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Problem Solving Through Emerging Technologies

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Abstract: **This article offers a discussion of the overall role of problem management process among emerging technologies when companies attempt to solve problems that affect their revenue and profit streams. The findings of this study have shown that different technologies that have emerged over the past decade have helped companies solve problems that might be significantly harder to solve if the firm simply depended upon humans. Technologies such as Artificial Intelligence (AI) and Predictive Analytics (PA) have been especially helpful. AI can support companies become proactive to solve problems before they have become financially or technically problematic. The employment of PA can support companies predict patterns for potential technical issues and/or even predict customers' future performance in terms of what they will buy, based on what they have already bought. The advantage of such analytics is not just for problem-solving but also to delight customers and provide better services. For the future, companies shall improve in the competency of matching up the current problem with the technology best designed to solve such a problem.**

Keywords: **Problem Solving Process, Information Technology Service Management, Internet of Things (IoT), Predictive Analytics, Artificial Intelligence, 4th Industrial Revolution, Public Onchain Database, Metadata, Augmented Reality.**

I. INTRODUCTION

The nature of this study's research encompasses a discussion of the new technologies that the workforce have at their disposal to aid in problem solving. The purpose of this research is to highlight clearly the many advantages associated with the new digital transformation engendered by constant and consistent technological advances. This study fills in the gap left by previous studies, which covered similar topics, but did not delineate the specific benefits related to how the digitization era will aid in the problem-solving aspect of a contemporary workplaces. The Deloitte (Greenwood, Solly and Robertson 2021) provides the pandemic-related advantage of digitization for the workplace, and offers impressive information on the historical digitization over the past century, but it does not explain specific examples of contemporary technologies and how they help magnify the productivity in current workplaces [1]. This paper will highlight the details on how optimistic the industry should be due to the new advances entering the collective workplace. Kumar (2022) has found that McDonalds is using artificial intelligence to help streamline its drive-in process in light of staff shortages [2]. McAfee and Brynjolfsson (2012) wrote several years ago very helpfully on big data, and they used the example of online bookstores and data provided by customer purchases [3]. However, the paper will provide more depth and offered similar detailed information on a variety of technologies since 2012.

II. ANALYSIS OF TECHNOLOGIES AND PROCESSES

A. Proactive rather than passive problem management

The 'problem' associated with the new digitization of data only becomes a problem if the process is not followed efficiently. As the University of California (2014) states, the process can admittedly be complicated [4]. The first step of the problem management process is ascertaining what the fundamental cause of the problem under discussion actually is. Part of the

overcoming of a workplace problem is in reaction to events, and another aspect is proactive. Obviously, it is far better to be proactive, and solve a problem before it becomes too serious. A proactive response will mean that the problem's solution will be far easier to realize. Proactive problem management strategies can result in the reduction of problem reoccurrence risks, as well as reduction of the associated time and cost inherent with any problem, that to achieve the highest services availability. If little to no focus is given to proactive problem identification, the negative ramifications will be the ultimate result if users are routinely suffering from service interruptions, which will impact the company's reputation.

Negative word of mouth can be crippling. Incident reports represent the first step in the overall process and are an extremely effective method for defining which problems need to be addressed, clearly because the problem in question is currently wreaking havoc. Since there will be more than one incident that displays problems, the incidents need to be arranged in terms of priority and must be aligned with the overall objectives of the company. Monitor the progress of problem handling, and recommendations of various options to be implemented as soon as is feasible. Two criteria for determining priority are frequency of similar incidents and their definitive impact on the organization itself (University of California 2014). If all these steps are followed carefully, then the impact of the new technologies should be beneficial on balance. Two of the emerging technologies most relevant to the problem handling success are artificial intelligence and the Internet of Things.

