software like Excel, now there will be more effective technologies. People will also change because they will also need experience and knowledge to work with BI, or companies will also tend to hire people who are able to work with BI...”
Future vision	Extension	- P9: “...Yeah, if the BI works well in some part of the marketing activities, the clients will try to industrialize it in everywhere, in the whole marketing department.” - P7: “After we made the BI, they would like to continue and apply to other stakeholders of their companies, just making other reports for another type of data. I think once you go with BI, you won't go back, you just need to continue.” - P6: “Yeah, when we build the dashboard for them, and they show it to their team and even other departments. And it makes other teams have a desire to work with us to apply the BI. So,

		most of the time they would try to apply for it in a different department after a success in their previous team.”
	Continuous improvement	- P3: “It depends on the result, it's hard to say yes or no. Generally, yes, if it works, customers will continue to use and internalize the knowledge.” - P2: “...And yes, they have the desire to apply BI in another level and they would like to be autonomous in the future.” - P1: “They'll move on and want to get into it more, but they'll do it slowly and without haste because it's neither a prerequisite nor a priority right now.”

5. Thematic diagram

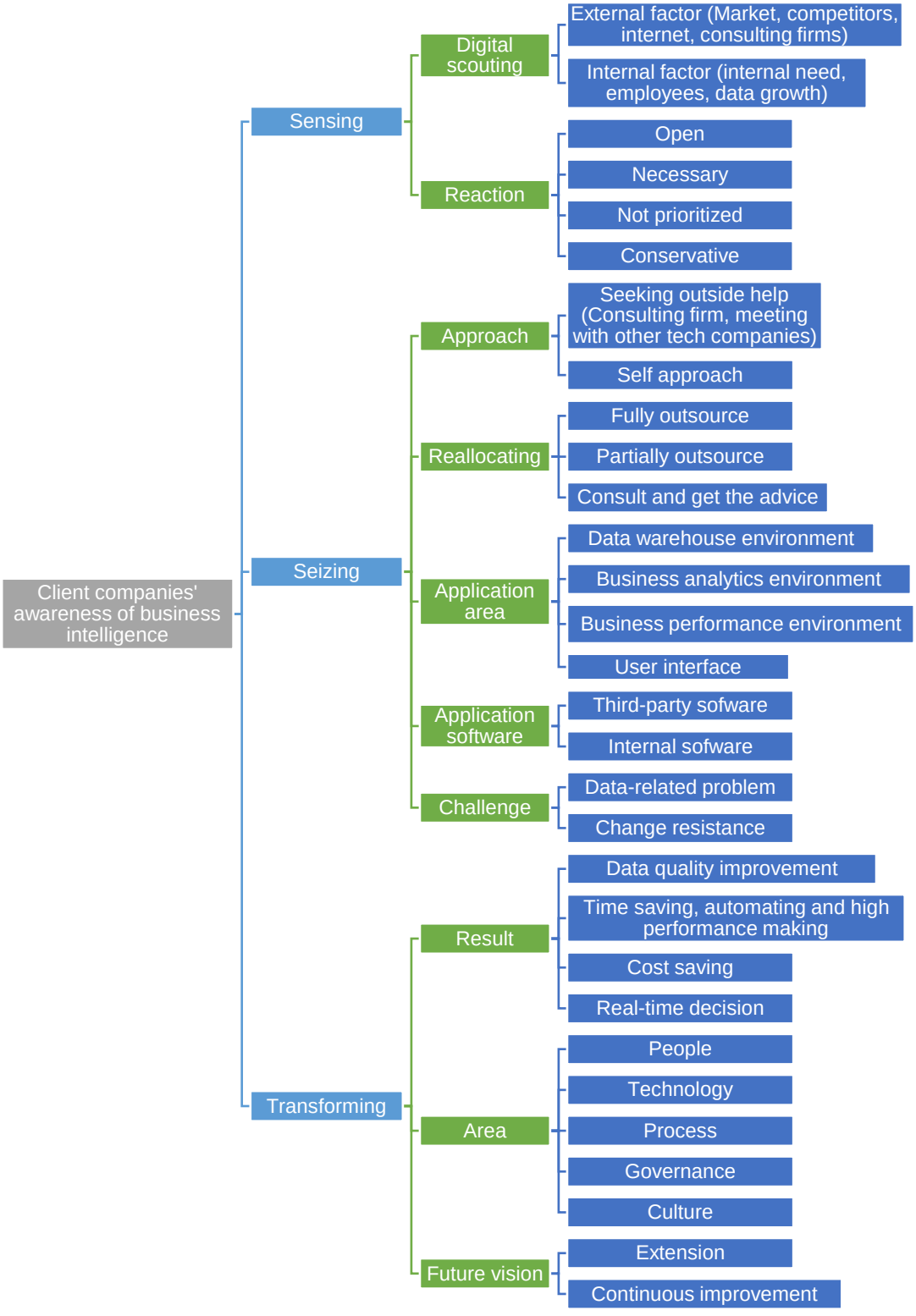

Figure 6: Thematic diagram

VII. Discussion of findings

1. Sensing

1.1. Digital scouting

As can be seen from the comments of participants after the interview, most of Equancy's client companies have a basic understanding of Business Intelligence. They had different ways of scouting this technology:

Some companies saw a need to apply Business Intelligence technology because they recognize their internal issues and the need for their own employees in the digital marketing department. This demand comes from the fact that the data that needs to be handled by the company in general and of the digital marketing department is getting bigger and more complex, making the data processing demand increase. However, these data are derived from so many different data sources that it is extremely difficult to extract these data into a single source to arrive at the data processing step. Not only that, the format of these data is also different, which makes synchronization and data cleaning even more complicated. Then there is the data processing step. The amount of data is getting bigger and bigger, making data processing in traditional applications like Excel impossible. At the same time, with the development trend of the internet, online consumers also have rapidly changing behaviors and habits at the current time, the way they approach websites and products is also becoming more and more important. diversified and across many different channels, media, and media, increasing the need for real-time and high-frequency data analysis. The next step is the dashboard and report-making stage. To do so requires technologies and software capable of visualizing data, with state-of-the-art features and the ability to offer a wide range of options for graphing and displaying statistics. Some people also need to connect or synchronize these charts with final reporting software such as PowerPoint to facilitate presentations and reports to superiors or partners. These needs cannot be satisfied by traditional software that cannot process large amounts of data, produce results and insights in real-time, at a fast speed, and cannot connect to software for making reports or presentations. That forces managers to look for alternative solutions, including Business Intelligence. In addition to solving the above problems, Business Intelligence also has the ability to automate processes, now, instead of having to redo every analysis from the first step, users only need a few clicks to get results with extremely fast speed and extremely high accuracy.

Some other companies really have the spirit of innovation as well as technological improvement. They are simply constantly curious and looking for solutions that are not just about optimizing workflows, accelerating labor productivity or reducing working time, but also turn the study of customer behavior through online channels to a new level, helping to find insights or KPIs that previously took a long time or could not be found due to resource and time constraints. And they sought solutions in both active and passive ways. As the consultant P1 commented, "They know it from the market, they will always seek new technology on the internet, news.... In some cases, they are informed by the agents of the consulting firms". More surprisingly, according to the consultant P9, "Some of the companies get this emergence directly from the ads of the companies who make those tools like Power BI, they do the marketing to sell their tools and licenses". Software companies are also really jumping into this game and making moves to spread this "trend" and provide the most practical solutions for businesses. From the above analysis, it can be realized that businesses do not have too many difficulties to realize the emergence and rise of business intelligence. Even for some companies, business intelligence is not a strange or new term, they have been really aware of it for a long time and it has really crept into the awareness of businesses, they have integrated it into their ecosystem by trying to build their own internal BI platform or by using third-party BI tools and software.

1.2. Reaction

Although companies know little about the concept of business intelligence, the reactions of businesses are really different and contradictory. According to the consultants, it depends strongly on the companies, but most businesses have quite positive reactions to this new solution.

First of all, the reason a large part of businesses are quite open to this technology is that "they discovered a new tool and it shows a lot of advantages" (stated by the consultant P6). Indeed, BI can really help solve existing problems in digital marketing departments, such as data growth, the variety of data sources coming from different channels, the complexity of processing and normalizing these data, the complexity of analyzing and calculating data to come up with KPIs, or the need for regular reporting, the need to update KPIs and insights in real-time. Even so, according to the consultant P1, "they are still "innocent" towards this technology, and they still cannot the whole benefit that it could bring to them". Enterprises still do not really see the real benefit of BI because they think that this solution is only for creating dashboards to visualize data to help them make reports to managers or superiors. Meanwhile, the hardest work is always in

the stage of collecting and processing data to become usable, which really takes a majority of time and effort.

Among them, a large number of companies consider Business Intelligence solutions to be really necessary in their digital marketing activities. Some companies have started using and developing their own software and others have started using it for weekly reports, and they have partly seen the value that it really brings, not just following the trend superficially. For example, the consultant P3 said, "On the beginning it was just a trend, but now they started to apply it and saw the real value of BI. they became the official users of that solution of BI on the daily basic". And according to one interviewee, for big businesses, BI is really useful when it can help them handle "a big amount of traffic on the website or a lot of data about their customer" (according to the consultant P9), and they need it to "make the decision". However, only two respondents (P3 and P9) answered that it is vital and the company cannot go on without it. The rest still think that BI is necessary but not a prerequisite, there will not be a case of "Without BI, the company will go bankrupt" (stated by the participant P5).

