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ABSTRACT.

The emergence of Artificial Intelligence (AI) now indicates that companies can quickly establish long term competitive edges. Despite the widespread evidence that AI is creating competitive edges for companies, there lacks evidence that companies are adopting the technology to a possible extent. The diffusion theory suggests that technology enters the market through properly defined phases. They include innovators (2.5%), early adopters (13.5%), early majority (34%), late majority (34%) and laggards (16%). For determining the extent to which companies adopt AI, this research presents a case study on five main entities- Dublin Airport, IBM, the public sector and AnalogFolk.

Methods

This research is a descriptive case study. Descriptive case studies require the observation of selected subjects. The underlying subjects entail the five companies chosen for case study analysis. Also, the research is qualitative as opposed to quantitative. Usually, qualitative research requires an in-depth theoretical analysis. On the other hand, quantitative research requires statistical calculations. The collection of data requires opening the home websites belonging to the companies under analysis. For instance, Dublin Airport, FedEx, and IBM. After collection, the main methods of data analysis include grounded theory, narrative, and content analysis.

Findings

The companies reviewed view AI systems as enhancements of service delivery. Dublin Airport and IBM view AI as an enabler of the delivery, both practical and efficient service delivery. Also, the Defense Advanced Research projects Agency (DARPA) views AI as an enhancement to the delivery of services. Although this approach to AI systems is necessary, it is not sufficient. The reason is that there are a variety of other ways that AI can assist companies such as automated decision making at the apex of managerial grids. Some challenges prevent the said companies from attaining a large-scale AI installation. For instance, legal gaps, the need for comprehensive training data sets, and the need for labeled training data sets.

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Chapter 1: Introduction

According to Brock and Von Wangenheim (2019), there is an increase in the interest in Artificial Intelligence (AI) by both managers and academics. As a result, Brock and Von Wangenheim (2019) believe that AI will transform humanity over the next decades. Brock and Von Wangenheim (2019) define AI as the development of computer systems that perform tasks that usually require intensive human intelligence (Alvarez & Barney, 2017). Examples of these tasks include visual perception, language translation, and decision making. Metcalf et al. (2019) depict AI as the new form of Business Intelligence (BI), which is the process of collecting, analyzing, and presenting business data in an actionable manner to business executives. Despite the potential of AI, Brock and Von Wangenheim (2019) indicates that there is minimal evidence regarding how managers are utilizing and improving AI systems. This problem arises from the fact that most managers do not have enough evidence of how companies can use AI to provide competitive services. Metcalf, Askay, and Rosenberg (2019) echo the benefits of AI by opining that it is enhancing business performance through the Artificial Swarm Intelligence (ASI) concept. Through the concept, Metcalf et al. (2019) compare AI to a "swarm of bees" that generates synergy and "overwhelming" capability through collaboration.

Tanaka (2015) inserts that business activities entail services that increase the value offered to customers. Tanaka (2015) argues that enhancing the experience of customers requires the delivery of high-quality goods and services, which is only possible through the collaborative power created by AI. The need for high-quality products and services suggested by Tanaka (2015) arises due to increasing changes in government policies, political motives, and the general business environment. Since most firms are improving as a result of these effects, modern managers that fail to pursue the concept of artificial swarm intelligence concept fail to triumph amidst the new challenges. Other emerging factors that stress the arguments by Barney (2015) include globalization, discriminative government regulation, increased competition, and the introduction of new technology. As a result, these factors are forcing organizations to seek new strategies to gain competitive edges driven by competitive business intelligence strategies gained through AI (Al Naqvi & Munoz, 2018).

Tanaka (2015); Brock and Von Wangenheim (2019); Metcalf et al. (2019) agree that one of the steps used to integrate a successful business intelligence system is the development and thoughtful integration of expert Artificial Intelligence (AI) models. At the same time, all authors agree that the outstanding concept about business intelligence is the swarm concept where the business generates synergy through enhanced and collective intelligence. Although Tanaka (2015), Brock and Von Wangenheim (2019) do not use the term swarm, the underlying observation is a collaboration, which is the building block of the swarm concept.

In the pursuance of business intelligence (BI) strategies, managers are also showing interest in adaptive business intelligence (Jenkins, Ambrosini, & Collier, 2016). Typically, Adaptive BI strategies help the organizations to learn from the previous occurrences and provide ultimate solutions in case of a similar appearance. Adaptive BI provides a vast room for the incorporation of artificial intelligence. For instance, Jenkins et al. (2016) insert that BI strategies also implies the technique of collecting quality and useful data for meaningful decision making through the use of sophisticated and advanced software. BI is also the method of obtaining a large volume of statistics, scrutinizing the data and formulating meaningful reports that occur in high standards such that the data is useful to the managers and the organization at large (Lasserre, 2018). The process of BI involves the utilization of advanced tools which are technologically enabled and, therefore, can enhance efficient and effective decision making. Metcalf et al. (2019) further indicate that the swarm concept largely depends on statistics revelation, data gathering, and business analytics. Other vital techniques include data warehousing, extract- transformation and load (ETL), online analytical process (OLAP), Data Mining (DM), Geographical information system (GIS), service-oriented architecture (SOA), Automatic Decision Systems (ADS), business performance management (BAM), and Business activity monitoring (BAM).

Usually, quality decisions have four different dimensions- effort, yield, speed, and quality (Ambrosini, Jenkins, & Mowbray, 2015). The AI systems suggested by Tanaka (2015); Brock and Von Wangenheim (2019); Metcalf et al. (2019) point towards the fulfillment of the above-said dimensions. Since businesses are continuing to face severe challenges despite the rise of key AI systems, this

research will seek to answer the research question- How does the adoption of AI contribute to the competitive advantage of companies?

Objectives:

- To evaluate the importance of the adoption and competitive advantage of AI in modern business strategies.
- To conduct a case study analysis on specific companies to understand the extent of the installation of AI systems.
- To analyse the learnings and benefits of adopting AI technologies.

Research design

A research design is a framework of techniques and methods selected to combine selected components of research logically with the primary aim of obtaining a satisfactory solution to the research problem (Bell, Bryman & Harley, 2018). This study is a descriptive case study. According to Bell et al. (2018), a descriptive case study requires the observation of a selected subject. In this case, the subjects of scrutiny include organizations chosen from both the public and private sectors.

Type of research

Between qualitative and quantitative types of research, this is qualitative. Patten & Newhart (2017) describes qualitative inquiry as a multifaceted approach to research that enables the development of a holistic approach. The first advantage of using qualitative research is that it encourages a holistic approach hence looking at problems and solutions with a broad view. Secondly, qualitative types of research are relationship-oriented, therefore allowing focus on the relationship of items within a system (Bulmer, 2017). Last but not least, the method encourages special attention to the continuous analysis of data (Patten, & Newhart, 2017). According to Newton & Burgess (2016), qualitative research relies on inductive reasoning more than it does for deductive reasoning. The most useful nature of this method is that it will start with a question followed by the search for related concepts, elements as well as repeated ideas.

Research approach and philosophy

The research approach is inductive, which is contrary to the deductive research approach (McAbee, Landis & Burke, 2017). Typically, the inductive method requires starting with specific observations. In this research, the consideration is that

the use of AI systems improves business performance more so in terms of (1) cost efficiency, (2) quality of decisions, and (3) efficiency of managerial decisions. After that, the method leads to generalized conclusions. In this case, the end is that AI systems are superior to traditional modes of business management. The most common reason for using the inductive approach is that it takes into consideration the context of the research (Jurado, Nebot, Mugica & Mihaylov, 2017).

The first chapter will evaluate the background information and introduce the study. The second chapter will complete a literature review about the theories of AI adoption. The third chapter will focus on will provide the problem statement, while the fourth chapter will cover the case studies. The fifth chapter is about the findings and discussion, while the sixth one will provide conclusions and recommendations.

Chapter 2: Literature review.

The purpose of this chapter is to evaluate the ideas of other authors regarding the research question under consideration. The research question aims at determining the role of AI in enhancing the competitive advantages of companies. The overall strategy is to complete a literature review followed by case studies on five key entities. They include Dublin Airport, IBM, AnalogFolk, and the Defense Advanced Research projects Agency (DARPA).

- **Business Intelligence (BI) strategies:** Business intelligence is the use of technologies, applications, and software for the collection, analysis, and integration of business information for superior performance, more so about business decision making (Russell & Norvig, 2016).
- **Cost efficiency:** Cost efficiency entails all managerial efforts aimed at maximizing the returns of a product at a fixed level of expenditure. Alternatively, cost efficiency also means minimizing the expenses at any given point of income (Stead & Stead, 2017).
- **Quality enhancement:** Quality stands for a collection of characteristics of a product that join to form its ability to satisfy selected customer requirements (Morden, 2017). Therefore, quality enhancement stands for the improvement of these characteristics to close the gap between customer expectations and the product delivered in the market.
- **Managerial decisions:** All decisions regarding the operations of a firm. The chief administrative choices include planning, organizing, leading, and controlling (Richards, Yeoh, Chong & Popovič, 2019).
- **Enhanced business managerial decisions:** A method of decision making that requires managers to access and analyze critical information before making sensitive firm decisions (Noe, Hollenbeck, Gerhart & Wright, 2017).
- **Artificial intelligence (AI):** AI is the development of computer systems that are capable of performing tasks that ordinarily require human intelligence. Examples of these functions include speech recognition, visual perception, data analysis, decision making, and translation (Russell & Norvig, 2016).

The diffusion theory

The diffusion of innovations theory seeks to explain how and why new ideas such as technology diffuse into the target market. Also, the theory aims to explain the rate at which new ideas spread. The discovery of the theory attributes to Everett Rogers, a professor's book first published in 1962. The model provides that diffusion is the process through which societies discuss and absorb new ideas (Smith, 2016; Ambrosini, Jenkins & Mowbray, 2015). The diffusion theory of innovations provides that there are four main determiners of how innovations spread- the characteristics of the change, communication channels, time, and the nature of the social system (Shollo & Galliers, 2016). Additionally, the theory cites that the diffusion of technology mainly depends on the existing human capital. For the innovation to become widely accepted, it requires widespread acceptance by the social system (Smith, 2016). The approval of the change by this system largely depends on the skills, knowledge, and exposure of the human capital to the new technology. Figure 1 illustrates the diffusion model.