B. Internet of Things (IoT)

According to PwC (2022), two of the most important emergent technologies in the terms of practical solutions to problems are the Internet of Things and artificial intelligence along with predictive analytics [5]. Enhancing data authenticity, identity verification and transaction security are just a few of the positive aspects associated with these more modern technologies. These together will have a positive impact on the reduction of fraud. In other words, problem management process can be streamlined and made more effective with the advent of the Internet of Things. It can be specifically useful to ensure the authenticity of hospital employees' educational qualifications and competencies to prevent medical related issues. Also, the IoT and the blockchain can be used in combination to make for a much more efficient supply chain in terms of offering a safe product from the beginning to the end of the process, as well as the safe disposal of materials. On the other hand, human resources departments have the responsibility of ensuring a safe and secure environment, and as Leonard (2019) points out, strategic human resource management will consider such an issue when it comes to making plans for the future. [6].

C. Information Technology Service Management (ITSM) Process

Additionally, according to Leonard (2019), ITSM plays a similar role to the Human Resources department in an organization, that of aligning departmental objectives and capabilities with those of the overall organization's needs, so they do not work at cross-purposes [6]. For ITSM to be handled properly, it needs to be implemented in conjunction with the Information Technology Infrastructure Library (ITIL). When attempting to solve a problem, following ITIL framework will represents the other perspective that needs to be considered so that all stakeholders are working for the same purposes. An analogy would be how strategic human resource management (SHRM) is one way to achieve the ends of a maximally productive workforce. This is especially helpful in case of a large amount of data needing to be processed in an organization. Everything will align as much as possible, causing much more efficiency to be enjoyed. According to Leonard (2019), the main advantage of ITSM that it is proactive, rather than reactive [6]. In other words, problem management aims to solve problems before the end user even experiences them. There are several uses for AI in the workplace, as reported by Leonard (2019). They include various elements that he chooses to focus on, and one of them is incident management, incidents result from disruptions in tech-inspired changes. Time spent learning new technology can take time away from one's true work they are supposed to do. A welcome result would be if AI could be employed to solve such problems. A second element is problem management, the focus of the subject paper. The advantage to problem management is that it can be proactive when employing AI or machine learning. Machine learning represents another element to define problems as soon as the relevant patterns are recognized. The more ITSM develops the better for the company that engages with it. Yet another element comprises intelligent chatbot. Once machine learning identify common issues, An integrated AI such as chatbots will interact with customers regarding their issues, rather than the conventional call centers, the chatbot can answer their basic questions and guide them to solve their issues. Such technology will help provide better customer experience while decreasing incidents creation. There is a proportional relationship between incident reduction (when a large number of customers call in their internet service provider and complain they do not have Wi-Fi access) and a company's productivity. When customers show initiative and practice self-help, this spares time for employees to focus on bigger problems, and so productivity will be increased.

D. Predictive Analytics

Pattern recognition is one way a large amount of data can become distinctly more manageable. Predictive analytics are extremely useful to determine future outcomes, for example, end users who find value in Amazon's recommendations about books they might be interested in based on past books they've bought. This is where PA becomes important, because there is no human interaction on viewing the past orders and manually suggests new books; this particular activity is done through robotics. However, in the context of problem solving 'pattern recognition', where future patterns are predicted based on past ones (IBM no date 7). Establishment of a pattern that repeats is one way to make problem management process more efficient, when a pattern is recognized, machine learning can be applied to situations where problems need to be solved, this will save time so mistakes are not repeated (Leonard 2019).

E. Artificial Intelligence

As Business Insider (2022) asserts, AI offers many advantages that go far beyond Amazon's pattern recognition capabilities. A good definition of this phenomenon is where traditionally human-inspired activities are supplanted by a computer. One of the most important given contemporary security concerns is facial recognition software. There are also others, such as early spotting of disease. One important point made in this study is how it is preferable to proactively spot problems before they occur or develop to any serious degree. This is applicable to the early disease detection discussed above. If doctors are able to detect a cancerous cell in its very early stages, it is a lot likelier that it will not develop further as it would if left to itself for years. AI-inspired diagnostic software can help diabetics retain their sight. As Business Insider goes on to say, [8]. Identity verification is extremely vital so that employees do not gain access to information of which they should not be aware. Disadvantages also exist within the realm of AI, and Melendez (2022) has issued a specific warning, also on the subject of security, is the cost of the training associated with humans learning the fine points of AI emerging era [9].