Some other companies, although still open to this solution, still consider it a "plus" rather than a necessity. The reason for this reaction is that they only see it as a "trend" and have not yet seen its true value. According to the consultant P1, "they still invest but not a lot of money in this technology". Another reason for this is that the size of the business is so small, and they haven't had the big digital marketing problems that big companies have. For example, the consultant P6 replied, "But if it's a small company that doesn't have so much traffic on the website or data, I'm not sure they will think that it could be useful for them to integrate the BI solution, it could be nice to have, but Excel still can do it perfectly in terms of the visualization of the data". Indeed, small businesses have not yet implemented many digital marketing campaigns across many different media channels. The data that they collect is also not from too many sources and is not complicated, in terms of quality and quantity. And when they don't have too many problems in data collection and processing, their work revolves around data visualization. With a limited amount of data, Excel was still able to handle and meet their minimal needs. And the workflow is also short, so they can still do the above tasks manually. However, if they really have a good perception of BI, they will realize that BI can still be applied well in small businesses. In addition to the ability to automate processes that save a lot of staff costs as well as save time, BI is really not too expensive to invest in. The proof is that some software supporting BI solutions such as Microsoft's Power BI has a free version. Users can completely use a relatively full range of features of this software. At the same time, Power BI is an intuitive, easy-to-use software that

doesn't require too many technical skills. The features of Power BI are also extremely superior to Excel, especially the ability to visualize data in real-time, create dashboards, pivotable, and most importantly, the ability to sync data with PowerPoint for reporting or presentation.

And finally, there is still a large number of businesses that are not too optimistic about this technology. The reason is quite similar to the group of companies above when they are used to old software and ecosystems. Some companies also have problems with modern software and they are afraid of innovation. For example, the consultant P6 said, "Sometimes they can be stressful or afraid because they don't feel comfortable with IT tools, and they just use Excel for a year by year and feel difficult to move to the others. So, what we can do is to help them and teach them, explain step by step why it could be a useful tool, why it could help them". Indeed, it is a common sentiment that can be understood because when everything is stable and operating on the right track, testing out new technology can create unnecessary risk and can waste a negative impact or disrupt operations if not applied properly within the team. From here we can see the role of consulting firms, they are an expert who has handled a lot of cases and as such, they can help businesses to be properly oriented and gain a clearer vision of BI technology in particular. Not only do they give advice, but they also even help client businesses implement projects, instead of letting these businesses do their own research. At the same time, when the project is completed, they will still be with the businesses for "product maintenance", as well as implementing software transfer steps, and training employees of client companies. The ultimate goal is still for businesses to be able to use BI solutions independently and without the help of consulting companies. Therefore, consulting firms could be a key to help businesses raise awareness of BI technology, allowing them to overcome the barrier of technophobia, and lead them in the right direction with a lower risk.

To summarize this section, businesses have had their first look at business intelligence solutions applied in digital marketing. They have recognized the rise of this technology both from external factors to their internal needs and have had different reactions to it. Most businesses are still quite open to BI solutions. Some have even adopted it and consider it an integral part of daily digital marketing operations and activities. However, there are still some businesses that have not really realized the true value and huge benefits that this technology can bring. Some even have a cautious and worried look as they have become familiar with old solutions or software. That makes them rigid and not ready to accept it. Therefore, consulting firms can be a solution to help businesses increase awareness of the importance of BI to improve digital marketing performance. Consulting firms are also a bridge to help these businesses get closer to new

technologies in general, as well as BI solutions in particular, helping them overcome their fears and test this technology with a lower risk than if the business had to test it on its own.

2. Seizing

2.1. Approach

After having had certain views on BI technology, businesses will have different approaches. Based on consultants' sharing, we see that client businesses have many ways to test this technology. Some businesses have sought outside help, such as through consulting firms or meetings with technology companies. Based on the consultant P5's opinion, we can see the reason for this behavior: "...most of the time they will hire a third party to do it for them because they don't really know what they want. The biggest advantage of having a consulting firm to work with is that the consulting firms have worked on a lot of projects, so they can easily find out what their clients need that team has to consult consulting firms". As can be seen, consulting firms have an advantage when they are experts in problem-solving. They understand how to apply BI technology to a variety of companies of different sizes, industries, or contexts. In the words of one consultant, consulting firms can help businesses "apply the BI solution in terms of implementation and strategy making" (shared by the consultant P3). Another reason that is also seen from a consultant is that these customers only have basic knowledge of BI, Therefore, hiring a consulting company with an external team to work instead of the internal team is the fastest way to help businesses access this technology.

Some businesses have tried the approach by learning and developing on their own. They have looked at their own inner team, observed the existing problem and found a solution, and usually the manager will be the one to think and decide the direction, setting a budget or choosing software to use. However, with the lack of knowledge and direction, there have been cases where businesses have tried and failed, they have given up.

2.2. Reallocating

At this stage, businesses will reallocate resources to start implementing BI technology. In this thesis, we only analyze cases where businesses have sought the help of consulting firms, other cases will not be mentioned. Therefore, this is a limitation and it will be mentioned in the limitations of the study section.

Based on the sharing from the consultants, we can see that businesses have different ways to work with consulting firms to implement projects. However, most companies would like to outsource fully or partially. Businesses trust consulting firms and let them do the work. As shared by the consultant P3, "The clients are always the final-decision makers. But in terms of implementation, they can do it partially autonomously or fully outsourcing", or from the consultant P7, "at the end, we will give them not only the insights but guide them on how to do it or what they need to do it, we make the whole product and at the same time help their BI team doing their tasks", we can realize that whether outsourced in whole or in part, the ultimate decision maker for the direction of the project is still the customer, and the ultimate task of consulting firms is to transfer technology or technology so that customers can apply this technology in a completely autonomous manner. In addition, some companies only need consulting firms to give advice. For example, the consultant P4 said "It on the complexity of the job. Sometimes we offer them service packages such as consulting and project implementation. And they just accept the consulting service depends first, and then they decide to whether let us do it or not. Then we had to work for 2 months, we presented and showed them our vision and how to do BI. In that case, they just pay us for the consultation". They may already be well versed in using this technology and just need a mentor to lead them on the right path.

2.3. Application area

It can be seen from the result that, with the help of consulting firms, businesses have been able to apply in many different areas a BI system defined in literature review, including data warehouse environment, business analytics environment, business performance management and user interface. In which, for Equancy’s customers, the data warehouse environment and user interface are the two most applied areas.

First, in the data warehouse environment, consultants help businesses collect, aggregate, clean and standardize data so that it can be included in the data warehouse. A real-life example from consultant P3: "I really work with the data of order acquisition in a mobile application. When you book a hotel, you can make a booking. And the BI will collect the data, sometimes the real - time data for example adding the service to cart, booking, the population type which use the application according to the region, so we can identify the groups of consumers who have the similar behaviors, which is helpful for the segmenting and customization of the promotion or ads to them.BI is used to prepare the data in advance: connect from different sources, extract the data and put it in the data warehouse or data lake. The idea is to transform, standardize, aggregate

the data so it could be ready to use". At the same time, the data sources are also diverse and complex. It can be in the form of text, images, tables, and comes from local directories or from online services, with different access languages. Consultant P1 shared: “We collect data from various sources such as Google Analytics, Adobe Analytics, Data studio, Excel files, PDF files. From there we will collect website traffic, conversions…”, consultant P5 also shared: “We gather, collect the data, we use SQL to query the data from scratch". These complex jobs can all be done and automated thanks to BI, as soon as new data is available, BI will automatically update and process it.

Next, in the business analytics environment, consultants will help companies mine and analyze data. These actions can be visualized by consultant P2: "They need us to calculate, analyze and provide the insights so they can put it on their internal dashboard. The mission is effective and mostly the performance...There are a lot of calculus parts”. Moreover, in business performance management, consultants will help their client companies define and analyze whether the KPIs they need are aligned with their goals. Consultant P5 shared: " then we organize everything, we work with them to define goals and KPIs to achieve, as well as calculation methods or formulas..."

And then, one of the most talked-about application areas is user interface, consultants help their clients to design dashboards and visualize data. The ultimate goal will be to help the customer - as an end user of the project - be able to work with the system completely independently and get the KPIs, numbers, dashboards or reports they like with just a few simple clicks. An example from consultant P1: "The final goal is to replace their entire existing workflow, which takes a lot of time, with a new process that integrates with BI and they will work directly with BI software instead of traditional software." It can be seen that in the future, after the application of BI technology, the employee's working process in the client's company must also be changed to meet the requirements.