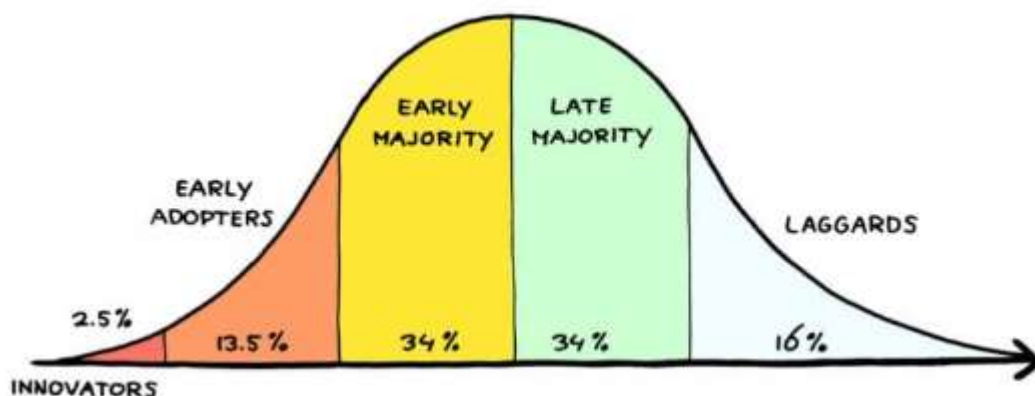


Figure 1: The diffusion theory (Smith, 2016).

Figure 1 indicates that there are innovators, early adopters, early majority, late majority, and laggards. Each of the group has a specific rate of accepting innovations. First, the innovators comprise 2.5% of the markets. They are the first to adopt changes. The second group consists of the early adopters who make up to 13.5% of the market. The third category comprises of the late majority who comprise 34% of the market. The last group to accept new inventions consist of the laggards, only comprising 16% of the market (Smith, 2016; Ambrosini et al., 2015).

An example of how technology penetrates the market is the "Corporate content filters," which prevents employees from visiting sites classified as inappropriate. For a company like Xeron Corp, this network is instrumental. Before installing it, 40 employees lost their jobs due to the use of company resources to visit pornographic materials online (Lu, Li, Chen, Kim & Serikawa, 2018). As such, the installation of the network not only reduced the chances of dismissal but also reduced conflict between management and employees. For instance, the release of the said 40 employees "poisoned" the environment between employees and employers where the former assumed that the administration was determined to "witch hunt" them (Lu et al., 2018).

Despite the fact the nearly all managers view this technology as instrumental, a recent survey revealed that only 38% of American companies monitor employees' emails while another 54% monitor internet connections. Among these, 17% of the 2,100 firms recruited to the survey confirmed firing employees for misusing the internet (Pesapane, Volonté, Codari, and Sardanelli, 2018). At the same time, 26% reprimanded employees, while another 20% recorded issuing formal warnings to employees for the same reason. Compared to general managers, IT managers have more issues increasingly with employees who abuse the internet. Over the past years, there has been an increase in the number of companies that adopt the "porn filtering technology" (Pesapane et al., 2018). These companies represent the first two groups within the diffusion theory, namely early adopters and the old majority. Over the next decades, the last group comprised of the late majority, and laggards will also adopt the technology.

Evidence of the feasibility of the diffusion theory

Another example of technology undergoing the diffusion theory is the biometric management of employees and customers. These systems facilitate automatic payments and processing of orders. Since most mortgages are online, the cases of theft and fraud reduce (Kumar, 2017). The ability to meet customers' demands provided by this initiative leads to customer satisfaction and therefore increases the need for similar goods in the future. The supply of goods can meet the requirements since the products are produced in large quantities, thus, enhancing business growth and development (Sotoudeh et al., 2019). The automated machine can count the number of employees in an organization and therefore reduces cases

of ghost workers, and this helps save money. Despite the outstanding capacity of the machine, the adoption rate is only (Kumar, 2017).

At the same time, the adoption of AI for market prediction only occurs at a limited rate despite the existence of overwhelming evidence on the profitability arising from the use of the model. Kumar (2017) inserts that AI systems are enhancing the production of quality goods by predicting the market state in the future and analyzing the competitor's tactics. This analysis ensures that products are up to the set standards. Currently, less than 15% of all medium-sized companies use biometric systems to manage critical operations. Since technology is central to the development of competitive edges, the expectation is that the adoption of this technology should be fast (Barney, 2015; Brock & Von Wangenheim, 2019). The diffusion theory indicates that only the early adopters and a portion of the old majority have adopted the innovation.

The feasibility of the diffusion theory is also visible from the use of chatbots. Although chatbots can effectively and efficiently respond to customer inquiries, a significant portion of companies are yet to adopt the technology (Kalogirou, 2007). In particular, the chat-robots can receive multiple messages from many users and respond to each in a personalized manner. As a result, the interaction resembles a conversation between two human beings. One of these systems is "Alice," created by Dr. Richard Wallace with the help of other 300 amateur programmers. Once the order was ready, the developer analyzed 6,000 conversations between the system and people who posed as buyers with varying questions. In particular, the company selected companies for which customers would ask specific questions.

In the end, the results of the system were superior to those with employees. Additionally, the responses were instantaneous, thus reducing the time of interactions. Although the results were impressive, the author believed that with improvement and deep learning, the system would record remarkable improvements (Serban et al., 2017). A conversation with a chatbot is helpful because it is like a virtual brain (Kalogirou, 2007). Once the interview starts, the system asks for the name of the user. From there, the conversation continues like one between two natural people where the system uses the details of the user. With minimal training, the system can quickly learn from every conversation and improve from customer to

customer. As it continues to offer robust personalization, customers also benefit from the fact the system is free of natural weaknesses such as boredom and discrimination. At the same time, businesses can teach the systems to communicate respectfully and in a manner that adds value (Ambrosini et al., 2015). In the future, AI systems will learn from the personality of a customer and use it for communication. For instance, if a customer is outgoing and talkative, the system will use a friendly tone. On the other hand, if the user is less outspoken, the system will provide facts rather than “decollate” the conversation (Kalogirou, 2007). Since most companies are yet to adopt this technology, the diffusion theory is applicable.

An additional illustration of how AI contributes to the yield of managerial decisions is available from the healthcare docket of the United States. In the country, policies require healthcare managers to reduce the cost of healthcare and improve quality at the same time (Willem & Madsen, 2017). The strategies for reaching these objectives include early detection, disease surveillance, high-value training, and competitive clinical decisions. Although these policies have a positive intention, the results are unlikely to improve without the integration of AI systems. For instance, healthcare records of the country were 150 Exabyte. BY 2025, the data will reach zettabyte size and finally yottabyte by 2030 (Willem & Madsen, 2017). For California alone, the data of 9 million healthcare users is between 26.5 and 44 petabytes. For healthcare users, putting this data together is an extremely tedious process, which is quickly becoming impossible. Therefore, the use of AI systems for data mining and analysis becomes a compulsory requirement.

Another evidence of the diffusion theory’s prediction of slow adoption is the real-time assistance offered by Apple’s Siri service (Willem & Madsen, 2017). This software relies on advanced machine learning technologies to answer questions, make recommendations, as well as delegate requests to other internet services and software. Since the discovery, Siri demonstrated that commercial AI systems need to be understood by customers. Once this type of understanding is available, managers find it easy to redefine business models as well as value propositions. Despite the outstanding benefit of the Siri service, other mobile manufacturers are yet to adopt it.

The diffusion theory implies that some companies are yet to adopt the high-value technology introduced by AI. Brock and Von Wangenheim (2019) adds to this claim by opining that companies have a lot of data but minimal ability to derive meaning from the existing data. The authors add that the strategy of obtaining meaning from data is a core function of business intelligence. A business intelligence system strategy stands for all steps undertaken by managers to ensure the successful integration of business intelligence in a company (Ambrosini et al., 2015). The most unusual nature of business intelligence strategy is that it is an extensive process requiring the definition of stakeholders together with the main actors, assessment of situations, the definition of goals as well as finding indicators of performance. Unlike other techniques, the business intelligence strategy defines the operations in terms of vision, architecture, processes, and organization (Ambrosini, Jenkins & Mowbray, 2015).

A further illustration of the applicability of the diffusion theory is the findings adopted by (Ambrosini et al., 2015). The authors found that 3% of companies expect low AI impact, while 21% of others expect a high result. Although multiple factors determine this outcome, the skills of workers are primarily essential. What is more, the administration must install useful training and reskilling plans. Initially, employees have essential data-keeping and analyzing skills. During the implementation of new AI systems for BI, managers need to develop efficient training models. Despite the evidence of the beneficial nature of AI systems, most companies are yet to adopt the technology.

AI as a transformative leader using Porter's generic model

The adoption of AI in businesses generates competitive advantages that compare to the generic advantages embedded in Porter's model. Porter (1985) describes in the book how companies can beat the competition by focusing on four factors- generic strategies, namely, cost- leadership, differentiation, cost-focus, and differentiation-focus. Porters (1985) first formed the basis of competition through three factors, namely cost leadership, differentiation, and focus. Later, Porter divided focus to two items- cost focus and differentiation focus. Porter (1985) also notes that the generic strategy is useful in determining the strategy of an organization.

First, cost leadership occurs when companies offer the lowest prices. The ability to offer the lowest price requires companies to approach a broad market hence achieving economies of scale (Porter's 1985). The segment also requires companies to keep prices as low as possible. Companies can only achieve cost leadership if capital investments are high.

Secondly, differentiation requires companies to target large markets while reducing the overall costs. Porters (1985) noted that this approach excludes competitors from the market. Although this method offers enhanced chances of success, it requires intensive market research. Besides, the company must maintain "touch" with the tastes of the consumers. This segment can only focus if the company can remain innovative.