F. Industrial Revolution 4 (IR4)

According to IBM (no date), the digital transformation we have been experiencing in our contemporary society, has resulted in better decision making, greater worker productivity, etc. [7]. Better decision making implies fewer problems overall, and thus, the problem management process will need to be implemented fewer times. Superior decision making is achieved all along the supply chain spectrum via the collection and analysis of relevant data. As far as productivity is concerned, this is achieved through predictive maintenance as an example also of the helpfulness of predictive analytics, as Leonard (2019) mentioned [6]. Building on the successes of past experiences, including in the 3rd industrial revolution's advances in the field of automation, the fourth industrial revolution (Industry 4.0) data has become informed when a combination of operational data and data gathered from a company's specific operations, which has in turn led to related improvements in various domains.

G. Public Onchain Database (POD) and Metaverse

Yahoo Finance (2022) tells us that three main aspects to metaverse and that a public onchain database or POD can solve the problems engendered by these various aspects [10]. A good definition of a POD is that it represents a database that groups together a system with full coverage of the various aspects that comprise metadata. The first one is that a POD can make the data easier to find, in spite of the fact that it is housed on different networks. The second one is that a POD can overcome the problem of no relationship between entities that appear in these different networks. Third, a POD is capable of pre-processing a variety of data sources found in different networks so that the functionality is streamlined. Aside from the preceding information, there are several benefits to having a metaverse database. There are two primary stakeholder groups who benefit from such an arrangement, data providers and data consumers. The benefits for the first group include their ability to search through automated data, enhance flexibility, and more. The advantages for the second group, of consumers, include the aforementioned access to data across the spectrum of possibilities, relevant tags, etc. Implementing POD middleware has solved the problem of segregated metadata issues from its roots. However, if faulty data is used then it will compromise any future analysis and results.

H. Augmented Reality

According to Defize, Bitaraf and Vermeer (2022), however, it is vital to remember that we can have too much of a good thing [11]. This is never truer than in the case of data mining. Hiring more staff is problematic, given the shortage of data management-related talent that currently exists. A better alternative to have enough data to remain competitive in one's industry, but not so much that the sheer volume becomes too overwhelming, augmented data can be the solution. These

authors provide a simple definition of augmented data management. It refers to the process of implementing data management responsibilities and tasks via the employment of augmented artificial intelligence. It replaces manual tasks with technologies that are able to be realized through computer work. An example has been provided by Javornick (2016), an illustration of the practical benefit of AR occurs when consumers virtually try on makeup or see how the furniture that they are interested in buying will appear in their living rooms, etc. [12]. According to Defize, Bitaraf and Vermeer (2022), AI means more accuracy in data mining, and are not as time-consuming, naturally, as labour that is manual in nature [11]. The time saved means that the relevant data managers have the opportunity to spend more time solving challenges or problems that have the largest impact on the company. The tasks that could potentially benefit the most from such AI include data quality, this is where pattern recognition is triggered, management of the metaverse in general which reduce the amount of data into more manageable segments through labeling, classifying, and searching data, master data management (MDM) ensures merging data to streamline processes. In spite of its benefits, Defize, Bitaraf and Vermeer (2022) acknowledge that it is not the be-all and end-all; humans are still necessary to handle the changes that are part of any dynamic firm 6[11].

III. CONCLUSION

No technology is perfect. There will always be pros and cons to any initiative designed to help solve a particular problem. Disadvantages to artificial intelligence can include the cost of training as subject matter experts learn how to make the best use of AI. Benefits of the emergent technologies depend on the particular one under discussion and what the problem to be solved actually is. However, in general, benefits include more authentic data, more accurate identity verification, safer security, and being proactive rather than reactive, or active rather than passive. The advancement of these technologies also offer the ability to implement pattern detection to predict and stop potential problems before they happen, this aid in better decision making and productivity, more manageable segments of data that can be analyzed with significantly more efficiency. In summary, problem management process can be operated similarly regardless of the circumstances. But the technologies that have been emerging over the past decade or so can render this process easier, and workplace tasks can also be fundamentally less challenging. However, depending upon the specific problem that needs to be solved, and which emergent technology that needs to be employed in order for a company to head competitively into the future.

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