2.4. Application software

The applications and software used in the implementation of the project are also extremely rich and diverse. It can be seen that most of the businesses mentioned by the consultants are choosing third-party applications as solutions to implement BI projects. Power BI is the most talked about application, perhaps because it is free, so it will help companies save a lot of money. Power BI also has the feature of connecting and synchronizing data to PowerPoint for presentation and presentation purposes, so it is highly recommended. In addition, some other BI

applications are also used, such as Tableau, Qlik Sense or Excel. However, Excel is not recommended by companies because it cannot handle big data nor is it capable of connecting a lot of data at the same time in real time. In the opinion of the consultant P9: "...in the data aspect, which is more technical to code, it could be Python, SQL". Programming languages are also used to work with and query data from different sources. Data sources can come from SEO tools such as Google Analytics, Adobe Analytics or AT internet. Power BI can even connect data from Excel files to collect and process data. Several tools for extracting data from the cloud are also used, in the words of the consultant P3: "I also use the tools of ETL "Extract Transform Load" like Talend or Snowflake". In addition, some large companies have also developed their own BI software, showing their seriousness and a good awareness of business intelligence technology.

2.5. Challenge

Findings from this research highlight that the two biggest problems today in the implementation of projects related to business intelligence technology are those related to data and related to changing habits and behaviors of employees.

First of all, data-related problems can be mentioned as data governance. According to the consultant P4, "Team members will have different concepts or methods for defining the KPIs they want, such as revenue or profit figures, and it will be difficult for them to agree easily on which method of calculation should be the last thing they want, those numbers should be taken or not, the data should be taken from this data source or not".

Next, there are many challenges in gathering data from a variety of sources. According to the consultant P7, "The difficulty could be from the source of data. It's not centralized". BI can connect data from many different sources. However, the person performing that job must also understand the data structure in the enterprise. While for large enterprises, structured data is extremely complex, with different data formats. Getting the right data is also a problem, and that data is still unusable. Those are just raw data and need to be processed, filtered, cleaned and normalized in order to be analyzed and calculated.

Finally, according to many interviewees' comments, change management is a challenge when working on projects related to business intelligence. According to the consultant P3, "People are used to old software, and the new tool is so complicated, so to be able to apply new software, it will take a lot of time for training, recruiting and changing work processes. By contrast, it's a bit paradoxical, although facing many obstacles in change management, compared to other fields

such as sales and human resources, digital marketing is the field where BI technology is easiest to be applied and everyone is easy to get used to it. Most of all, change management will not be as difficult as other departments". Indeed, even though BI tools like Power BI have an intuitive interface, having to switch over to BI tools from outdated software and having to explore and work on a new interface is still a problem. for employees in the client company. The bright point here is that digital marketing teams are used to having to work with multiple digital platforms at the same time, so it will be easier for them to get used to and use this BI technology.

3. Transforming

3.1. Result

After observing, looking for approaches, and testing BI technology to a certain extent, businesses will begin to realize certain changes with positive results. According to the consultants, although these results are still largely invisible, they will, however, bring long-term effects rather than a short-term effect such as increasing return on investment (ROI).

First, companies began to notice a change in the quality of their data. According to the consultants, they can get the KPIs they need. Next, a lot of businesses realize the importance of business intelligence to increase work productivity, automate work processes, thereby saving time, especially in the future when the amount of data is more and more, the difference in time between manual and automated ways will increase more and more. As the consultant P7 said, "Before they needed a week to get the insights of a day, but now it's just 5 minutes, so of course, they are happy with it. Not only that, but they can also be able to identify the issues easier". Therefore, it can be seen that BI also helps them identify problems in their database, such as data duplication, thereby helping them to reduce errors in KPIs calculations and obviously leading to more accurate decisions, increasing productivity as well as reducing time to check or correct errors.

More surprisingly, another positive effect of BI technology recognized by businesses is cost reduction. It sounds paradoxical because in the beginning, businesses will only see investing in it as a big expense and will not get immediate results. However, according to the consultant P7, "...it would help to reduce the cost because in the long run they won't need a lot of people to do the operation to get the results". The long-term adoption of BI technology will help businesses not have to spend more resources and capital to recruit more staff to perform manual processing tasks because the processes will now be automated. And finally, one application of BI that is also

frequently mentioned by consultants in previous sections when asked about their clients is real-time data visualization. For businesses with lean operations, or an agile spirit, constant change and improvement are essential. But changing or improving must also be based on some reason or logic, not instinct and feelings. And according to a consultant, BI has helped businesses "track the KPIs they want in real time" (stated by the participant P5), since before making any decision, even very quickly, businesses will tend to check and observe. data first, thereby creating a routine and behavior based on the data. That helps make better decisions.

3.2. Area

Inspired by the Bi capabilities maturity matrix, from sharing with consultants, we can see that people are the biggest change in businesses in the transformation process. Besides, other factors also change more or less such as technology, culture or process. First, there has been a big shift in the human element. The reason is that, when a new technology is applied, the staff in the digital marketing team must have high qualities to be able to operate it properly, employees must improve their IT skills. Those problems can be solved when companies consult to help to train employees for client companies. In the worst case, if they can't find employees who are able to operate, hiring new people can be considered. However, it rarely happens because BI projects are created for the end user so it will be extremely intuitive and easy to use. Next, technology will be a big changer. According to the consultant P7, "...they will invest money to buy the BI licenses, servers to hold all the data together, the data storage...". These new technologies will gradually replace the old, incompatible technologies to handle increasingly large data files or big data. Moreover, the working culture will also have a change when everyone in the business will have more "BI culture" thinking and behavior. An example from the consultant P7 is "...once they understand the way of using the BI, gain more control of the data, it will make them use and rely more on the data for the insights, they will not say "Oh yeah I think I work well so I'm going to do it." but "Yeah, even if it is a great idea that we can do, let me check how it happens every time". Businesses have a data-driven way of thinking and behavior to inform future marketing decisions and strategies. And as a result, business processes will also change with operational processes integrated with BI technologies.

3.3. Future vision

Finally, after applying BI solutions in their businesses, many businesses have different visions for this technology. It can be seen that most businesses want to expand this technology

more not only in the digital marketing team but also in other departments. In the case of the consultant P6, "when we build the dashboard for them, and they show it to their team and even other departments. And it makes other teams desire to work with us to apply for the BI. So, most of the time they would try to apply for it in the different department after success in their previous team". On the other hand, businesses also tend to want a continuous improvement when applying this technology, they want to apply it on a higher level and want their team to be able to run it completely autonomously instead of having to go through consulting firms, as consulting services are still paid and that would increase the cost for businesses.

VIII. Conclusion

1. Implications

The purpose of this thesis is to study the awareness of businesses about the importance of business intelligence technology to improve digital marketing performance. It studies how do they understand the concept of BI, how do they apply it, and if there have been any changes in perception, corporate culture or business model.

Business Intelligence is no longer a fairly new concept that is becoming more and more popular day by day, especially in the marketing department with large data processing needs coming from different communication channels, as well as the increasing need to create dashboards or visualize data for reporting or presentation purposes or to automate workflows, BI plays an increasingly important role in businesses. However, many businesses did not have a broad and in-depth view of this technology. causing them to become lost and sometimes misunderstand, misapply or simply cannot integrate it into the backbone of the business, and some of them waste money and time.

Teece et al. (1997) have based their notion of dynamic capabilities on three clusters of actions: sensing opportunities, seizing opportunities, and transforming organizations (continued renewal). This model will be used as a measure to review and evaluate the perception of businesses through different stages.

To conduct this research, a qualitative interview was conducted with 9 people who are consultants working in the consulting firm Equancy. These consultants all have experience working with business intelligence technology in digital marketing and have the time to work and consult with many different client companies coming from many diverse fields and also having different company sizes. Research findings have shown that businesses have more or less awareness of this business intelligence solution. These perceptions could come from external factors such as the market, competitors, the introduction of consulting and software companies, or from the application needs of the businesses themselves. Most businesses are open to this technology with the help of consulting firms that help guide and inform businesses. Not only stopping observation, but businesses have taken accompanying actions to apply this technology. They can carry out projects by outsourcing to consulting firms or do it themselves and leave the consulting firms alone to perform their missions as advisors. However, most of them will let

consulting companies do the projects, thereby seeing the importance of consulting firms to help businesses make the transition and adoption of BI technology.

The technologies, software as well as scope of applications are also many and varied. One of the most widely used business intelligence-related software is Power BI which is free and easy to use, however other paid software like Tableau is still used and it depends on the company. Companies apply BI technology to solve many operational problems such as data collection, processing data, building dashboards and visualizing data for presentations and presentations as well as getting real-time insights. During the implementation of the project, enterprises encountered many difficulties related to data sources as well as difficulties in change management because they had to change the mindset and way of thinking of employees in the enterprise. However, it is not a waste of money, businesses have also realized the benefits of applying business intelligence technology, although according to the comments of the consultants, these are intangible and long-term results, not helping businesses increase revenue immediately. The first is improving the quality of the data they manage, which helps businesses get KPIs more quickly and accurately. Next, BI allows automating of the processes of working with data, thereby helping to increase labor productivity and reduce working time, helping businesses save money when they do not have to hire employees to do the work. craft service.