The third factor, cost focus requires companies to target niches with low competition and high focus. After selecting this nice, the company must ensure the lowest prices. This segment also requires corporations to understand the dynamics of the market. The last segment is a differentiation focus, where companies target focused niches with minimal competition. This segment requires companies to have high branding capabilities hence activating the royalty of buyers (Porters, 1985).

The arguments by Porter's (1985) compares to Brock and Von Wangenheim (2019) who provide that a relationship between Porter's generic model and business competitiveness. In particular, Brock and Von Wangenheim (2019) approach AI from the perspective of a transformative digital leader (DLX). The source extends these

characteristics to include the organizational features that enable some companies to benefit from AI systems than others. The first of these characteristics is the "integrated data management" (Brock and Von Wangenheim, 2019). The first requirement for a successful BI strategy is widespread collaboration through strategic business departments. The placement of these departments ensures the integrity of data and proper flow of information, whether it is entering or exiting the managerial system. Regarding the same point, Ambrosini et al. (2019) add that stakeholders at different levels of service delivery should participate in the provision of raw data and the utilization of processed information.

Secondly, Brock and Von Wangenheim (2019) finds that a business intelligence strategy requires an active process of data validation. Through the integration of AI, a hospital system recorded 95% accuracy in record keeping. This argument implies that the quality of data overruns quantity. As such, managers should focus on ensuring that the data validation process is agile hence responsiveness to the latest BI functions. Brock and Von Wangenheim (2019) opines that AI is one of the easiest ways through which companies can attain data accuracy. For instance, if an AI system can figure out the volume of sales, it also needs to determine the number of units sold as well as the selling price per unit. Otherwise, the system would not be helpful to the management (Ambrosini et al., 2015).

Other authors continue to support the same point on how AI generates the advantages embedded in Porter's Model. For instance, Crock et al. (2019) show that AI systems ensure that managers only target and collect data that is useful to the management. For instance, if the marketing team discovers that buyers are exiting the organization, the immediate priority should be to determine why they are leaving as opposed to how many of them are going (Barney, 2015). Once the team determines why the buyers are moving, they should strive to discover metrics that can measure the reason for the exit — for instance, customer feedback and general customer satisfaction (Ambrosini et al., 2015). The determination of such a fact requires the application of the swarm concept proposed by Askay and Rosenberg (2019).

The concept of Artificial Swarm Intelligence (ASI)

Literature further introduces the concept of ASI. Metcalf, Askay, and Rosenberg (2019) introduce the idea of Artificial Swarm Intelligence (ASI) with a design that links teamwork to a swarm of bees that remain united on all fronts. Once employees mimic the framework of a swarm of bees, it becomes easy to amplify the intelligence of humanity, hence facilitating the decision-making processes. Once employees mimic the behavior of bees, the outcome is a "human swarm."

In the approach, Metclaf et al. (2019) start by acknowledging that in the current digital-first world, customer-centric and numerous as well as diversified managers and owners of businesses are barraged with 'overload of information' and are desperately searching for means to deliver understanding, greater control, and intelligence from their institution's data. In a similar way, Pugh (2006) supports this argument by providing that among the best quick fixes to this expanding complication is to accept and embrace a Business Intelligence strategy. This insertion by Pugh (2006) link back to Metclaf et al. (2019) who identifies that the original design of AI systems targets to make centered predictions based on the existing set of data.

This target further compares to the first benefit of a human swarm, which is smart and informed decision making. Managers must have a grounded grip on what the business's data and information implies. Is it right, knowledge does not automatically translate to or equal intelligence, especially when the data is in the different section of the business (Metcalf et al., 2019). Literature again inserts that the underlying objective of a Business Intelligence is to covert a business's information and data into real structured data that can advise strategic decision making across all aspects of the company (Cunningham, Salomone, & Wielgus, 2015). Established by the customer's know-how, it's evident that using data-driven and up to date intelligence not only leads to better compromises but will conclusively generate exceptional financial achievements.

Further review reveals that the professional foundation of making decisions intelligently is a one, integrated respiratory system that collects information from all interactions. This argument once again compares to Metcalf's et al. (2019) evidence that biological swarms pool intelligence together to form an overwhelming force of

intellect. For instance, a critically implemented AI system operates as a link in the middle of teams. It enables the business to use information that conveys an array of crucial business metrics. At this juncture, Cunningham et al. (2015) inserts that examples include productivity, sales cycles, product inclinations, core customers, staff performance, customer conduct, trends of the market, and revenues. Some of the results of the swarm concept in-depth scrutiny to kick start sales, improve the conduct of the marketing department, and – permanently – boost teamwork. Providing salespeople with the necessary tools can monitor their activities and identify trends in the behavior of customers (Ambrosini et al., 2015). This factor is fundamental if the salespeople are to clock their methods more critically and take advantage of cross-selling and up-selling opportunities. Equally, the swarm concept provides companies with deep customer understanding can easily attain differentiation focus. This ability enables differentiation focus, which is another key factor in Porter's generic model.

Akerkar (2018) adds that it is essential to gather information and data from numerous departments. Initially, companies gathered knowledge related to marketing, transactions, operations, client service, and product improvement. This information was later available for traditional use. Comparatively, Metcalf et al. (2019) note that the use of AI removes the conventional perspective to introduce the swarm perspective, where managers combine the data for informed and enhanced decision making. Ali, Kwon, Lee, Kim, & Kim (2015) empathizes this point by arguing that managers need AI to create integrated customer profiles based on their synergy with the business, irrespective of the channel of communication. This initiative creates commercial intelligence, conveying accurate intuition on buyer behavior and trends, thus allowing the company to whet its marketing, sales, and business growth approaches proportionately. All of these factors are essential to the attainment of differentiation focus.

The link between the generic model and AI also links through the Swarm Intelligence Concept especially upon application in human resource management. For instance, AI system reaches out to HR managers and remind them of unfinished tasks (Ali et al., 2015). This ability helps to reduce the workload and ensure all the tasks commence on time. The adoption of the automated machinery creates well-organized departments, which further improve the company's public image. The

machine can locate the most hardworking employee in the organization and recommend reward by the managers. The machine is further capable of predicting a problem in particular machinery and report to the management to ensure safety at the workplace ("Modern Optimization Techniques). The motor can extract the employee information, profile, and scheduled interview by just tapping several data sources. In this case, the recruits are incapable of lying about their capabilities and working experiences and therefore reduce the chance of employing inexperienced workers. There are machines designed to conduct interviews with job candidates in organizations. The devices are capable of asking questions related to the job at hand, as well as general issues. The machines, in most cases, act as advisors to the human resource managers.

In the same line of thought, Johnson (2017) further finds that AI induces both time and cost-efficiency. Cost efficiency is the ability of an organization to utilize readily available materials and resources by minimizing the time, labor, and money spent in the production of a given level of goods and services. The concept of cost efficiency hails from the fact that the main objective of organizations is profit maximization, which is mostly achievable through cost reduction during manufacturing, marketing, selling, and distribution. Cost efficiency creates room for organizations growth and innovation, especially in an environment characterized by advanced technology. While pursuing cost efficiency, organizations must also ensure that the quality of goods and services remains competitive for competitiveness. Once these factors become attainable, companies start to achieve both cost efficiency and differentiation focus.

The role of business intelligence in organization

Porter's Generic model focused on the generation of competitive advantages of companies, which generated the research question for this dissertation. In the same line, Ambrosini et al. (2015) add that the main objective of businesses is profit and shareholders' value maximization. The profit maximization goal is achievable by reducing costs and increasing productivity. On the other hand, stock-value maximization requires a positive business image, which is made by the production of quality goods and the company's ability to fit in the competitive market. For that reason, the business must work ahead of competitors to gain a competitive advantage by using AI (Ambrosini et al., 2015).

Tanaka (2015) adds to the same line of thought by showing how AI creates competitive edges for modern businesses. The authors disregard the argument that companies are separable from services. For companies that offer services, the quality of services is a central determiner of the class. On the other hand, companies that sell goods cannot separate the quality of services from products. Tanaka (2015) defines business activities as efforts to increase the satisfaction of customers. For companies that sell products, the provision of supporting services such as customer support enhances comfort.

Tanaka (2015) identified two perspectives of services- results and experience. On the one hand, results entail the adequate fulfillment of customer needs while also ensuring emotional engagement. On the other hand, experience involves the skills of customers before, during, and after purchases. The main determiners of experience include depth-interactions, flexibility, friendship, politeness, and abilities—Tanaka (2015) likens goods to a molecule comprised of both the products and services.

Akerkar (2018) also adds to the findings by Tanaka (2015) by showing that Business Intelligence (BI) has the ability to discharge disorganized blockages, redesign and refine existing business procedures, brutalize routine tasks and implement advanced levels of prioritization. The productivity gains and efficiency can be ample, including more active and receptive customer service, improved utilization of salespeople's precious time, and timely appraisal of product advancement cycles and marketing crusades. The efficiency factor is as well palpable at a more superior level as a result of automated dashboards and reporting (Akerkar, 2018).

Systematization and concentration of data and allowing the data to be reachable via the Cloud, significantly reduces the time of administration. Businesses whose employees work remotely report that Cloud CRM elucidation reduces the number of calls to the office by half, notably promoting productivity as well as data integrity (Jussila et al., 2016).

The consummation of accomplishing all of the points mentioned above should be an enormous development in return on investment across the business – from administering daily efficiency, customer experience, sales deal modification metrics, via modeling, analyzing, and designing ultimate development strategies and

approaches (Ambrosini et al., 2015). The combination of these factors links the arguments back to the generic model embedded in Porter's (1985). Without the appropriate disciplines and right insight, it's straightforward to return to old days of carrying out activities on preconceptions and hypotheses – especially about preferences and behavior of the customers – and could put a business on the wrong path.

Initially, AI was for complex processes such as image analysis (Ghosh, 2019). Recently, evidence emerged that businesses are competing to adopt artificial intelligence as a strategy for improving cost efficiency hence implementing Porter's Generic Model. One of the most prominent reasons for these changes is the fact that in the modern business environment, successful marketing entails the acquisition and utilization of voluminous cost management data.

