THE ADVANTAGES OF INTEGRATING ARTIFICIAL INTELLIGENCE IN BUSINESS PROCESSES

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Abstract: In the current age of information, digitalization is offering advantages to the organizations proportional to their willingness and determination to integrate technology. Innovative high tech has determined the developments of extremely dynamical and demanding operational environments but is also providing the tools to cope with them. In order to achieve success modern organizations need to implement highly flexible processes, which can be easily adapted to the permanent changing input variables or to the customizable output requirements. The development of artificial intelligence technology and its integration into the organizational business processes is promising to bring advantages, which could never be reached by utilizing classical human based processes.

Key words: business process, artificial intelligence, effectiveness, machine learning, decision-making, process redesign.

1. INTRODUCTION

Every organization relies on three main pillars: people, technology and processes and by integrating these resources, the organization aims to accomplish its mission and goals. The management strategy towards operating with these resources can take two main approaches: the classical one where those resources could be viewed and designed to operate independently with very limited and strict regulated interactions, or a second one, where a more holistic approach with a high degree of interconnectivity and integration is designed between them. While the first one has been the basis of designing organization management for a long time, in the last years it has been observed that such a strategy is hampering the performance of the overall system (M.L. George, 2004). The modern highly dynamical environment where current organizations need to operate require from them to adopt a more complex resource management framework in order to increase their ability to adapt and thrive (Dell, 2005).

While the people and technology components are easier to visualize or comprehend and even have in all organizations dedicated well established corresponding management structures, the third one - processes - has not generated a similar standardized approach. This domain is currently beneficiating of different strategies and various levels of attention based on organization internal complexity, the specific operational environment and the domain importance established by managers. The organization processes depend extremely on the mission, internal entities, external partners, legislative framework, technology and most important people. This extremely complex set of factors determine the emergence of a set of business processes which is unique to every organization and are left to the decision managers to govern. In addition, due to this complexity and need for flexibility, the creation of a general accepted standardized framework for ensuring the development of efficient business processes was not possible.

A business processes within an organization is the combination of a set of activities with a structure describing their logical order and dependences and having as main objective to produce a desired result (Ruth Sara Aguilar-Savén, 2004). Business processes are conducted horizontally or vertically within an organization and may or may not be visible to the customers. Sometimes business processes even cross the boundaries of the current organization (Gartner, 2020) and involve external entities. The development of technology determined an increased adoption of a service oriented framework within modern organizations and such external processes become more and more frequent.

2. BUSINESS PROCESSES

Because of the huge diversity of organizations, there are numerous types of business processes, designed and particularized for the different areas of the organization: sales, customer service, technical, finance, production, business continuity, procurement, management, etc. All of them can be divided in three main categories, which are encountered in every organization:

• operational processes: processes that are designed to transform inputs into outputs and to create value for the organization. Depending on the situation, the outputs could be goods, services or both of them. Such processes are the vital ones for the organization as they implement the main goals and reflect the overall reason of its existence;

• supporting processes: processes that do not contribute directly to the transformation of inputs to outputs but ensure the running of the main processes by providing resources, task synchronization and life cycle management. Supporting processes are also very important for

the organization and should be carefully considered because the quality of their performance directly impact the running of the operational ones;

• management processes: processes used to establish the goals, plans and strategies of the organization. Such processes could be also seen as designed to coordinate and control the other process. The strategic management process is one of the most important management processes designed to create the overall process framework for the organization.

In the effort of addressing the efficiency vector of the business processes the domain of business process management was developed. Business processes management is a discipline designed to discover, model, measure, analyze, improve, optimize and automate (Figure 1) the business processes (Wikipedia, 2020).

Traditional business processes management emphasizes the operational efficiency realized by standardization and automation in order to scale, reduce error rate, improve compliance and minimize costs. This metrics are typical for classical organization environments and do not reflect the dynamics of a digitalized changing modern environment.

Digital businesses are thriving growth opportunities for organizations willing to take the risks of this novel approach. The modern world requires an approach to process management, which is based on variety, flexibility and on the fact that every customer has different requirements and particularities. Generic processes cannot ensure varying needs being
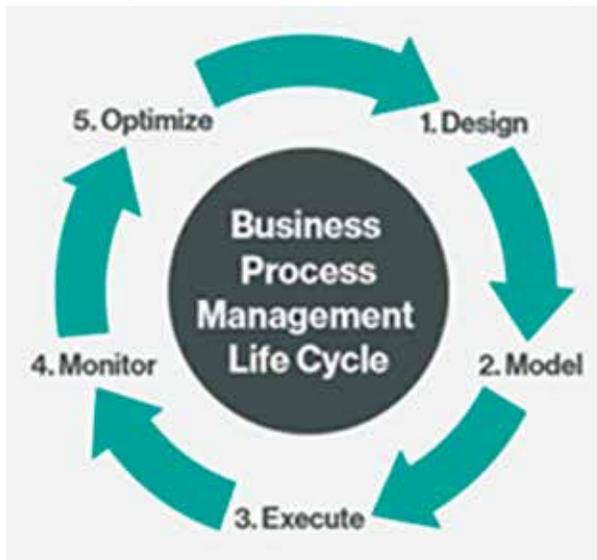

Fig. no. 1 Business Process Management
Source: www.sweetprocess.com, last retrieved February 2021

satisfied efficiently and effectively. The modern metrics from business process management are a combination between standardization and customization but the success of a modern organization requires an operational framework, which allows deviation from standards when necessary. Organizations need proper processes in order for human resource at every hierarchical level to get the right information at the right time in order to be able to rapidly make, within an agreed framework, the required change and adapt to the new challenge or opportunity.