In the process of transforming with business intelligence technology, people are the best agents that change the most when they will have to have changes in thinking, thinking and behavior to be able to work with BI software. Technology also needs to be invested in and upgraded. After all, most businesses really have the desire to continue using this BI solution. They really want to improve it continuously in the digital marketing department as well as want to apply it more broadly in other departments of the business. In that case, consulting firms are now considered as a bridge to facilitate this process of transformation. They will help businesses orient and strategize for the adoption of this technology, helping them with construction and technology transfer as well as training the employees of the client companies, thereby enabling these companies to work autonomously with this solution and achieve the ultimate goal of making it part of their operations, allowing businesses save a lot of time, increase productivity, and save costs thanks to automation as well as get the insights in real-time. As a result, businesses will make informed decisions and strategies when it is data-driven decisions, not feeling-driven decisions.

Finally, regarding the relationship between thesis and internship, I am currently interning at the consulting firm Equancy in the position of Digital Analytics consultant. My mission involves digital marketing activities and campaigns, as well as daily tasks like tracking and reporting,

working with SEO platforms like Google Analytics or Adobe Analytics. This research will help me better understand business intelligence as well as its application in digital marketing, thereby helping to optimize my productivity and automate work processes, which helps me save time so I can challenge myself more with other tasks or with other clients who need advice on digital marketing.

2. Recommendation

Finally, the business itself should also have an innovative mindset. With the rapid development of technology today, the slow transition will cause businesses to be left behind. Therefore, businesses need to have policies to train their employees on BI technologies, as well as change the mindset of managers to be open to this technology and go out of the comfort zone to test it.

We realize that, right from the beginning, businesses have a basic understanding of BI, but some businesses still do not fully understand its nature as well as the full benefits that BI can bring to the world. Improve productivity for digital marketing. Therefore, the advice given is that leaders should focus more on research on this topic in a systematic way to get a comprehensive view of BI. Managers or CEOs play a huge role in the business and their vision will also influence the vision of the team members, they should also understand that this BI technology will not bring an immediate result. immediately to them, so they shouldn't be in a hurry but treat it as a long-term investment. Businesses that do not have a complete view, do not have a clear direction, or do not know where to start to implement a project, can completely look to consulting companies. Consulting firms with extensive experience working for companies from many different industries can help businesses make it happen. As seen from the results, businesses after cooperating with consulting companies have had positive results and most are satisfied with the benefits that this technology brings. It can be said that consulting firms will close the gap to access to business intelligence technology.

In addition, BI is inexpensive compared to the benefits it brings. If some businesses are still afraid that the application of this technology will be expensive, instead of investing too much money to invest in licensing software like Tableau, they can start with free software like Power BI. They can run small and continuous tests, and use agile methodology to change and improve results continuously, thereby reducing research and development costs. Another solution offered to businesses is that they can create small projects on a small scale in advance to see results

quickly. From there, businesses will have the motivation to continue with other bigger and more ambitious projects.

Next, we found that one of the difficulties that businesses face after applying business intelligence solutions is change management, because some employees in the company are afraid or afraid of new technologies when they are also familiar with old technologies and do not want to change their habits. The advice given to the leaders is to convince them and update employees with the latest technology trends so that these employees do not feel surprised. Then, the leaders could regularly organize training sessions, share knowledge about the BI technology as well as invest money in online/offline courses or software certifications to help employees learn and adapt to new technologies. Managers should also understand that the successful application of new technology is the effort of everyone in the team or department, not just the manager. At the same time, business owners should also inform their plans in advance to lower-level employees so that they have time to prepare their knowledge or skill set to respond to the arrival of new technology in the department. Enterprises must avoid sudden announcements or avoid immediate application of BI technology without informing employees, leading to shock and inability to adapt to changes.

In some specific areas of BI technology, such as data warehouse environment or business analytics environment, if the head feels that his staff is having difficulty to perform complex tasks, it is necessary to outsource, such as a consulting company or an expert in that field to help and help employees in the company do it. those complex jobs. That way, employees in the enterprise only need to do simple tasks in the user interface area without having to engage too much in complex BI tasks. At the same time, thanks to that, employees will not have difficulty getting into this technology and will not be afraid. Furthermore, in order to help employees get used to new processes quickly, enterprises need to develop serious and detailed standard operating procedures (SOPs) to guide their employees step by step to access this new technology. Managers should allow their employees to edit processes or listen to employees' opinions in order to find difficulties or problems that arise in the process of performing work and to take measures to update them. update or edit the process. These SOPs will also be useful documents for new employees to refer to and keep up with industry requirements. On the other hand, when recruiting new employees, businesses should look for candidates with good qualities and the ability to adapt to new technologies in general and BI technology in particular, enjoy working with new and constantly changing things and have an open mind, or a mindset of getting out of the comfort zone.

Furthermore, consulting firms or BI software developers can play an important role to help businesses to improve BI technology adoption by promoting and introducing more of these technologies on communication channels such as LinkedIn or the websites of the consulting firms (or BI software developers) themselves. Introductions to Bi technology should be in the form of case studies, to help businesses understand it practically.

Finally, the government also needs to take measures to increase awareness of BI technology among consulting firms using mass communication, business and technology forums or events. They can also invest money to create hubs, which are bridges between businesses, consulting firms, and software companies to help businesses permeate an environment with new technologies and modern solutions like BI, to help businesses open up and have a better view of this technology, avoid creating fear, wariness or conservatism against new digital disruptions.

3. Limitations of the study

Like many other studies, this study also has certain limitations that need to be considered along with its results, analysis and recommendations.

First of all, Equancy is only ranked as a small and medium-sized consulting firm, the number of employees working here is still small, and even the number of employees working directly with both business intelligence and digital marketing is extremely less, leading to a lot of difficulties in collecting samples and ensuring the expected number of samples. Therefore, the small number of samples makes it difficult to ensure the representativeness of the population.

Secondly, the participants in the interview are almost those who are working in the position of consultants, only one person is a manager, and many of them still do not have a long time of exposure to the world of consulting in general and in the field of digital marketing or business intelligence in particular like seniors or directors, and the number of clients they interact with and consult. not yet diverse and numerous, resulting in their lack of in-depth knowledge and experience. This lack of experience and knowledge makes it difficult to delve into aspects of both business intelligence and digital marketing, making the information and data collected also not yet fully insightful and scholarly.

In addition, from another perspective, some external causes such as this technology, although present for a long time, are still new, unfamiliar and have not been applied widely in businesses. That makes consulting companies also not have many opportunities to approach, cooperate and work with a large number of corporate clients from many different fields, with

different business sizes. It is also a possible reason why consultants still do not have extensive and deep experience that makes them unable to share deeper experience during the interview process.

Moreover, because it is a small and medium-sized business, the scope of work in its missions and projects with customers is not entirely large, and some missions have not covered the whole project from the beginning to the end. In addition, many projects are still in the process or have just been completed. So in some ways, that limits the ability to give consultants a holistic and broad view of the importance of business intelligence to improve the performance of digital marketing, making the results of the research not so broad and generalized, and have not yet touched and mentioned businesses working in sectors outside of the areas listed in the results, or not reaching many small and medium-sized businesses that have, are or will be adopting business intelligence technology in their industry their digital marketing.

At the same time, these are also subjective opinions from consultants. Therefore, most information and data will be biased and tend to be one-way. Consultants will also tend to place more importance on consulting firms in raising awareness among client companies of the importance of business intelligence to improve digital marketing performance. As a result, the obtained information lacks objectivity and lacks information as well as the importance of other factors.

Furthermore, information and data on perceptions of client businesses were collected from a consulting firm. Therefore, it is difficult or impossible to collect the information of customers who do not contact or seek the help of a consulting company or self-aware or develop BI technology. Consequently, that makes it impossible for the study to touch all of the business files and makes the results more biased in terms of whether clients work with the consulting firms.

Additionally, due to the time limit of an interview and the specificity of the BI capabilities maturity matrix, the author has not been able to collect further data from the consultants to be able to answer in detail for each element in the matrix.

All of the above causes will make it difficult to collect in-depth information and knowledge, which can reduce to some extent the quality and quantity of the collected data.

A few other aspects should also be mentioned, such as the dynamic capabilities model consisting of three factors sensing, seizing and transforming, which is used to test the awareness of corporate customers about the importance of business intelligence to improve the performance

of digital marketing, in this research paper. This model is still widely used and applied in many other technologies than just business intelligence, and because it is still a generic model that has not been customized in detail just for enterprise intelligence technology. The lack of a detailed business intelligence-only model also made it difficult for the author to gain a deeper understanding of business intelligence's awareness of corporate customers. That could affect the quality of the analysis, conclusions, and suggestions of the author.