Further evidence for this claim arises from Kimball et al. (2015) who cites that there is a rapid increase in the application of artificial intelligence in the modern business which positively influences the businesses processes, activities, and economies by minimizing costs, applying advanced tools increasing the quality of products. Besides, customer's satisfaction which is at the center of differentiation depends on the quality of products and price, which must show a balance. This claim is similar to another by Berisha-Shaqiri, & Shiroka-Pula, (2018) who claims that introduction of digitized business processes enhances business cost efficiency, increases customer satisfaction, lowers employee turnover, and lowers the cases of ghost workers in an organization. Apart from that, modern AI systems play a significant role in accessing customer credit history and purchase patterns.

Modern businesses are adopting new technology to enhance productivity and effectiveness. The advanced machinery is replacing human labour and hence, high manufacturing speeds. Differentiation focus through customer satisfaction is only achievable by meeting customers' demands as they arise. Production of quality goods enhances customer satisfaction as well as improving the business's public image. In the pursuance of differentiation focus, production of quality goods offers the company a competitive advantage due to the possibility of generating additional market share (Porter's, 1985).

Machines ensures fair and reliable decisions that will enhance long term business growth and development. Human decision making, unlike the AI approach, originates from the procedures used by AI-based theories. In cases of financial situations, for example, when clients are applying for a mortgage in banks, artificial intelligence is capable of identifying a client's past financial record within a period. Artificial intelligence has assisted businesses in saving a lot of money that could be wasteful in cases of poor decisions.

Although the application of artificial intelligence is capable of making a sensible and precise decision within a given time, the top executive management should incorporate the managers and the employees since they have a clear understanding of the activities within the organization. The opinion of every individual in the organization matters and including everyone in decision making helps reduce conflicts and therefore enhances the company's growth and development.

Businesses should minimize the variability of raw materials to ensure the production of goods that meets customer demands. Introduction of new technology, mergers, deregulation, and globalization have played a vital role in determining the quality of products produced in an organization. Enhanced quality ensures that the business does not encounter lawsuits from unhappy customers. The class helps the company there are no side effects associated with the products; therefore, assists in avoiding harm to customers. The lawsuits are, in most cases, costly and could negatively impact the profitability of the organization. In the case of food-related products, the business is expected to install advanced machinery that will test how safe the products are before reaching the public.

Usually, enhanced quality helps reduce wastage as well as enhance business cost-efficiency. Waste is costly, and it occurs when the business fails to take quality control measures during productions. Increased labour and material cost affects the overall production cost, which further decreases profit (Suhonen, 2018). Companies should pay attention to processes involved in the creation of the goods and services to lower variability failure to which an increased number of finished inventories will be a waste. Taking quality control measures helps the organizations detects a defect at an early stage and take precaution measures to minimize wastage and increase profitability. Workplace safety is essential since it reduces accident cases among

employees. Protection increases employee's morale, which, in return, leads to increased production of quality goods and lowers employee's turnover. Production of quality goods enhances the company produce quality goods and therefore attracts experienced human resource to the organization.

Additionally, Artificial intelligence aids in reducing the chances of errors during production, therefore, enhancing the production of quality goods and services within a short period. The technologically advanced tools utilized in artificial intelligence gathers, analyze information and predict the possibility of an error before it occurs.

Artificial intelligence has improved the quality of services offered in the medical field. With the help of artificial machine intelligence, doctors can detect the patient's problem and assess their health risks thoroughly as recommend the best medication. The machines can detect both physical and internal health disorders in patients. The medical professional uses plastic surgery simulators during training, which are capable of detecting and monitoring brain functioning. Their application of radiosurgery during tumour surgery enhances a successful operation without damaging the tissues surrounding the tumour.

The development within organizations will create a room for effective communication between the employees and the managers. Effective communications assist in increasing the employee's loyalty, which in return leads to the production of quality good as employees work to attain organizational objectives. Digital interview and talent scanning on the recruits will enable the organization to employ with the required job title. Although artificial intelligence is advantageous to both the employees and the organization at large, managers are expected to focus on customer expectation needs to attain the organization's goal of profit maximization. Artificial intelligence machine is capable of predicting consumer's behaviour and construct an automated customer persona. The devices are also capable of conducting continuous audits on the financial statement, therefore, reducing cases of error in the finance department.

In recent years, much research on the psychological decision-making processes of human occurred. As a result, there emerged several models of decision-making chief among them the Expected Utility Model by salvage. Usually, this model considers a set of external events that combine with a list of possible

courses of action. For each combination, the model estimates a utility value. As a result, it selects the model that has the highest level of utility. Although these studies aimed at utilizing the decision-making models with AI systems, it has become increasingly difficult because computers require high representation in such a decision-making environment. Besides, humans can gain a partial understanding of their situations. For AI and BI systems, the acquisition of this knowledge is systematic and sometimes complicated.

Similarly, business executives must portray skills that enhance managerial decision making. Indeed, Michalewicz, Schmidt, Michalewicz, & Chiriac, (2006) confirms that the success of businesses depends on the effectiveness of the decision made by the managers. In particular, effective decision making helps the organization to attain profit maximization goals. Nevertheless, managers need to research the effectiveness and reliability of decisions before implementation to reduce the risks inherent to each choice.

For instance, several businesses are targeting computer algorithms that duplicate human conversation, recruit employees, and answer human resource-related issues. The 'Chabot's are enhancing the human resource operation by screening the employee's talent and hiring the recruits that best fit their experiences (Thornton, 2007). Equally, human resource managers are beginning to pilot the artificial intelligence machinery to adjust the employee experience. The 'Chatbot are increasing efficiency and effectiveness in the human resource department by enhancing the online learning experience. Managers can conduct online interviews and chose the best candidate. These bots are capable of answering nearly all human resource questions hence increasing learning experience for employees. If the systems have increased capabilities that extend to this level, it is important to investigate the specific ways through which AI delivers differentiation and cost focus embedded in Porter's generic model.

AI technologies as key components for competitive advantage

1. Voice recognition

There are a variety of ways through which AI is enhancing competitive edges in modern companies. One of the main ways through which AI drives the generic strategy is voice recognition. Currently, there are varying figures regarding the

emergence of voice technology. Andrew Ng, the chief scientist at Baidu, noted that at least 95% of word recognition using AI systems is as accurate as when using natural humans. The expectation is that voice adoption will increase together with the demand for smart speakers (Winimy, 2019). Over the next two years, the estimated increase in the use of speakers is 26.4 million queries. The largest portion among these queries belongs to corporations such as IBM and Dublin Airport. These companies incur significant costs through alternatives to voice recognition, hence a reduction in the operating costs after a widespread availability of voice queries' services. Winimy (2019) further finds that by 2020, half of the searchers made will use voice recognition. At the same time, the digital users of virtual digital assistants will reach a revenue of \$ 1.8 million at the end of 2020 and \$ 15.8 billion by the end of 2021 (Winimy, 2019). This growth will enable companies such as IBM, FedEx, and Dublin airport to overcome the challenges associated with inefficient voice recognition. In particular, voice recognition will free up employees from mundane tasks, thus allowing them to focus on other critical issues. This capability will push businesses beyond their normal capabilities.

2. Real-time analysis of data

Real-time analytics involve the processing and analysis of data that is loaded instantaneously. The system effectually processes the data on arrival without storage or later retrieval. However, in massive data, business activities more are required (Advani, 2017). The application of a cognitive computing innovation such as AI enhances real-time analysis increasing the potential enormously. The use of real-time intelligence originated from the active and dynamic sectors such as defense, aviation, and robotics. These fields have continually innovated technologies that access data in real-time, delivering highly responsive data. Artificial intelligence in real-time analysis capacitates business to have insights on data and respond immediately after the system receives the data (Abu-Naser & Hilles, 2016). Real-time analytic systems handle vast amounts of data at high speed with short response time to answer queries. Data analytics operate on continually updates or on-demand user request. Some of the real time analytics in customer service include viewing orders as they come in, updating customer activity, and providing real-time customer data during a promotion.

3. Cyber defense

The handling of data used in defense of the cyberspace supersedes human capacity and require automation. It involves the application of a hard-wired and decision-making system to defend cyber space against the dynamic evolving attacks effectively (Abu-Naser & Hilles, 2016). Artificial intelligence enhances flexibility and the learning ability of the system. Artificial intelligence has been applied in artificial neural nets on perimeter defense. Cyber defense highly depends on artificial intelligence for effective defensive and offensive defense operations. Artificial intelligence has been a transformative milestone in cybersecurity, giving states the capacity to achieve more with fewer resources.

Through the integration of management systems and AI, companies can make the right decisions through up to date information and analytic functions. Companies make decisions based on the data from the information management systems as company operations information enters the system (Abu-Naser & Hilles, 2016). The integration of artificial intelligence with decision management systems enhances the system decision making to a different level. The capability of AI helps the decision-making systems to translate data and predict trend models. The consumer and marketing departments have leaped heavily and can custom efforts according to the significant demographics.

4. Virtual Assistants

The intelligent virtual assistant is also known as an intelligent personal assistant. The artificially intelligent system performs services or tasks based on individual questions or demands (Advani, 2017). Another link between AI and Porter's generic model is the use of systems to reduce the complexity of operations. For instance, simple chat boxes enable companies to receive and address queries without the interruption of key operations. This approach is especially important for companies that offer virtual services, such as banks (Winimy, 2019).

. Advanced virtual assistants can interpret speech and respond via a voice. Assistants can provide answers, control automated home devices, and manage tasks such as to-do lists, email, calendar, etc. There has been rapid growth in the use of a virtual assistant, and advanced products are entering the market continually.

For instance, google and apple have installed large bases of users on their smartphones, while amazon has an install base for smart speakers.

5. Advanced facial recognition

Another key area where AI is applied is the facial recognition system, which involves the processing of substantial amounts of data through AI. The primary building block for the facial identification systems is the identification or verification of a person's facial appearance (Lu et al., 2018). The system is capable of differentiating the spaces between eyes, ears, lips, and the nose. The system also detects slight markings such as scratches and birthmarks. Equally, the system also identifies faces based on the texture and slope. The systems are useful in the control of security systems such as biometrics (Lu et al., 2018). Other than the face, other alternatives include fingerprints and eye scanning. The identification of a face may also require comparison for faces sourced from digital images or video frames.