3. ARTIFICIAL INTELLIGENCE

The development of technology has brought challenges but also opportunities to organizations. Indeed, the climate where to operate

and the requirements for increased flexibility and adaptability has put a great pressure on them; however technology offers also a plethora of opportunities and tools which could help them achieve success.

Artificial intelligence is the theory and development of computer systems able to perform tasks normally requiring human intelligence, such as visual perception, speech recognition, decision-making, and translation between languages. (Oxford Reference, 2020)

Machine learning is an application of artificial intelligence. It allows systems the ability to manipulate data and learn from it without being explicitly programmed to do it. Machine learning uses algorithms that can be classified in three main categories (Figure 2):
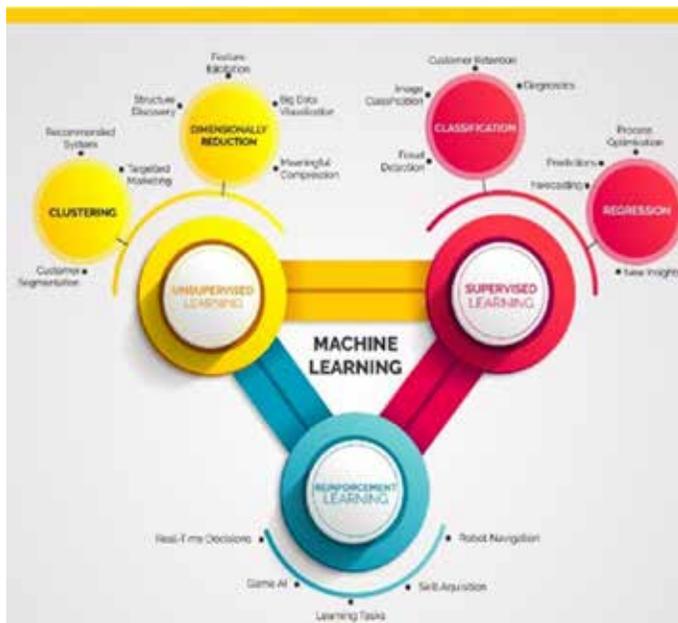

Fig. no. 2 Types of machine learning
Source: www.brainstormingbox.com, last retrieved February 2021

3.1. Supervised learning

In supervised learning, algorithms are trained by using labeled training data alongside known solutions. The labeled training data provides models for algorithms to build their training database. By employing labeled pairs of input and output data, an algorithm will be trained on how to map a provided input data pattern to an output. After training, an algorithm can be used, with an accepted error rate, to classify input data in a certain category or to predict future courses of action.

3.2. Unsupervised learning

Algorithms in unsupervised learning are not given any solutions. Instead, with only unlabeled data as input, they must attempt to find hidden structures and patterns. This approach is mainly used for clustering, such as grouping events based on common characteristics and association, where preferences and tendencies are identified. The benefit is that the system identifies data patterns without the contribution of the human. The results, for example, could be personalized supermarket discounts sent to your phone, an error source identification, a potential new cyber-attack strategy or a tailored homepage for a service.

3.3. Reinforced learning

In reinforcement learning, software agents are placed in an environment and seek to maximize the cumulative reward for their actions. The significant difference of this algorithms compared to the previous two is that no training data is needed; the training of the system is performed by employing them in cycles of observation and action/ reward mechanisms. This type of machine learning can be applied in areas such as game playing and for control problems.

4. ARTIFICIAL INTELLIGENCE IN BUSINESS PROCESSES

Digital transformation is getting deeply integrated into the business processes with artificial intelligence leading the effort. Making artificial intelligence a part of business process management is gaining a lot of traction for uncountable benefits that come with it. It helps organizations to automate their complex processes system by developing a dynamic and modern technological environment. Here are some directions in which artificial intelligence can be integrated within the business processes with associated benefits. It needs to be mentioned that not everything can be automatized and replaced by technology.

4.1. Repetitive tasks automation

Automation of the repeated tasks is one of the most common applications of artificial intelligence. Robotic process automation and intelligent process automation are technologies based on machine learning and artificial intelligence algorithms that are used to replace the repetitive work done by humans. By employing these technologies, large volumes of repetitive work are transferred from humans to automated systems increasing the productivity, accuracy, responsiveness, while minimizing error rate.

4.2. Increasing human resource motivation

By integrating automated systems in business processes, the human resource is relieved from performing the repetitive tasks and reassigned to other activities involving emotional intelligence, reasoning, judgment, or communication with the customer. Employees appreciate the opportunity to work on tasks that are less repetitive which stimulates their thinking and offer more value to their organization. Their active contribution is really making a difference and this induces a strong sentiment of work satisfaction increases their commitment for enhanced productivity. In this manner, both employee motivation and customer satisfaction are improved.