4. Areas for further research

This research can be widely applied in consulting firms to help understand more about customer perceptions of the importance of business intelligence to improve digital marketing productivity. First, research could be done with more consultants who have worked with clients for long periods of time and spanned a wide range of assignments and fields. Consultants with senior positions, managers or even CEOs are encouraged to do research and collect data. Second, this topic can be used for further research on other consulting firms, small, medium, large, or even global consulting firms, that will help bring a more multi-dimensional view of the real role of consulting firms to help raise awareness of client businesses about BI. as well as get a more general view of the range of projects the consulting firms are involved in with their clients. Third, business intelligence is really applied in many fields, not just digital marketing. So expanding on this topic in a way that the importance of BI in areas beyond digital marketing such as human resources or finance could be a way forward to help bring a more comprehensive picture of the application of BI technology, helping businesses realize its importance in all activities or departments of the business. In addition, as mentioned in the limitations of the study, due to the limitation of interview time as well as the specificity of the BI capabilities maturity matrix, the author has not been able to collect detailed data in this area. Therefore, the author proposes to organize qualitative interviews just for this part with the consultants. Thus, consultants will have more time to dig into each element in the two dimensions of the matrix. At the same time, before the interview, the interviewer needs to have a private talk with each consultant to explain to them the concepts of this model, so that they are not surprised during the interview and have the time to prepare the response in advance.

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Appendices

Appendix 1: Interview script

Participant	1. What field do clients work in? And how big are those companies?
P1	I work with client companies in the fields of ecommerce, telecommunications, and pharmaceuticals. They are all big companies not only in France, but they also have international influence
P2	I work for a company in the automobile sector, it's a big company
P3	Generally, I work with big companies, even with CAC40. It is a list of the top 40 publicly traded firms in France, sorted by trading activity, market capitalization, balance sheet size, and liquidity. Then I work principally with the clients of the industry of aeronautics and automobile, tourism and retail.
P4	In general, I work with clients in the travel, retail, finance and luxury sectors. Customers are also diverse; they can be from startups to very large global companies. Most of my clients are using BI.
P5	I work with clients from many different industries. Many of them are global companies. They can come from industries such as food and beverage, wine and spirits, entertainment and hospitality, telecommunications.
P6	It's very vague. It can be from the retail industry like food and beverage, to the construction industry, B2B e-commerce, and from the very big companies which are present worldwide with more than 1000 employees to some small and medium companies (SME) with around 100 employees.
P7	I work with a car company Volkswagen, in the personal vehicle team. It is a very big company.
P8	The client I work with is Volkswagen, a very big company.
P9	They work in the aeronautics industry, entertainment, insurance, hospitality. In terms of size, it depends on the company. Generally, it's the middle to big companies.

Participant	2. How are your clients recognizing the recent emergence of BI in digital marketing?
P1	They know it from the market, they will always seek for the new technology on the internet, news..., They can also see from their employees because they will have internal meeting with them to see the working methods and procedures, and they will see issues and limits when they work with a huge data which are from a lot of kind of data sources. In some cases, they are informed by the agents of the consulting firms.
P2	They can recognize from the market and from their employees
P3	The need for data-driven decisions in digital marketing, the need for valorization from the clients and the offers which highly push the BI. They need to connect better with the data to get a higher performance. The objective is a better connection with the consumers, so the client companies can do better targeting, for example customize the promotion for each segmentation of their consumers.
P4	They realize that they need to be able to access data and display digital marketing data. Therefore, if you get data from Google Analytics regularly from tools with a few ticks like that, it will be easier than relying on someone who doesn't know how to use all the functions in Google Analytics to get insights from web marketing campaigns, or and relies on a lot of people working together to get insights.
P5	In the digital marketing department, because it's a "digital", so they have more awareness of BI. And when they usually work with Google Analytics and Adobe Analytics, they really want to make it at another level, a higher level, so they are going to try BI to automate all these things (data...). There are different steps: first you have to create the KPI, then follow them, you realize that there are so many people working to update those slides or numbers, then you have to try go to another dimension. You will want to try to automate a lot of things you'll have so far, otherwise you would lose a lot of time & people. For BI, you also need to have an aesthetic eye to work with design tasks, because in BI, sometimes you don't just want to see boring KPIs numbers, you want the presentation to be beautiful as well. In addition to reducing work time and improving data visualization, it also helps you discover common problems and errors such as duplicate data in the database, so you can know the source. of the problem and

	find a way to fix it from the root. Depending on the issues happening during the business, not update the using BI trend, enterprises use BI as a tool to solve the happening problems, improvement
P6	BI is the new thing that we need to know but basically, they already recognize the needs of doing data analysis, they are just not aware of these BI tools that allow them to save time and get a better analysis. Sometimes they have more and more data that needs to be analyzed but they just don't know how to solve it.
P7	I think they have seen it because they tried to work with another agencies 1 and a half year ago. They've tried to make a dashboard. I think they did it on Power BI, but in another way. But in the end, we did work well. And I think thanks to the BI project. They would like to put the info together and have the overview, the performance or the best level of analysis from the data source. Moreover, the people in the company talked to them about it and presented the beneficial stuff. I guess they slowly recognize it but more from the employees.
P8	It’s typical to think & move very slowly. They are in individual departments that are either going to have first-hand experience and understand that BI being useful too. They know that something to explore but the organization and structure are so big and it’ hard for project contraction. it cannot implement right away BI tech, they have to hire, but they don’t want to pay other people to do it so it’s a kind of difficult situation, a part of my project is to create proof of value.
P9	Some of them realized that this was the technology their competitors were using. Others know this technology from the advice of consulting companies through some tech events or expositions. Some of the companies get this emergence directly from the ads of the companies who make those tools like Power BI, they do the marketing to sell their tools and licenses.

Participant	3. How do your clients react to the emergence of BI in digital marketing? Do they think that they need to apply BI to improve their digital marketing performance?
P1	It depends on the company, sometimes some companies just see it as a "trend", and they follow that trend superficially without taking it seriously or treating it as a necessity. But sometimes they see the potential issues and they think they need to

	apply BI before it can happen. Some companies feel excited and interested in it, but there is no more than that because they are still "innocent" towards this technology, and they still cannot the whole benefit that it could bring to them. Yes, they feel that it is important and useful. But it is still nice to have, not a vital thing, and in terms of the cost, they still invest but not a lot of money to this technology
P2	I think that they have a positive reaction toward BI, they have tried to develop their internal tool and the mission that we work with them is just about giving them the numbers and analysis so the clients can fill it on their dashboard.
P3	They are more and more excited, I can say that. On the beginning I was just a trend, but now they started to apply it and saw the real value of BI. they became the official users of that solution of BI on a daily basis. Everyone considers it essential, even vital, because it helps connect data together, standardize data so that we can offer the best adaptive solutions, thereby helping to better understand customers.
P4	I can tell they're really excited about this technology. In some companies, what they want at the end of the day - the goal, is to enable all team members to use BI to get the insights they want. It is necessary because some managers need it for weekly reports or they need a quick check, so it must have.
P5	They are excited but it really depends on clients but usually they have a wow effect, and they want to take it to the next level, like, "Ok this is good, next we want to have more information in this dashboard". At first, they were quite indifferent to this technology, especially in some departments. But then they had problems working with large amounts of data, and they had to ask for help. That's why they became more open after that. However, not everyone is open to it, but especially for the digital marketing team, most of them are quite open to this new technology. On the other hand, some customers don't really see the added value and BI brings, they are satisfied with the visualizations available on analytics sites like Adobe Analytics. That's because they haven't seen the real use of Bi to save time. For

	customers who adopt this technology. At first, they just saw it as an extra element in their projects, but over time it became an integral part of their work. But for them, BI won't be vital, like "without Bi, the company will go bankrupt", that won't happen, but it's still essential.
P6	It depends on the clients. Sometimes they can be very excited because they discover a new tool and it shows a lot of advantages, sometimes they can be stressful or afraid because they don't feel comfortable with the IT tool, and they just use Excel for a year by year and feel difficult to move to the another. So, what we can do is to help them and teach them, explain step by step why it could be a useful tool, why it could help them. I would say it depends on the size of the companies. If it is a very big company with a big amount of traffic on the website or a lot of data about their customers, they will think that it's useful and necessary for them to have this BI technology to make the decision. But if it's a small company that doesn't have so much traffic on the website or data, I'm not sure they will think that it could be useful for them to integrate the BI solution, it could be nice to have, but Excel still can do it perfectly in terms of the visualization of the data.
P7	They are excited and hopeful about it. We come from a consulting firm that has BI branch, we are the expertise in this field, and they see what we can bring to them is a good match, and they are excited about BI. I think in some way they still think that it is nice to have because in some parts, up to now, they still have acceptable results without BI, you know that without the BI they still could follow the performance, the different topic and scope. But now they slowly start to see that other companies have the BI projects. And instead of manually getting the data to get the insight, they realize that they just need a bunch of people putting the data together and then they have a bunch of experts like us who know how to use that final data, they can get more. But I don't think that they will have the mindset that "we need it". Because if they really need it, they will try it sooner.
P8	It could be useful, but the thing is that it’s so slow moving that we need to create proof of value that ppl don’t really see what they can gain from it. So it could be that be interesting, something to explore, be curious/ not curious they can do it by

	themselves Do they think that they need to apply BI to improve their digital marketing performance? (Unnecessary, nice to have, must have, vital...) Maybe needed but the client mustn't need to have it. Pay less the biggest return investment so they not really interested in providing us number mkt matric they want the actual insides, Nice to have I think they need but they don't formulate they need Ppl talk about it but they don't really do that much
P9	I would say it depends on the person. Firstly, I want to say that the emergence, it's not the emergence anymore, it's like finished, because it's already emerged, and it begin to be implemented everywhere. But it is the moment when the customers know what the purpose of using it or how does it work, not everybody is using them, because besides BI, they have different kinds of tool. They use old tools or undeveloped tools. Some customers still use it because it still works, and they don't care about the new tools. Some people already knew about BI, but they still work with their old tools. But generally, in most cases, I see that they accept the BI very well because once you show them the use case, they will say "Oh it's great". On my own experience, I would say that not many people would say it unnecessary, and some of them say it's vital, we can continue without it. But some of them said that "It's good to have but...". Maybe it's a bit cliché but they think that BI is just "visual" aspect, and they don't see that BI is more than just visual things, like centralizing the data, getting interactive, having user-friendly interface, making the filter...everyone can use it and just not only us. Moreover, sometimes it could even help you to find some problems with the data. Because when you show a graph, and there's an error or something, you can identify that it's because they didn't do well on data engineering because the data is not good.