Usually, face recognition involves the processing of substantial amounts of data, which can be improved by artificial intelligence. Face recognition and AI are two complementary innovations where the latter enhances the former in tasks such as individual identification and face unlock (Lu et al., 2018). The application of AI has allowed surveillance equipment to increase the ubiquitous and precision capabilities rapidly. The use of AI for face recognition is increasingly becoming an important concept.

Conclusion and research problem

On the one hand, models such as Porter's generic theory stress that companies should pursue four main competitive advantages- generic strategies, cost- leadership, differentiation, and cost-focus. On the other hand, literature shows that the integration of AI technologies can potentially generate corporate competitive edges. When it comes to trends and technology as shown by diffusion theory is all about Early Adopters for whom innovation became widely accepted. Only after that the Early Majority follows and with some delay the Late Majority. AI became a transformative leader when it comes to competition.

Therefore, this paper will investigate the research question- How does the adoption of AI contribute to the competitive advantage of companies?

Artificial intelligence, through the application of algorithms, helps to find solutions to the most complex problem facing managers. The machine can help detect the most significant issues which human beings are unable to notice, therefore increases accuracy. Computers can identify changes in a specific pattern and thus can easily detect credit cards fraud and shoplifting. Application of machine intelligence during managerial decision making enhances machines are capable of detecting a problem that will occur shortly with accuracy and therefore help the organization in constructing an accurate budget that incorporates the cost that will incur when the predicted problem occurs (Ali, Kwon, Lee, Kim, & Kim, 2015). Unlike human beings, decisions made by the machines are not likely to lead to conflicts among people within the organization, therefore, saving time used in solving disputes.

Despite the existence of concrete evidence on how AI enhances competitive advantages, the literature fails to indicate how AI can enable the attainment of the competitive edges outlined in models such as Porter's generic theory.

Chapter 3: Methodology

This research aims to answer the question- *How does the adoption of AI contribute to the competitive advantage of companies?* Through selected methodology and case studies, the research sees to show real life examples of how the Adoption of AI have increased the competitive advantage in such organizations like IBM, Dublin Airport or FedEx.

Type of research

The research is a descriptive case study. According to Yin (2011), the purpose of a descriptive case study is to focus on the details to approve or to disapprove a hypothesis. In some instances, descriptive case studies also aim at answering an actual research question. Other types of case studies include exploratory, intrinsic, instrumental, and collective methods of case study. The exploratory case study is applicable in cases that lack specific outcomes. Secondly, an intrinsic case study is appropriate in cases where the main aim is not to understand the underlying phenomenon (Yen, 2011). This fact is also actual of the instrumental case study. Since the objective of this dissertation is to understand the use of AI in modern businesses, these methods fail to emerge as appropriate. Therefore, the remaining choice is a descriptive case study.

Reasons for selecting a descriptive case study

The use of descriptive case studies is appropriate for this study because they enable the collection of verifiable facts. For instance, the corporate competitive edges generated by the use of AI at Dublin Airport is both an observable and verifiable fact. On the limiting side, the findings from case studies are not verifiable to the larger populations (Yin, 2011).

Another advantage of using a descriptive case study is the creation of sufficient room for exploring and describing the topic in a practical setting. For instance, the ability to compare the use of AI in companies such as IBM, Dublin Airport and FedEx.

The danger of using case studies is that the description and analysis must be widespread for proper understanding. The lack of rigorous explanations increases the risk that the case study will be unsuccessful. For expanding the scope of

coverage, it is essential to cover critical theories that provide the framework of comparison between different observations. An example of the theories used is the technology diffusion theory.

Research philosophy

The research philosophy used in this descriptive case study is positivism. The approach only approves information acquired through measurement and observation as opposed to speculation (Yin, 2017). The best feature of positivism is that it permits the use of theories to guide studies. The remaining types of research philosophies considered for the study but rejected include realism and interpretivism.

Data collection

The target is to collect secondary qualitative data. According to Yin (2011), case studies require the collection of information after a close analysis of a real-life situation. The research is concentrating on secondary data. According to Yin (2017), secondary data entails information gathered for purposes other than the one used in the research. The main source of data is the official websites of the companies under analysis.

The first step of data collection was visiting the home website of the entities used as case studies- Dublin Airport, IBM, DAPRA, FedEx and AnalogFolk. After opening the home websites of these companies, the next step is to search for the use of AI in relation to the main challenges facing the entities. For each case, the dissertation investigated the challenges facing the entities before the adoption of AI and the competitive edges after the adoption of AI technology.

The application of this step follows recommendation by Yin (2017) where the authors recommend that for proper understanding, there must be an in-depth analysis of the challenges and background information motivating the installation of AI in the company. For each case study, the data will have five main headings which include- the background, challenge, solution and results.

Other than collecting the information from the websites of the said websites, the research will also collect information from other secondary sources. Examples include peer-reviewed journal articles and verified academic books. The main source of these books is the university's digital library.

Data analysis

Since the data collected will be mostly qualitative, the appropriate methods of data analysis are narrative and content analysis. First, Content analysis is the most popular method of analyzing qualitative data. Once data is collected, it will be analyzed against theories documented in the literature (Yin, 2011). Secondly, the narrative analysis will assist the study during the examination of contents from respondents. Pointedly, it will focus on the analysis of respondents' analysis to extract data.

Another important method of data analysis but which will not be used in this research is coding. According to Yin (2011), coding is the categorization of data based for easy analysis. The appropriate method would be to code data in terms of topic and relationship. For instance, the role of AI in driving cost efficiency would form a single category. During data analysis, the identification and analysis of these methods becomes less exhausting. The following pictorial summarizes the methodology selected. The following tabulation provides a summary of the entire methodology framework.

	Alternatives	Most suited approach
Research design	Descriptive, Correlational, Causal-Comparative/Quasi-Experimental, and Experimental Research.	Descriptive
Research method	Qualitative, quantitative and mixed research	Qualitative
Type of research	Descriptive, exploratory, illustrative and cumulative types of case study	Explanatory case study
Data collection	Secondary research, surveys, focus groups interviews, and observation.	Secondary research
Data analysis	Coding, narrative and content analysis	Narrative and content analysis

Chapter 4: Case studies

1. Dublin Airport

Challenge

Screening, facilitating on-time flights, and providing excellent customer experience for an estimated 31.5 million airline passengers using every year Dublin Airport (Dublin-airport, 2018).

Background

Dublin Airport (DA) is an international airport operating from Dublin, the capital city of Ireland. By 2018, it was the busiest airport in Europe and the most active in Ireland with a record use of at least 31.5 million passengers a year. Serving as the headquarter of Ireland's flag carrier, the airport boasts of extensive short and medium-haul networks (Dublin-airport, 2019). The main networks connect to North America, East Asia, and the Middle East. Despite the outstanding performance of Dublin Airport, the competition is fierce. As such, the prosperity of the airline largely depended on the use of advanced tools of BI chief among them, artificial intelligence.

Following the expansion of the airline's network, challenges started to emerge. For instance, handling 220,000 flights and 31.5 million passengers required increased efficiency and sophisticated surveillance systems. Operations of this level require optimal departure, arrival as well as turnaround times. On top of that, the airline was striving to maximize the experiences of customers in the queue. On top of that, there are peak hours during which the airline records an increase in the number of arriving passengers. Over the past years, the airline witnessed a growth of 45% in subscribers. This type of improvement presents security threats to other airline users. It became difficult for the airline to make strategic security decisions without a comprehensive application of AI systems.

Airlines with this level of operations require a complete data information system coordinating information from the inside and outside of the organization. The conglomerated information collected then assembles before the chief information officer (Dublin-airport, 2019). Before the adoption of AI systems, Dublin Airport relied on manual inputs done by the data analysis team comprising of twelve members equipped with analytical tools.

Solution

The company had to adopt extended AI systems and purchased the Syntech ONE 200 technology, which is a technology developed to screen baggage running through multiple passenger lanes. In addition to automating the process of screening, the system will also enable the authorities to detect contraband items. The Syntech ONE 200 system is compatible with the conventional X-ray security system. When the two systems work together, it becomes easy to identify smuggled items.

At the same time, Dublin Airport adopted Synapse Dublin Airport installed Vision Technologies Explosives Detection Systems. The primary purpose is to screen passengers' luggage. The basic advantage of this technology is the ability to characterize luggage and focus screening in particular areas. For instance, handles, shoes, and hair. The software can learn the pattern of hiding drugs hence act in line with the change. The software integrates real time analysis capabilities. For instance, the analysis of packages at one entry point also reflects on another entry point. At the same time, the information becomes available to other monitoring points hence revealing the security status on a real-time basis.

This solution compares to the outcomes discovered by Brock and Von Wangenheim (2019), which featured as the transformative digital leader (DLX). An example of the underlying principle is the "integrated data management" concept (Brock and Von Wangenheim, 2019). This principle insists that managers should ensure widespread collaboration through strategic business departments. Regarding the same concept, Ambrosini et al. (2019) add that stakeholders at different levels of service delivery should participate in the provision of raw data and the utilization of processed information.

An example of how AI is installing Porter's model is the use of the real time analysis which links with decision management. Rather than apply independent decision-making systems, Dublin airport uses the data gathered from different points on a real time basis to control managerial decisions. Additionally, the system controls the decisions of different departments which include security, coordination and

budgeting. Based on the challenges facing each department, the system ensures coordinated decision making.