4.3. Enhancing decision-making capabilities

The decision making process involves the processing of a quantity of data based on a previous understanding of environment in order to establish a future course of action. The usage of mathematical models in the process is highly beneficial. However, those are just simplified versions of the real complex environments and their limitations increase the risk of not taking the right decision at the right time. By employing fuzzy systems and neural networks, real complex scenarios could be much better modelled. Artificial intelligence systems integrating these technologies can then be trained on realistic scenarios with all the intricacies and ramifications to develop a better understanding of the environment of the decision.

Artificial Intelligence can mimic the real systems and can be trained from scenarios or past experience. Uncertainty and imprecise knowledge can be represented with fuzzy logic (Pedrycz Witold, 2008) and artificial neural networks (Hammerstrom, 1993).

Augmented decision-making processes based on artificial

intelligence decision models can assist the managers in decision support for tasks such as: organize received data, integrate and visualize data, prioritize and filter event specific relevant data, design an optimal response, assess and quantify risks (Phillips-Wren G., 2006).

4.4. Redesigning processes

As companies grow more and more they develop highly complex processes, which involve many internal and external entities. Due to the high level of sophistication, improving the business processes is hampered, as it is highly difficult to understand the interdependencies between them. Business process improvement efforts could beneficiate upon the usage of an artificial intelligence platform in order to automatically map the processes and establish the relations between them. The data could be later analyzed by using different visualization modes based on desired criteria. Artificial intelligence can be used to identify critical failure points and even recommend optimization actions for those processes.

4.5. Performing predictive analysis

The high quantity and variety of data coming in short time is putting a huge pressure on the current organizations and their ability to maximize the value of collected data. Artificial intelligence algorithms can be integrated into business processes in order to compute large quantities of data collected from various channels, which is otherwise unfeasible to be performed by employing traditional tools and processes. In this way, it is possible to identify patterns that are too complex to be discovered by the human mind. For example, analysis-segmenting prospects based on their buying behavior for marketing purposes, detecting trends, identifying a cyber-persistent threat hiding below classical detection level or even identifying emerging opportunities in a conflict. Artificial intelligence technology can in this way provide predictive analysis of possible courses of action and determine faster and more effective decisions.

4.6. Decreasing costs

The possibility to process large quantities of data and identify relations with the information environment can support the organizations in decreasing costs in a multitude of ways: decreasing error rate, reassign human for more productive tasks, eliminating waste from decision cycle, identify risks in supply chain, optimizing resource utilization, etc. According

to a research from Accenture, "a successful RPA implementation can yield a 40 to 80 percent reduction in processing costs, and up to an 80 percent reduction in processing time." (Acenture, 2017). Even though initially there are some investments in adopting and integrating the new technology within the organization in less than a year most enterprises already reported a positive return on investment (UiPath, 2020). The technology is highly flexible and even the initial costs can be lowered by adopting a scaling up program based on performance.

4.7. Improving customer experience

When first introduced into organizations artificial intelligence was considered only a cost decreasing tool. However, improving the customer experience has emerged as another highly appreciated characteristic. Artificial intelligence-based business processes provide accurate insights into customer's behavior, offer virtual customer assistance and triage, predict maintenance and upcoming repair needs, connect right service staff to customers, prevent fraud, expedite customer complaints and enquiries. Such systems can build customer profiles and can identify market trends or propose products most suitable to

the customer needs. Chatbot is one example of a technique, backed up by artificial intelligence technology, which is designed to establish a direct communication with the customer. Such techniques improve the customer experience by helping to create a transparent platform of communication between entities.

4.8. Improving organization adaptablity

Modern organizations have to operate within an extremely dynamic environment and their success depends greatly upon their ability to take advantages upon opportunities. This requires for the organization to have processes which enable rapid data collection and processing, quick and efficient command and control system and highly flexible reaction tools. Their organizations structure is being able to permanently adapt on short notice to the new environment.

The internal business processes are defined by complex interlaced relationships which, in order to support the dynamical organization needs, require themselves to have a dynamical nature and be able to modify the way they operate or their outputs. Because of complexity and impact, such efforts are usually extremely difficult and require long and complex processes, which are not operationally effective.

Due to their ability to rapidly process data and learn, automated processes based on artificial intelligence can be designed to dynamically reposition themselves or to provide managers with early warnings. Auditing and evaluating sub-processes could be triggered and performed more frequently and much rapidly than in the classical environment. The results can be implemented with human support in and supervised framework or even automatically in an unsupervised or reinforced one.

5. CONCLUSIONS

Artificial intelligence is not just a labor-replacement or cost-saving mechanism but it has the potential to radically change organizations in an unthinkable way. The technology is revolutionary in its ability to impact and transform how every layer of organization works. Artificial intelligence-embedded business process management solutions are assisting businesses to overcome performance blockades, seize opportunities and improve their work efficiency and quality. Organizations all over the world need to understand the benefits of artificial intelligence and to integrate business process management capabilities for optimizing their business processes.

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