Participant	4. How do your clients seek a way to integrate BI into digital marketing in their business? How do they seek the support of your consulting company?

P1	There are many ways, sometimes they will find some consulting firms like us, sometimes it's us who will find them to present to them the benefit of implementing the BI.
P2	They will seek our support from us
P3	They have tried a lot on their own, some of them escaped, and it depends on the results that they will decide to continue this game or not. But normally they will start to look forward to some consulting companies, the expert, raise their use case to us. And the consultants will say yes or no, applicable, feasible or not. They need consultants to accompany them to apply the BI solution in terms of implementation and strategy making.
P4	In my case, the client companies will definitely turn to the consulting firms first to seek help. Therefore, the most common way is that they will find and recruit external teams to develop reports or something like that. I also know some companies, instead of hiring people from outside like that, they will ask those people to teach the employees on their team how to use BI. But most of them will outsource, because they don't need to hire someone to work for them for a long time, they just outsource to help them implement a project in a few months or design them a dashboard and that's it, so they don't need a full-time developer. It is completely up to the customer. There were a few missions that I had to develop from start to finish. But at the same time there are missions where I'm just a consultant, I'll get into their software, analyze what just happened, give context looking at how BI is integrated, quote, timing and staff to complete that project for the client and let them consider if it is possible, it takes a lot of time. And then they will take this information and find another company to do it. It's consulting work, sometimes they will find a company that offers cheaper rates than our company.
P5	Usually, it depends. Sometimes they may have tried to build it themselves, but most of the time they will hire a third party to do it for them because they don't really know what they want. The biggest advantage of having a consulting firm to work with is that the consulting firms have worked on a lot of projects, so they can easily find out what their clients need. Even if the company has a team working on BI, sometimes that team has to consult consulting firms.

P6	The last company that I worked for, I was the only one who was working on BI. And it was much more difficult because i am the only expertise on this solution. So for the companies who just have the basic knowledge with this technology, they have to meet a consulting company that have all the resources and skills to realize the projects because as a consulting company, we already worked with a lot of companies from different industries so we know what is the most appropriate solution in which industry or in which type of company.
P7	They have tried to integrate it is to make an overview of the performance in the different scopes like analytics, traffic data, lead data (or potential clients), sales data, target stuff... but at the same time, they cannot see what works. Their architecture of data is very big. It's not just one table of sales, one table of customers' information, one table of products' info and you link it together, that's a basic thing, but in this case, they have some problem like the duplicate of the lead data, or there are a lot of data source or info to match and connect that they wouldn't be able to do it by themself. So, from that extent they will need us to do it. We've been used to working with different data sources, they need us to automate it.
P8	Small, Kina of proving they not really get the require They not really requesting stuff which we try to collab They not really do They need the support from consulting firm
P9	There are many ways, because some of them approaches the consulting companies, some of them can go to some events like data meeting day and big data events where the companies show their technologies, some of them can make a review in their internal team and it's like "We don't see clearly and easily the insights from the data", because the manager cannot just looking at the code, they need to the something easy to understand which is not the technical part of the data. And BI tools can help you to better know the insights through the data like "Who are my customers, potential customers?" and from that they can have new approaches to improve the marketing strategy. There are some cases that the marketing team told their manager that we need to have a better analysis tool, and

	the manager will think, decide and give a budget to them to buy a project related to BI tools.
Participant	5. What did you do to help them? How do your clients implement BI technologies? Is the consulting mission effective or not, why/where is effective, and why/where is not effective?
P1	We collect data from various sources such as Google Analytics, Adobe Analytics, Data studio, Excel files, PDF files. From there we will collect website traffic and conversions. Then we help them process data, as well as create dashboards to visualize the data. The final goal is to replace their entire existing workflow, which takes a lot of time, with a new process that integrates with BI and they will work directly with BI software instead of traditional software. We're in the implementation phase right now so I can't say the results yet, but the previous projects worked well, and it helped clients solve their problems on time
P2	They need us to calculate, analyze and provide insights so they can put it on their internal dashboard. The mission is effective and mostly the performance.
P3	I really work with the data of order acquisition in a mobile application. When you book a hotel, you can make a booking. And the BI will collect the data, sometimes the real-time data for example adding the service to cart, booking, the population type which use the application according to the region, so we can identify the groups of consumers who have the similar behaviors, which is helpful for the segmenting and customization of the promotion or ads to them. BI is used to prepare the data in advance: connect from different sources, extract the data and put it in the data warehouse or data lake. The idea is to transform, standardize, aggregate the data so it can be ready to use. The consulting mission is effective. Normally a project can have 3 phases: ....
P4	It depends on the complexity of the job. Sometimes we offer them service packages such as consulting and project implementation. And they just accept the consulting service first, and then they decide to let us do it or not. Then we had to work for 2 months, we presented and showed them our vision and how to do BI. In that case, they just pay us for the consultation.

	I found it to be effective, several projects helped point out the problems they were having. Normally, however, I think it's hard to measure. But I think with dashboard as the end result of the project it is always useful for managers to get accurate insights or KPIs in a short time. Goal, advice, development - customers just need one of these/ after presentation, high cost-> no build, no continue Generally effective, analyze problem, the given solution will be use/not to measure the effective
P5	It depends. Some companies will let us do the work from start to finish. We gather, collect the data, we use SQL to query the data from scratch, then we organize everything, we work with them to define goals and KPIs to achieve, as well as calculation methods or formulas... and build the dashboard. Others just let us design dashboards or advise on strategies to apply BI, or how to set KPIs, so you won't work too much with data collecting, because some of them already have a team to do that job. Missions are generally effective and bring a lot of value to customers. With the help of consulting firms, clients are better oriented and thus it better meets their real needs, sometimes it's not what they want, but it's what they need.
P6	My first step is to explain to the clients why we need to use Business Intelligence, and how we can help the clients' companies with the daily tasks. So, it depends, sometimes we need to make a benchmark of different BI solutions to the clients because they don't know the different tools so they can be aware about the new tools. But normally, my main mission is to build the dashboard, with Power BI - a tool created by Microsoft. So, I will try to centralize all the data of the company to make a measure, to create the KPIs about this data, and build the dashboard by visualizing those KPIs. Our mission is also to help them learn how to use this tool or even integrate this tool within their companies. Most of my project processes, the clients will send me a dataset, and based on that you can build some KPIs, some graphs that you will show to the clients. If they

	don't like the design, they will tell you why, then we will correct and choose the other design. And it depends on the clients whether you have the right to build your own KPIs or not. The mission was effective, we were working well, and they were satisfied, and they continued to contact us to collaborate on another project.
P7	We did a full overview of what result what kind of info we need to see at the end to help them (markup of the project) and then we identified all the data source that we use, and it's like 10 different data sources. And then it comes to my work, my work is like implementing some of the sources, all the lead stuff, linking the data together, figuring out how we can merge the data, cleaning them a bit because they can overlap. We don't have to clear a lot of data, but we still need to manipulate it and transform it in a way to be usable for the results. Honestly, I would say it's a full implementation because the team is planning to do the whole implementation. But in the end, we will give them not only insights but guide them how to do it or what they need to do it, we make the whole product and at the same time help their BI team do their tasks. I could say it's effective. I'm not sure because we are still working on it but the effective thing here is that we have results, everything is still on the right progress. But we haven't finished yet so I cannot tell you whether it's successful or not. However, I can see that when we centralize the data and make it easier to use and get insights from, and compared with what we are doing right now, it will be effective. It's
P8	House thing? They can be extended to what we can make it available to client We switch from a manual method to a more regular approach we cannot make the proposal and they reject because of budget reason or something Doublicating, annoy existing solution which doesn’t work They clearly depend on our company to build the dashboard or other stuffs Is the consulting mission effective or not, why/where is effective, and why/where is not effective?