Results

The airline integrated AI systems to ease the “burden of work” and enhance coordination. One of the areas of installation is the screening department, which checks both passengers and luggage. In June of 2019, for instance, the airline screened an average of 56,600 passengers before 7 am of every morning (Dublin-airport, 2019). In addition to the screening, AI systems could learn and predict the overall behaviour of passengers. For instance, the intelligence systems predict the times of arrival to ensure that there are sufficient staff and security agents at the time and points of entry. For this facilitation, the airline's artificial intelligence systems relied on historical and current data (Dublin-airport, 2019). In addition to using historical and current data to predict the arrival of users, the airline collects data about external factors that also affect the demand for airline services. After forecasting, it compares the outcomes with real data to determine whether the analysis was correct. Through this gap analysis, the management can now seize the opportunity to improve the quality of information hence high-value decision making (Dublin-airport, 2019). Out in the airfield, the airline uses technology to cut delays as well as improve the punctuality of flights in the European airports. Precisely, this process entails real-time sharing of data amongst air traffic control, the airlines, and ground handling operators. According to the airline, the use of enriched geospatial data develops models to determine important factors that affect the real-time performance of varying departments. On top of that, the internet of things (IoT) tracks all movements within the airline (Dublin-airport, 2019).

2. IBM

Challenge

The need to expand services while also maximizing effectiveness and efficiency.

Background

IBM is a multinational technology company headed from New York but with operations in at least 170 countries (Russo-Spena, Mele & Marzullo, 2019). The

company manufactures and sells computer software, middleware, and hardware. Additionally, it provides consulting and web hosting services. Inventions developed by IBM include the automated teller machine (ATM), hard disk drive, and floppy disks (Tanaka, 2015). IBM is an ideal selection because of the underlying mission of value enhancement, as well as profitability. The sale of these products to multiple global markets mainly increased the traffic of data flowing in and out of the company (Russo-Spena et al., 2019). At the same time, the technicality of the devices sold by IBM causes an increase in the traffic of customers asking for assistance.

Solution

IBM believes that value enhancement and profitability depends on two underlying concepts- effectiveness and efficiency. On the one hand, effectiveness implies the provision of the desired products, while efficiency stands for the attainment of the highest possible value at all levels of operation (Tanaka, 2015). One of the ways through which AI is useful to IBM is the integration of credit card services. After installing AI systems, the company could anticipate trends in the market hence prepare to offer the appropriate help to customers. The solution applied by IBM resembles the Porter's (1985) description of how businesses establish competitive edges through cost- leadership, differentiation, cost-focus, and differentiation-focus. For instance, cost leadership occurs when companies offer the lowest prices. IBM reduces costs by reducing the cost of gathering, analyzing and integrating data.

While recognizing the voice of customers using AI, IBM is leveraging the benefits attached to Porter's model. For instance, the company uses AI-assisted systems to identify specific aspects of the human voice. For example, the tone, emotions and owner (Winimy, 2019). The company eradicated the human department charged with these functions. Additionally, IBM uses machine driven speech-to-text conversion systems to surpass the average performance of natural human measured in both speed and accuracy (Winimy, 2019).

At IBM, the Artificial intelligence employed in text analytics involves the analysis of text structures. Through text analytics, Artificial intelligent system learns and interperate the form and meaning of a text. The design is mostly applied in fraud detection and security systems. A system enabled with an Artificial Intelligence

system distinguishes between two types of text samples with no human intervention (Advani, 2019). During an interaction, the designs draw responses from stored inferences independently making it practical, faster and efficient than humans. Elsewhere Updated Decision Management System is a technological innovation that depends on artificial intelligence (Advani, 2019). The system can interperate and convert data samples into predictive models. The models are vital in the organizations capacity to make significant future plans.

Results

Initially, the systems collect data about customer spending patterns. After that, the expert systems decide whether the appropriate services for the specific customer. The system now assists by enhancing and monitoring telecommunication with both internal and external partners (Calderon, Jaramillo, Zuñiga, Hernandez, & Rivas-Echeverría, 2018). The company's report of 2019 indicated that the use of these systems quickly improved the quality of services while cutting costs for both the customers and the company. In some instances, it also reduced the prices for other stakeholders (Tanaka, 2015). IBM's CEO indicated through the report that the time for the adoption of advanced AI systems is ripe. Supporting this statement, the manager stated that systems such as Inteltec are now available in at least 35 American states. By borrowing the policies developed by IBM, banks and telecommunication companies are also using these systems to prevent, investigate, and detect fraud (Russo-Spena et al., 2019).

Another domain where AI systems now dominate the value enhancement at IBM is customer support. Initially, customer support relies on traditional methods such as email and advisory systems. In a daring endeavour, IBM sought to use AI systems to sort out overwhelming emails received from customers. The project followed an AI model by Brightware's, which is an AI system that automatically opens emails and understands the content (Russo-Spena et al., 2019). The system classifies them for appropriate employees and even composes answers to specific questions. After that, employees only require to check the conversation briefly and authorize the response. Here, the technology used is Fuzzy logic, which enables systems to decide which template best suits a reply for incoming questions. After finalizing the AI system, it would respond to over 12,000 messages to customers

every month. Regarding the emails, 45% received automatic responses from the system (Serrano et al., 2018).

AI systems are also instrumental in IBM's marketing departments. The use of these systems is especially useful in marketing, where managers select customers based on specific behavioural traits. Indeed, Handorf, Haussler & Duffy (2016) confirms that unlike earlier years when marketing systems were for automation only, they are now analytical tools. Upon a combination of their analytical capabilities with theories of customer management, marketing effectiveness improves by large margins (Ji, 2017).

At the same time, the systems make it easy for managers to target marketing messages to specific customers. As a result, the individualization of campaigns becomes easy. For example, e-Offers analyzes consumer behavior before proposing targeted marketing messages (Hassabis, Kumaran, Summerfield & Botvinick, 2017). Moreover, the system can also analyze multiple messages targeted to specific buyers and select the most appropriate one. Equally, the system decides how often the message should be sent to customers as well as suggest improvements in the words (Handorf et al., 2016).

3. Defense Advanced Research Projects Agency (DARPA).

Challenge

The external aggression against America by adversary states such as Iran is rising. The 911 attack that directly claimed at least 3,000 American lives continues to illustrate the security threat posed by adversaries.

Background

DARPA is an agency charged with the development of new technologies to be used by America's department of defense. The agency started in 1958 and has grown to include 200 employees and twenty offices. The need to promote the economy of America together with the overall security of the country against adversaries. The promotion of America's security, along with security, is enshrined in the executive order on AI requires the use of AI systems to promote the economic development and security of America.

On the 11th of February 2019, the president of the United States signed an executive order announcing a large scale American AI initiative aimed at promoting the board security together with the stimulation of the country's economic growth. The primary aim of the project was to promote as well as protect the national AI innovation interests of America (Launchbury, 2019). Other than treating the project as a secluded invention, it occurred as a collaboration with the private, academia, and international partners.

The American government selected five key objectives- research and development, unleashing resources, removing barriers, workforce training, as well as promoting a global environment that supports collaborative AI. In May 2018, the government of America hosted a summit to discuss the policies required to support the AI. The summit recruited 100 senior officials in the American government (Launchbury, 2019). They included heads of industrial labs, business leaders, and representatives to academic institutions.

Solution

DARPA focused on collecting and processing aircraft related information through programs such as the National Aerospace Plane (NASP) that integrated AI systems. The program enabled the agency to leverage advanced networking and processing capabilities. Also, the programs enabled the agency to develop relationships with universities hence making it easy to handles wars such as the Vietnam combat. At the same time, the programs enabled the agency to pursue simple but widespread security operations (Launchbury, 2019). For instance, the lightweight satellite, submarine technology, and anti-armor. In July 2016, DARPA announced the testing and fixing of security gaps in the American software through the Cyber Grand Challenge.

The benefit of this solution compares to the outcomes observed from the Texaco application and which also features in Porter's Generic model (Xiang et al., 2015). It emerged that cyber defense technology enables the government to achieve the generic strategy model. These days, AI is a vital line of defense used to counter a variety of threats, especially phishing and other types of people-centric attacks. All types of phishing leave behind a trail of leaked data that exposes victims to malicious manipulation. Since phishing is advancing quickly, the security apparatus requires to

remain ahead of cyber attackers. AI is an important technique of anticipating changes in the hacking business. For instance, AI extends scanning to files, URLs, and other vulnerable areas. This concept is referred to as computer vision, where systems can detect websites that impersonate pages in the attempt to phish for information. Equally, the AI cyber defence systems can learn the trends in malware, especially the patterns of targeting weak areas within a system.

Results

Over the last 50 years, the agency led to groundbreaking research and development. In the department of defence (DoD), the agency created stealth systems meant to repel penetrations (Launchbury, 2019). For example, the department of defence can now complete real-time analysis of sophisticated cyber-attacks. Other capabilities include biomedical advances, human language technologies, multi-automatic target recognition, and the detection of fraudulent imagery (Fan, Lau, & Zhao, 2015). The system will focus on new initiatives as well as the strengthening of the existing ones. For instance, the current AI system can identify the faces of internationally wanted criminals (Launchbury, 2019). Rather than relying on the manual analysis of faces, the system can analyze the faces of thousands of people and identify the face of a wanted criminal.

4. FedEx

Challenge

Increasing inefficiencies due to misinformed managerial decisions and poor operational model at FedEx

Background

Federal Express Corporation (FedEx) is one of the world's biggest transportation companies. Using Trajecta for internal analysis, the company discovered that picking up items from customers was more expensive than compensating customers who delivered at the premises (Rao, 2017). Therefore, the management used this information to discourage picking questions from customers' homes. Also, the company sought to influence customers to start delivering their cargo at the premises and receive payments. For effective decision, the management needs a four-step project- surveying customers, create predictive models, selection of customer groups, and the examination of the results.

Solution

The solution for FedEx was to use Trajecta to select customers who aim to improve the delivery of a personal parcel. Henceforth, Trajecta supplemented the survey with data from external sources collected through data scrapping, a primary principle of AI systems. Another example of the models used by FedEx is the Boxever. This AI model enables companies to learn the changes in the preferences of customers and make adjustments. As the founder of the software indicates, the purpose is to “deliver micro-moments that delight the customers” (Rosenbaum, 1971). The approach applied by FedEx compares with findings by Metcalf et al. (2019) where in the current digital-first world, customer-centric and numerous as well as diversified managers barrage with 'overload of information' after proper AI integration. The information enables companies to become customer-centric (Pugh, 2006).

In addition to the benefits listed above, FedEx is also using AI to pursue Porter's model. One of the AI applications used by FedEx is virtual assistant. Other than conducting the general tasks in a generalized manner, virtual assistant is also aware of the context (Rao, 2017). For instance, employees working for FedEx only needs to state the address of the recipient for the system to enter the details and dispatch an email. In addition to reducing the frequency of errors, the applications also increase the speed of sending emails and parcels. This change increased the efficiency by about 2%. The international company anticipates heightening the improvement to 14% by the end of 2025.

Deep learning is similar to Machine Learning and operates on Artificial Neural Networks. During programming, different levels are involved in the transformation of data from input data to abstract and composite presentations. In the context, the word "deep" refers to the several data transformation levels performed by the computer system (Advani, 2019). The innovative technology has significant use in various domains including computer vision, efficient development of chatbots, news aggregation, automated translation and customer service. Another milestone innovation in Artificial Intelligence is expert systems. These are computer systems that use the stored data to replicate human decision-making ability (Advani, 2019). The invention involves a complex program that has a reasoning ability and involves

predefined rules. Compared to the standard code procedure-based machines, the expert systems are significantly efficient in complex problem-solving.

Results

After three weeks, the company received improvement results. The system was equally used to profile buyers with the highest portion of buyers becoming the target of the company. Finally, the management contacted the consumers on the phone and attempted to convince them to drop their cargo at the premises. This attempt was also made on customers who the customer ranked as least likely to change their plan. In the end, those that changed their minds the most were the ones that the AI system used by FedEx had ranked highest. The company managed to cut costs by margins of between 2% and 5% (Rao, 2017).

5. AnalogFolk

Challenge

Accurate and instantaneous face recognition also capable of detecting emotions.

Background

The team developing AnalogFolk set out to discover the reasons why the Marmite causes a sharp division. The underlying assumption is that people either love or hate a product (Alvarez, 2019). Fifteen years before the development of the TasteFace, the team developed the first neural network using Prolog. The team developed the wrong model by focusing on the algorithm as opposed to the output (Alvarez, 2019). The desire to develop a face recognizing application caused the team to retake the project and come up with the TasteFace App.

Solution

The AI app created for face recognition turned out to be an innovative creation. TasteFace could now assist people in discovering their “Marmite gene.” The application invited people to try the Marmite in front of the application, which later uses facial recognition technology to analyze and understand reactions. The software builds on the Microsoft Emotion API, which is capable of recognizing emotions such as fear, surprise, contempt, disgust, and happiness. AnalogFolk further developed a bespoke algorithm that would convert the emotions on a scale of

love and hate for the Marmite. Thereafter, the application provides a rating of between 0% and 100% (Alvarez, 2019). Users then share the results on social media. The exchange of these results increases synergy, which is the concept of cost efficiency embedded in Porter's Generic model. The same concept is present in Metcalf's et al. (2019) argument, where the professional foundation of making decisions intelligently is a one, integrated respiratory system that collects information from all interactions. At the same time, it rhymes with the concept of biological swarms of intelligence that combine to form an overwhelming force of intellect.

Results

The TasteFace application was a huge success. After launching it, the application surpassed the X-Factor as the top trending topic on Twitter. The sales increased to the present state of over half a million users. As the project's director stated, it is an example of how the world can use AI for fun and in an engaging way. The project succeeded after the close partnership between the project creators and Microsoft (Alvarez, 2019). Rather than create the project from scratch, instead, the partnership was concentrating on combining the existing systems for efficiency.

Chapter 5: Analysis and discussion

The extent of AI adoption

The case studies show that the adoption of AI systems in modern businesses is still less than optimal. Dublin Airport, IBM, and the public sector believe that the existing wage burden of human planners can drive down profitability by large margins. As a result, the companies are racing to install AI systems. This finding compares with the fact that companies are viewing digitalization as a new source of competitive edge. Metcalf et al. (2019) indicated that workplaces are now awash with robots that are working with natural human beings to enhance production. Indeed, it is common to see robots working in a production line that was initially for human employees. This claim closely resembles another argument by Russo-Spena et al. (2019), where companies are introducing robots to cut operational costs. A close analysis of the companies shows that AI systems facilitate cost-efficiency in a variety of ways, such as the proper management of inventory. Initially, Tanaka (2015) opined that AI is an essential requirement of appropriate inventory management through the reduction of the costs of holding excess inventory and the costs of stock outage situations.

Similarly, each case study relies on automated inventory management systems to enhance synchronization and accessibility of records. By reducing the human input in data analysis, other sensitive docket receive additional human employees. According to Lewis, Cantore, and Passmore (2016), expert AI systems run different tasks at the same time, thus achieving high-value cognitive synchronization. This fact closely associated with the event that Dublin Airport's use of an AI system for the determination of optimum maximum and minimum inventory levels (Dublin, 2019). Therefore, the section concluded that compared to employees, an AI system is not only less erroneous but also less costly.

Additionally, AI drives costs down by assisting budgetary functions. Initially, literature pointed out that AI enables companies to keep detailed records of expenses and revenues. Once this information is available, the management can use this information for that project are within the schedule, thus avoidance of cost overruns. According to Tarafdar, Beath, & Ross (2019), project information is valuable when managers intend to determine the profitability of specific projects. In

the end, the costs are also comparable to those of similar projects accessed from the same organization or through data scrapping.

IBM confirmed these claims by showing that the use of AI for scheduling is a valuable investment. In particular, the company's home website records that AI enables the accounting department to access accounting information from within the organization. Equally, AnalogFolk pointed out that AI promotes efficiency by monitoring individual cost centers. In particular, AI tracks trends in expenses over a long period, thus showing discrepancies. Equally, Dublin Airport showed that the use of AI reduces the difficulty of sourcing data from outside, especially when reviewing the performance and strategies of competitors. These arguments closely tied with Sotoudeh et al. (2019), where cost efficiency and forecasting are critical outcomes of the installation of AI systems. Traditionally, managers tracked previous levels of activities to estimate future market demand. As such, they would determine appropriate levels of production. Comparatively, Malhotra (2019) indicated that the use of Neural Networks closely monitors and manages expenses.

An increase in the level of operations quickly increases the number of employees required, thus making it difficult for managers to manage employees manually. Indeed, Tanaka (2015) provides that without the use of AI for managing employees, it would be impossible to hire and manage employees. At the same time, Berisha-Shaqiri and Shiroka-Pula (2018) pointed out that AI is increasingly becoming a priority for human resource managers. Indeed, this claim also gained support from Malhotra (2019), where modern employee management is challenging to complete by traditional means. These days, the nature of work requires employees to coordinate between several departments. As a result, IBM affirmed that performance management involves the collection of information from several departments. Since the human resource department only claims a small share of the organizational budget, managers must utilize AI systems that speed up the collection and analysis of employee-related data.

Another prominent way through which AI systems enhance personalization is real-time assistance (Deb, Jain & Deb, 2018). Both Dublin Airport and IBM insist that AI systems enable companies to attain high-value personalization. This case is also valid for FedEx, AnalogFolk, and the public sector. Initially, Jurado, Nebot, Mugica,

and Mihaylov (2017) opined that at least half of modern managers believe that AI is disrupting businesses in industries such as manufacturing, healthcare, and agriculture. The authors added that the IT docket is the most welcoming industry for automation. Other dockets that quickly adopt the AI systems include banking and financial services (45%), manufacturing (21%), and logistics (34%). As such, the education, automotive, and healthcare industries are yet to absorb the technology on a large scale.

The refusal of AI systems would guarantee poor performance for the affected industries. For this reason, IBM believes that using machine learning technologies to self-learn technologies to improve the speed at a level that is unmatched by human beings. Through AI systems, firms can easily understand the needs of buyers and improve weak links in service delivery.” This finding closely related to the literature review, where most authors argued that business competitiveness requires large scale collection and analysis of data through existing AI systems (Preece, 2018).

Jussila et al. (2016) noted that personalization was one of the uses of AI systems. In particular, the systems were suitable for receiving and responding to emails. In the worst scenario, the systems read and understood the underlying messages of incoming messages and select a template for such a response. From here, employees would briefly view the interaction before authorizing the use of that template. In the best scenario, the systems would automatically and independently respond to emails without the authorization of employees. In one case, a company reported using the system to respond to at least 12,000 emails per month (Preece, 2018).

In addition to the other outcomes, AI systems could assist in the management of financial instruments. For IBM, data is the “lifeblood” of market analysis since it drives insights, improves processes, and enhances understanding of all stakeholders. While elaborating these responses, Olszak (2016) opined that AI is the primary tool by which to understand market trends, make informed price decisions, and anticipate the marketing objectives of competitors. In the end, there is evidence that this capability increases revenues and open the business to previously unexplored areas.

Cognitive automation, which stands for automatic brain processes is an essential managerial component. Pagallo (2018) indicated that human input increases the chances of erroneous entries and data manipulation. This claim also reflected by Richards, Yeoh, Chong, and Popovič (2019), who indicated that human error was mostly responsible for data entry errors that later confuse managerial decisions. At the same time, Rao (2017) believed that administrative decisions would be better after eliminating human input from the data collection and analysis systems. The same authors also showed that the errors would decline if the managers supported human input with expert AI systems. For most cases, it is impossible to eliminate social information from decision-making systems. As such, the goal should be to reduce errors and points of interference.

At IBM, automation also assists the management in making managerial decisions. For instance, IBM targeted to increase sales support, customers, potential clients, and employees through an advanced AI system. The company called the system CAST or BW. The operation model of the system was to collect expert knowledge from the warehouse, the internal competency centers, and the internal enterprise resource center to deliver a competitive advisory tool. Indeed, the company's management compared the system to work with their most knowledgeable employees. For customers, the system identified underlying problems within their computers (IBM, 2020). On the other hand, the employees would use the results of the system to identify cross-selling opportunities. Finally, the company used the system to determine common problems facing customers that require immediate attention.

Another manner in which AI contributes to competitive management is by enhancing timely and well-informed managerial decisions (Dignum, 2017). Similarly, Walczak (2016) believed that AI is at the center of competitive management. The agreement between the two sources is that AI enhances the speed and quality of decisions by providing sufficient, accurate, and timely information.