	Potentially effective? for the firm and for the client Because saving time, saving general resources Better internal investment
P9	First, the clients will give us the data, it could be clean data or unclean data. In the case of unclean data, we have to treat it to make it usable to put them in the dashboard, it depends on the clients. But generally, as a consulting company, we have to treat the data. Sometimes based on the need of the clients you have to ask them what data you need to get. Then I will be in charge of creating the dashboard and putting it to PowerPoint to see if it's more UX parts. You have to show the parts that clients need or the parts that you think useful for the clients, like which filter to use, which columns, tables to show. what role of those clients, "is it only for the marketing team? Or is it for the business manager? ". You need to make sure the purpose of the dashboard is, who is the user? So, to resume, I can say that there are 2 kinds of face of work when applying BI in digital marketing, the 1st thing is, all the scope, the people we can address, all the data which are ready or not and the 2nd is the creation of the dashboard. Yeah generally it is effective, but the missions will take longer than expected. I could take more time than you think.

Participant	6. How long have they implemented BI in digital marketing? From the perspective of your clients, what things make it challenging to implement the BI in digital marketing? What things make it easy to implement the BI in digital marketing?
P1	Usually with the projects that I work on, we will do 100% and they are only the final decision-makers. From the perspective of your clients, what things make it challenging to implement the BI in digital marketing? Difficulties for customers now can be the price of service, standardization of data, training of employees
P2	I have a reporting committee every month about the performance of the past months like lead, which shows potential customers. And Power BI is used to group

	all those data. I also work with internal tools of the client companies. There are a lot of calculus parts. I also use Adobe Analytics which helps to measure the on-site traffic, lead, and the data which show how many leads transform to sales (lead-to-sale conversion rate). I also collaborate with another agency who implements digital marketing campaigns. We have some difficulties during the project, like there are a lot of internal tools and it's complicated and not user-friendly to work with all of them at the same time.
P3	The clients are always the final-decision makers. But in terms of implementation, they can do it partially autonomously or fully outsourcing. It's not easy to estimate the time but normally it's about 2-3 months. it could be 1 year. But generally, to build a tool, it's 3 months, and then if you want to go further, like training or something, it could take longer. Another pain point is the personal data, the management of the personal data (collect and stock) is very complicated. We must comply with European cybersecurity legislation The pain points is change management. People are used to old software, and the new tool is so complicated, so to be able to apply new software, it will take a lot of time for training, recruiting and changing work processes. By contrast, it's a bit paradoxical, although facing many obstacles in change management, compared to other fields such as sales and human resources, digital marketing is the field where BI technology is easiest to be applied and everyone is easy to get used to it. Most of all, changing management will not be as difficult as other departments.
P4	Depend how complex customers looking for ‘1page dash’/performance, 3-4m It depends on the complexity as well as the customer's requirements for the project, it can be from 3-4 months I did see a few things, such as the ability to know which type of visualization, which graph. You also need the acumen to look at a data loop, to know what meaningful KPIs you can create with such data. Or you have to think about how to design the dashboard to have a beautiful, easy-to-use interface.

	Another problem encountered is data governance. Team members will have different concepts or methods for defining the KPIs they want, such as revenue or profit figures, and it will be difficult for them to agree easily on which method of calculation should be. The last thing they want, should this number be taken, should the data be taken from this data source. On the other hand, if the source is good, it will be easier
P5	It depends on the customer, but the ultimate goal is for the customer to become autonomous with Bi or dashboard related work, and we will only be advisors. I'd say it would range from 1 to 3 months if you only counted the dashboard making process. But if you look at the whole data collection process, it can take a lot of time. In my personal opinion, data collection is always a huge challenge in the project. Sometimes the design work also takes a long time. You have a lot of people working on the dashboard and they really have different visions of the information they want to see and the design they want to see. During work with corporate clients, keeping track of what we have already done, regularly making meetings between the parties, giving them previews of sketches sometimes helps to speed up the work, making the mission easy. more, because sometimes you or your client will go astray, it's a good way to do it.
P6	Normally they will outsource what they need us to build the dashboards which are ready to use, so they just want the fully built dashboard so they can click and access the data. But they need to be autonomous as well because the data is changing every day, so they need to know how it works so they can integrate new data sources for example. At the end of the project, they need to be partially autonomous. I would say if you want a dashboard with 5-6 KPIs, maybe it's about 1-2 months. It could depend on the number of data sources, the design and on the security of the dashboard, which depends on different role of data.

	There are difficulties for the customer's staff switching to new software, discover the new interface while working on the project.
P7	We are still working and building it, but at the end of the project, I can say that it's still outsourced work. As the consultant, we use the BI at the first part to get the insight. But the final goal is they could use it autonomously themselves. They can log in to the report, the things that we have uploaded to the BI, have access to the dashboard and get their own info. So instead of asking us the insights, they just need to go on to get that info directly. But then as much as they could use it autonomously, it wouldn't be full because they still need consultants like us to get deeper insights or for the maintenance, so I think it's partially autonomous. I's about 2 months. The difficulty could be from the source of data. It's not centralized. The clients don't have to envision working with data, and not a lot of data is ready to be used. They always have to gather and merge them from many sources, from everywhere. There are some kinds of data like lead or sales, the data are cleaner and it's better to work with
P8	This project I am doing right now will be implemented in November. We really rebuilt the project last week, so it takes 2 months From the perspective of your clients, what things make it challenging to implement the BI in digital marketing? Slow organization is the big problem That we guess the actual implementation getting the data outlet? We have so many data resources, reliability of information updated- late one day- not work-> do it again, a typical problem, building trust What things make it easy to implement the BI in digital marketing? Communication - easy to get information and good working relationship, build trust (company, report - data/presentation

P9	It depends, some of them want something partially autonomous but still, they need our company to treat the data to have good data, some of them want something which is fully autonomous from the inside. It depends on the project, but generally the purpose in the long term is to make the clients to be able to use it autonomously, and at the end of the project, the clients don't have to ask us to automate. It depends but generally it's 3 months. But 3 months here í the time when you can understand the data, treat and analyze the data and make the first version of the dashboard. But after 3 months it will make more time to make something autonomous. The data of the customers is the biggest challenge to implement Same thing, it is the data, if it is available, ready to use, then the BI aspect is easier

Participant	7. What applications of BI have been, are, and will be applied by your clients in their digital marketing strategy?
P1	Normally we work with Google Analytics, Adobe analytics, AT internet (a competitor of Google Analytics which is creates by French people), Google tag manager, Adobe Target, Adobe launch, Google data studio
P2	It's GA, Adobe, Excel and internal software. Actually, I don't know if they use BI technology or not, right now it seems like they are trying to create, it is an internal tool, and it is not Power BI, nor Tableau. But they are not informed yet in terms of Power BI, it is us who help them to work with that. The internal tool just helps us to get easily data instead of going to search the data. Our clients don't have to do anything, but we help them by giving them insights.
P3	We use Tableau, Power BI, mostly BI, and Adobe Analytics for the acquisition and modernization of the data. I also use the tools of ETL "Extract Transform Load" like Talend or Snowflake. The clients also use some platforms like Google Cloud Platform (GCP). Yes, but it's rare that the clients are applying in their principal

	activities, but the digital marketing department is the area which is most applied. But they are more and more involving in this technology.
P4	We work with Google Analytics, Excel, Tableau, Power BI, and also Dataiku, which is a French software for data science as well as data exploration, Qlik Sense. Customers want automatic reporting, KPIs with just a few clicks.
P5	The main tool is Power BI. We also use Adobe Analytics, Tableau, Snowflake, Excel, Datama. Some of them have already had internal tools, but sometimes it's not so developed for the new department. Another department is not going to use BI in some departments not for the whole company. We do not consider Excel as a BI tool because it has a lot of limitations. It cannot treat a large amount of data. And if you want to automate by Excel, it will take a huge amount of time.
P6	The main tool that everybody uses is Excel, thanks to that you can make some small analysis. But because of that, sometimes they are not aware of the better tool to make data analysis such as Tableau or Power BI. Most of the time they don't have those tool or they have them but don't know how to use it in a very great way. The other reason is with the big companies, they have millions of rows of data, and Excel cannot handle all that data. Yes and no, I would say that most of the time these tools can be useful, but they can be afraid of changing these tools like Excel or PowerPoint.
P7	One of the main tools that they use in my account is Adobe Analytics, and they also use Excel. Some of the stuff that they sent to us is the reporting of the sales. Power BI is used as well in some operations. Moreover, they also have their internal software and platform, which is VWContact which has all the lead data. They also have some databases, for example the sales and those data match with the lead data. The company is starting to apply BI and implement it.
P8	For general analytics, we use Adobe analytics US scientific we use constant square, for example.
P9	In terms of tools, in the data aspect, which is more technical to code, it could be Python, SQL. In terms of BI tools, I can say Power BI, Tableau, Qlik Sense. Yeah, I can say that all of them are doing it

Participant	8. What are the current main tools or technologies that your clients use to work when applying business intelligence in digital marketing?
P1	Like I mentioned, it is designing the dashboard, visualizing the data, standardizing the data with Tableau, Power Bi, Qlik Sense
P2	I'm not sure because I don't involve them so much on their team but they seem use it to as a reference so they can make the decision and give the best strategy
P3	BI will help us to gather data from different data sources, such as Google Analytics and Adobe Analytics, combine and make reports in real time.
P4	Usually dashboards, data visualizations. They will try to extend this technology to other departments
P5	In addition to the applications of Bi that I mentioned earlier such as data collection, dashboards design. I will define new BI strategies for many other projects in the future.
P6	It's the dashboard, it will help to target the right customer, get the alert if you spend a lot of budget to run the campaigns. Moreover, you can restrict access to the data to the specific people. For example, only someone who works in HR can get the data of their employees instead of someone in another department.
P7	The main thing is to follow the performance of the marketing campaign, to do the dashboard, data governance, and keep the data "healthier"
P8	Dashboard, weekly/monthly report Like we need to have the proof of value then they can see what we can do for them
P9	BI is used to help customers to do better segmentation: BI can help people to aware of the data, to see which population, what are the different kinds of population to adapt to the marketing strategy. BI could also help them to see some tendances in the long term, demographic and geographic information. And from that, the clients can customize the campaign of the marketing strategy which fit with each region, each kind of customer, each period of the day, week, month or season...

Participant	9. What is the result of those implementations? Why? How do your clients feel the results after applying BI in digital marketing?

P1	The results are good. For my current project, we are still in the process of working on the project, so I won't be able to say anything in advance, but everything is under control and in the immediate future this implementation also brings positive results like the first numbers of KPIs. Customers are also satisfied with what's going on because they see results, they didn't see before or spend more resources to get there.
P2	The result is positive and effective, and they feel satisfied with that because they can get the insights that they want
P3	We usually get good results, with the operational efficiency. We reduce the workload, analyses, tasks, and we industrialize the operation and facilitate the sharing of information. Normally the clients appreciate the results.
P4	Overall, it will help the business team to be leaner, with less resources to work on. Everything is now automated with the BI solution in a very short time. Work has also become easier, and it is easier to use as well. Normally, the whole process goes well from start to finish, they greatly appreciated it. They know the KPIs they need, they are satisfied with the services we provide them. It's almost impossible for them to not use it and feel like it's a waste of money, because we've had to go through a lot of testing, testing, a lot of meetings, discussions, we also gradually improve the versions through each such test. And our consulting company also explains and gives them very detailed information
P5	The results are mostly positive as far as I can see. Of course, sometimes it is also very challenging when the amount of data is increasingly large and complex. We have greatly improved the accuracy and time to find KPIs and insights in digital marketing campaigns. They feel it offers good value and appreciate it.
P6	Most of the time it's positive. At the beginning of the project, you can be afraid about the result, because you cannot see directly that result. But 1 or 2 months

	later you will see it. Yeah, sometimes it can take time to be happy or satisfied but most of the time we have positive results. They are happy and satisfied
P7	The results are positive because BI helps to gather the data from different resources, so it will be easier for us to get the right insights. Before they need a week to get the insights of a day, but now it's just 5 minutes, so of course they are happy with it. Not only that, but they can also be able to identify the issues easier.
P8	Nothing has been produced yet. The work is done but not yet presented How do your clients feel about the results after applying BI in digital marketing? (They value the results, feel satisfied, unsatisfied...) Not really know yet
P9	Normally those are good results, because it helps customers. What can make the negative result is sometimes, the clients just want to see the results that they want, but BI will show the real results, the reality, and they said that is not normal because normally it is not like that. They are not satisfied sometimes but they have to accept the reality.

Participant	10. How can your clients measure the result? Are all the results measurable? If not all, which is the area that businesses cannot measure?
P1	BI helps to increase work productivity and reduce working time. It also helps to reduce costs because everything is now automated, and you don't need to hire more people to do manual work.
P2	Actually, I don't know clearly, because normally BI doesn't bring a clear result, and we cannot see it right now. But it can help to make a better data-driven decision and strategy.
P3	They will see a decrease in working time and workload, but it's not easy to measure, because it won't bring the turnover immediately. We are rather going to reduce the cost of operation than to create turnover.

P4	I guess some tools can measure the time someone can export the data from the dashboard, and from that you can measure the performance.
P5	The result is that they can track the KPIs they want in real time. Main goal: visibility action, real visual measure, save time. So far, given the data I'm working on, the main goal is not to improve revenue, but to improve visibility of some action taken in the companies. That's why you won't see too many measurable results. But at least, what we can see now is that we've saved a lot of time getting those KPIs, the cost of getting the insights has come down, and we know that our customers will have good, clean data to work with. There are tasks, which used to sometimes take up to a year, but now only take about a month. Such successes will sometimes help motivate other departments, through word of mouth, for example, to keep them motivated to adopt the technology. It is like a pre-test in a small scope, and if successful, it can spread to other projects and departments in the company.
P6	It's difficult to measure the result because it's not like when you produce a physical product, but most of the time you will have an overview of the data thanks to the visualization of BI and it helps you to save time as well during your daily task. The time is not easy to measure so I can say that it's intangible. But in the long term when they have more and more data, this solution can help to improve their overall time, add new KPIs, new data sources easier.
P7	The results cannot be measured right now because it will bring the long-term value. And there are some intangible values like you can identify the issues easier, and you can get a KPI easier, like the transformation rate of the lead... And it would help to reduce the cost, because in the long run they won't need a lot of people to do the operation to get the results. Another thing is time efficiency, but it's like there are a lot of things that are not measurable.
P8	We spend less time on the manual activities, more time on generating value, and higher return over investment.

	Potential results which are the inside, more relevant data being produced - a lot of intangibles, general approach as well, recommendations, the report of what we're doing right now, rethinking processes, rethinking the information we provide. The result is positive but it's hard to get the detailed number. We will help bring relevant numbers, and better data and KPIs.
P9	It can be KPIs, the numbers, rate that they want to see. Some KPIs that you cannot measure is like to better understand their customers, or to get a better performance. Sometimes it is ambiguous, and you cannot see it.

Participant	11. Is there any change in the procedure of working or operation activities after that application of BI in their teams? Do your clients have any desire, intention, or plan to continue to apply BI to improve other parts in their digital marketing activities?
P1	There will be changes in workflow, technology and people. They'll move on and want to get into it more, but they'll do it slowly and without haste because it's neither a prerequisite nor a priority right now.
P2	I'm not sure that I know because it's an internal stuff and we are still implementing the project. But maybe after that, they will train their people to work with new insights. And yes, they have the desire to apply BI in another level and they would like to be autonomous in the future
P3	Mainly it's culture and technology, for people, there is always training and recruitment. It depends on the result, it's hard to say yes or no. Generally, yes, if it works, customers will continue to use and internalize the knowledge
P4	At least 20 people working with report, no one dash, teaching seminar show people how to use, change magma rather than excel. Governance. Lean process. Dashb friendly solution, update excel data -> more cloud, push company to have more modern BI Changement management, data governance, leaner processes, technology, use cloud- friendly solution, cloud-based structure combine with BI. More & more companies do Really need

P5	Yes, sure, culture and governance will change a lot, because they will have a new "BI culture" where they will tend to think of this technology to solve their problems. Technology and software will also change. If before they only used basic software like Excel, now there will be more effective technologies. People will also change because they will also need experience and knowledge to work with BI, or companies will also tend to hire people who are able to work with BI. The process will also change more or less because they will also integrate this technology in the working process and consider it as an important thing. And at first, they'll be quite unfamiliar or scared to work with it, but then they find out that they don't have to do so much manually, and everything is automated, they will appreciate it and see it as an important part of the process.
P6	I would say People. Employees need to improve their IT skills because when you have more and more data, or tools, you need to know those tools and technology and so on. Yeah, when we build the dashboard for them, and they show it to their team and even other departments. And it makes other teams have a desire to work with us to apply the BI. So, most of the time they would try to apply for it in a different department after a success in their previous team.
P7	In terms of governance, yes, because they will have a better vision of the data that they work with. Secondly with the culture, I think it's great, because once they understand the way of using the BI, gaining more control of the data, it will make them use and rely more the data for the insights, they will not say "Oh yeah I think I works well so I'm gonna do it." but "Yeah, even if it is a great idea that we can do, let me check how it happens every time". Like if they have a reflect of checking the data every time so it's gonna be better rather than just asking us when they do a big move. This way even when they want to do a small thing, they can gather insights without having to ask us, because obviously the more you ask us, the more you have to pay us. In terms of technology, yes because they will invest money to buy the BI licenses, servers to hold all the data together, the data storage. People, maybe because they might help employees to prevent manual work but with BI, and from then, their people will have more time to do another task like analysis, putting the people from doing useless stuff to do useful stuff.

	After we made the BI, they would like to continue and apply to other stakeholders of their companies, just making other reports for another type of data. I think once you go with BI, you won't go back, you just need to continue
P8	Governance, yes. In terms of technology, missing data systems yet, people have the access to the data they need for generating reports, etc. so I think it’s moving on technology scale.
P9	Yes, in technology, because they have to invest in new tools and the way that they work is not in traditional marketing. There is a change in the people, because they have to have a high quality of skills or knowledge to work with it after their project without needing someone to help them. In the process, yes, for example there is a change in the process of putting new campaigns, they will go first to the dashboard to see the data and insights, and then to use it to have the appropriate strategy. Yeah, if the Bi works well in some part of the marketing activities, the clients will try to industrialize it everywhere, in the whole marketing department.