This argument resembles another by Hoy (2018), who believe that the integration of expert AI systems spurs companies into growth and competitiveness. An example of how AI enhances managerial decisions is the Dallas Teachers Credit Union (DTCU). After operating for a decade, the union decided to become a bank, but the market was fiercely competitive. As such, the union contacted IBM for the

help of selecting an ideal AI integration method. Before this contract, IBM was famous for using IBM DB2 Intelligent Miner, a software designed by the company for large scale data mining. Using demographic characteristics, IBM aimed at locating people who are likely to open a bank with the union's upcoming bank.

IBM used the software to determine factors that determined the number of customers visiting the bank as well as the frequency of those visits (Chinzei et al., 2018) After that, the system correlated the distance from a person's home to the location of banks to determine the time taken to reach the bank from home. Here, the manager discovered that customers who needed ten minutes to drive to the bank had a checking account. As such, the software used AI to collect information like addresses and locations to map an ideal market where the union would open the bank.

Equally, AI systems also promote both internal and external collaboration. Willem Pieterse and Madsen (2017) added that AI systems enhance the yield of managerial decisions by aligning docket to work in synchronization. This outcome resembled the systems theory discussed in the literature review. According to the method, organizations comprise of smaller units whose working together generates synergy.

Another way through which Artificial intelligence helps organizations to attain cost efficiency is by ensuring optimal production levels by gathering information about consumption patterns and the size of the market, commonly known as market analysis. As a result, companies quickly reach economies of scale by large manufacturing or cutting activities to reflect trends in market forces. Once this machinery is in place, they reduce paperwork, thus cost and time-saving.

The number of manual labourers is reducing due to the introduction of machines that can perform social duties with speed and efficiency. The devices are capable of promoting workplace safety since they can predict a fault in an individual computer and recommend the best solution. This step reduces cases of accidents in the workplace, which further increases the employee's morale. Increased motivation among the workforce, increase productivity and lowers employee turnover. Low employee turnover helps the organization retain the best employees within the organization (Kalogirou, 2007). This initiative further strengthens the employee-employer relationship, which also enhances organization's growth and development.

Challenges barring the adoption of AI systems

The extent of AI adoption amongst the companies has not reached optimal levels. According to Metclaf et al. (2019), optimal adoptions stand for a situation where companies adopt and leverage an AI system to the furthest extent possible. The problem of “sub-optimal” adoption is that companies fail to attain economies of scale which arise when companies achieve the highest-level output at a given level of input. This approach views the purchase and installation of AI systems as the purchase of standard capital machinery (Metclaf et al., 2019). The lifetime of machinery allows the managers time to utilize the system. The failure to attain maximum output translates to a loss in revenue.

One of the main challenges barring the installation of AI systems in the case studies is the quality and quantity of data. For instance, IBM requires to train AI systems using a vast amount of data. For the system to read and categorize customer emails, the system requires intensive training through past customer emails. According to Cunningham et al. (2015), the quality of AI systems largely depends on the availability of training data sets. Although the systems learn through the same model as human, they require a vast amount of information to identify the pattern of data. Some robots can gather this information with minimal human assistance. For instance, the RPA robot can scrap and peruse publicly available information. This method applies to systems meant for handling data (Cunning et al., 2015). In cases such as clinical trials where high accuracy is preferable, the systems must learn with a vast amount of information and under strict human supervision.

Another challenge facing the effective implementation of AI systems is data labelling. For instance, AlalogFolk developed a robot worm to navigate and unclog the human brain. For the safety of the patients, the robot must learn to differentiate between clogs and normal tissues. Installing this ability in a system requires the provision of millions of labeled images. Before technological advancements, data mostly comprised of plain texts. After the emergence of the Internet of Things (IoT), data now consists of plain texts, videos, plain, and images. Training AI systems requires the labeling of the different types of data. For instance, ImageNet is an AI system comprising of at least 14 million labeled images. Since the system cannot label the images, the labeling requires human contributors. Another challenge

barring the adoption of AI systems is explainability. Most AI systems generate the results through many “black boxes.” For instance, the RPA robot can predict the outcome of a process while providing minimal explanations.

Also, AI systems are open to bias and error. This challenge is exceptionally high when using AI systems in the public sector. Incidences of AI systems showing prejudice against women or African American women are reported multiple times. Since AI systems cannot initiate discrimination in the same way as a human, the most likely explanation is error and bias. Perception arises from the opinion of humans. Since AI systems learn from data sets created through the opinion of humans, bias is likely to result. At the same time, people’s views can also depend on stereotypes, myths, and personal interests. In the end, the quality of data declines. The possibility that AI can generate errors also causes the risk of legal issues. For instance, the wrongful diagnosis of a patient risks legal action against the software developers, hospitals, and health care providers. Equally, AI systems introduce the risk of data leakage, theft, or manipulation. Each of these occurrences can cause permanent damage to the information owners.

Chapter 6: Conclusions

This dissertation presents a list of lessons on many fronts. In particular, the case studies teach that modern businesses adopt AI systems to a limited extent. This behavior is predictable using the diffusion theory of embracing technology. The theory divides the target market into five categories, namely innovators (2.5%), early adopters (13.5%), the old majority (34%), late majority (34%), and laggards (16%). Companies adopt technology for ordinary marketing functions. The main focus is on the effectiveness and efficiency of service delivery. Although this level of adoption is necessary, there are other areas that the companies can apply advanced AI systems. For instance, IBM's provision of customer services takes comprehensive data into account, which is only available through modern technological infrastructure. Once the data is available, it maps on a model before condensation and analysis for decision making. For example, the introduction of a new product by IBM requires the condensation of unlimited data showing the existence of sufficient demand in the target market. The study of market data and the introduction of new products requires businesses to have high flexibility from all aspects, mainly because markets continue to show dynamism. For these objectives, managers should focus on automation, voluminous record-keeping, increased accuracy, high-value synchronization, and chain transparency.

The traditional theories of organizational management pursued competitive decision making through foresight, collaboration, control, command, and organization. Although this approach was right at first, its application is technical, inaccurate and time-intensive (Barney, 2015). Due to this problem, most managers barely applied it. After the introduction of AI systems, managers abandoned the model to use other methods for all processes. Consequently, the rollout of these systems lacked proper objectives hence declined performance.

One area through which the system theory aligns with AI is the generation of synergy, now known as collaboration. Initially, the systems theory summarized that organizations are a collection of departments whose mutual dependence is advantageous to all parties. The concept now stands for collaboration, which arises from the use of a cohesive AI business system. Literature referred to this concept as "swarm intelligence," resulting from the overwhelming strength created by

collaboration. An example of these systems is Trajecta, which collects data for organizations and applies it to decision making across the board. If managers were to ask the systems theory, the cost of collecting data for each department would be not only costly but also erroneous. In an equal measure, the use of a bureaucratic approach required a complete division of labor to the extent that the absence of a strategic manager would halt operations or stop them completely. Now that AI is a complement of this theory, employees or managers can easily bypass the absence of a strategic employee by using past information for decision making. Alternatively, the existing AI system can co-join strategic managers regardless of physical separations.

Key learnings

1. Companies can benefit by anticipating the challenges of AI

One of the emerging key lessons is that despite the advantages of adopting AI, corporate managers should appreciate that the adoption of an AI system is a complex undertaking. This observation stands in contravention to the assumption that AI can generate automatic competitive advantages. Therefore, organizations must operate as an ecosystem where all members assume critical roles. In such a business setting, the ecosystem landscape business model is attributable to significant AI technological transformations. For example, business processes may be redesigned through the reinvention of workflows and layouts for fulfillment centers after an introduction of robots and optimization algorithms based on machine learning. Business models need to be redesigned to take advantage of machine learning systems that can intelligently recommend beneficial modes of service delivery. Firms need to reevaluate and rebuild their strategic alliances. For small companies that cannot afford to hire algorithm scientists, they can collaborate with companies providing open source platforms, and use available API to develop application solutions. All these issues and more are essential in building the broader AI business ecosystem.

1. Companies can benefit by integrating data labeling

The need for extensive data labeling and classification also reduces the applicability of AI systems. For mitigating this challenge, there is a list of methods that AI developers can use. The companies can use internal resources to label the data or outsource when the required level of expertise is high. Another challenge barring the adoption of AI systems is the risk of bias and error. Addressing these challenges requires the use of the LIME approach, commonly known as local interpretable model-agnostic explanations. The primary aim of the LIME is to increase the transparency of the model. For instance, if an AI system concludes that a patient has flu, it will also provide the basis of the decision. Examples include sneezing, headaches, and malnutrition.

2. Companies can benefit by addressing the legal aspects of AI

Finally, the adoption of new AI systems is slow due to existing legal gaps. Addressing this problem requires proper development of the existing laws, uniquely to define the criteria of dividing legal culpability. The current privacy laws insist on the liability of organizations that handle data while leaving out software developers. At the same time, proving that software developers are responsible for data leakage is difficult. As a result, all players within the AI industry should advocate for laws that define the criteria of legal culpability, hence encouraging responsibility.

The future of AI

The objective of Artificial Intelligence in the world of business has, over the years, shifted from trying to replace employees in making them smarter. As such, artificial intelligence will, in the future, become an indispensable component of business systems with a focus on the enhancement of traditional theories as opposed to replacements. As such, AI systems will affect the nature of work in all industries. Also, there are possibilities that AI will reduce the demand for manual workers. For instance, automation threatens 25% of the existing American jobs. Despite this challenge, AI will positively contribute to the delivery of services. Customers will receive prompt and personalized services.

Although the future of AI in management is promising, the challenges barring the widespread application of AI systems will continue to haunt organizations. For instance, cyber-attacks can impose devastating financial and reputational impacts on industries. At the same time, the need for extensive training data sets will continue to challenge the installation of new AI systems. This challenge is exceptionally high due to the changing behavior and preference which will demand the replacement of AI systems after a few years of utilization. Even with the growth of these challenges, the digital world will continue to discover additional opportunities.

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