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# A REVIEW OF ARTIFICIAL INTELLIGENCE AND ORGANIZATIONAL AGILITY

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## ABSTRACT

*For a long time, business environments were relatively stable with changes taking place incrementally. When a radical change occurred, the pace tended to remain relatively slow, and was not quickly followed by other significant changes. Most of the changes and events in the business environment were predictable and to a large degree, certain. However, technology innovation agility, long-term public policy shifts and deregulation are destabilizing the business landscape and reshaping the world in which we live. In particular, artificial intelligence has led (and will lead) to turbulence and uncertainty in the business and consumer markets. The artificial intelligence has the potential to connect everyone and everything. The objective of this paper was to review relationship between artificial intelligence and organizational agility. The two variables were operationalized using Internet of Things, neural network and machine learning for artificial intelligence as predictor variable and human resource agility, information technology agility and innovation agility for organizational agility as the criterion variable. Literature reviewed showed that there is a relationship between artificial intelligence and organizational agility. Hence the study concludes that hike in artificial intelligence improves the agility of organizations and moderates this association. Therefore, among other recommendations, the study strongly suggests that organizations greatly build a strong adaptation to emerging change brought about by the adoption of artificial intelligence system.*

***Key Words: Artificial intelligence, Organizational agility, Internet of Things, Neural Networks, Machine learning, IT agility, Innovation agility***

## Introduction

We are living in a dynamic world, customers changing their preferences rapidly enforcing organizations to adopt the concept of organization agility to generate positive organizational performance. The previous researches have helped to reveal the extent to which an organization is capable of coping with environmental determinants and degree of appropriate measures the strategic objectives of the organization, resources and organizations today tend to possess a strategic vision for change to enable them to achieve organizational agility, and suggesting it is a substantial increase in the resources allocated to research and development and investment in human resource especially if they are fast, flexible and responsive to change and uncertainty and also characterized with high-quality products and these elements of organizational agility, which works to increase organizational performance effectively. The research has been to highlight how artificial intelligence impacts the agility of organizations: agility in dealing with the market and agility in dealing with manpower and fitness in technology in promoting organizational performance (to gain competitive advantage), whether financial or non-financial.

For a long time, business environments were relatively stable with changes taking place incrementally (Kidd, 2000). When a radical change occurred, the pace tended to remain relatively slow, and was not quickly followed by other significant changes. In these relatively stable environments organizations were not urged to be adaptive or pro-active to respond with speed to internal and external events. Most of the changes and events in the business environment were predictable and to a large degree certain. However, technology innovation agility, long-term public policy shifts and deregulation are destabilizing the business landscape and reshaping the world in

which we live (Hagel & Brown, 2003). In particular, the Internet as a communication and transaction infrastructure has led (and will lead) to turbulence and uncertainty in the business and consumer markets. The Internet has the potential to connect everyone and everything. Friedman (2005) claims that the globalized world of the twenty-first century has made the world flat. Radical "nonlinear change" which brings about a different order is becoming more frequent.

Over the years, man has continually sought to better his life and his environment and ultimately to reduce the weight of hard work on his lifespan. The pursuit of man has made for a very agile environment which has produced countless changes to which he must adapt. His adaptability to everyday changes whether geographic, economic, technological etc, is a determinant of his survival and attainment of progress in his new world characterized not only by new innovation agility which are interconnected, but also their application and diffusion describing an extraordinary quickening in the rate of growth and change.

Artificial Intelligence is one of such opportunities and innovation agility present in today's world. As a concept, John McCarthy came up with the name "artificial intelligence" in 1955 and it is a field of study which tries to make computers "smart" (Norvig, 2003). In general use, the term "artificial intelligence" means a machine which mimics human cognition. Russel and Norvig (2003) posit that at least some of the things we associate with other minds, such as learning and problem solving can be done by computers, though not in the same way as we do. Artificial intelligence (AI) can therefore be defined as the ability of a computer program or a machine to think and learn. In a discourse, Zeb-Obipi (2019) defined artificial intelligence as the ability of machines and computer software to model human behaviour and thoughts in such a way that they can think, comprehend and execute task. He furthers the discourse by alluding to some related dimensions as Machine Learning (ML) and Machine Recognition. Zeb-Obipi defines Machine Learning as the ability of a machine to acquire experiences and adjust its behaviour based on such experiences on a relatively long period of time; and Machine Recognition as the ability of a machine to identify, track and predict voices, text and images given programmed memory. Put together, AI is the action of an ideal (perfect) intelligent machine which is a flexible agent that perceives its environment and takes actions to maximize its chance of success at some goal including the ability to adapt to present circumstances or situations.

Recent advances in Artificial Intelligence (AI) has enabled technologies to perform a wide range of tasks that normally require human intelligence such as voice recognition, image recognition, and prediction. Machine Learning (ML), which is a subset of Artificial Intelligence, involves giving technologies the ability to learn from experience without being explicitly programmed through the use of different types of algorithms. Hence, Machine Learning is considered one of the most impactful technologies in today's era that is shaping the future of work in many industries (Brynjolfsson & McAfee, 2012). Researchers emphasized that AI-based technologies must be viewed as collaborators and partners that are deployed to augment human capabilities rather than automating them (Davenport & Kirby, 2015). In addition, researchers indicated that AI will create new professions that have no precedents. The new professions will be created to mainly train, explain, and sustain AI-based technologies in organizations (Wilson, Daugherty & Morini-Bianzino, 2017).

More so, today's organizations operate in an environment with rapid changes that make them have adaptive strategies. In fact, the organization's problem about being successful in a dynamic and unpredictable environment is known as the most important challenge of today's organizations. Although several mechanisms such as timely production, re-engineering, virtual organizations and virtual networks have been introduced, agility is one the most popular. In such an environment, agility has become an important feature that has significant impact on employees' behavior and firm performance. The agility approach that has been introduced and developed two decades ago is a conscious and comprehensive response to changing needs in competitive environment and obtaining success from the available opportunities.

Artificial intelligence is a major force driving the need for business agility and at the same time an important capability, which accounts for a firm's level of business agility. Over time, Artificial Intelligence has developed and matured significantly. Although, Artificial Intelligence was relatively expensive in the early days of computing, efficiency was the primary objective shaping the architecture, while delivering relative performance. Roles and relationships were tightly defined to optimize use of scarce and expensive technology resources (Hagel & Brown, 2001). During the years, Artificial Intelligence has become standardized and commoditized, leading to lower prices due to economies of scale.

The essence of organizational agility in relation to AI cannot be overemphasized. Artificial Intelligence channels are wide-ranging and include machine learning, robotics, internet of things, neural networks etc. These channels have a wide range of applications which cut across the organizational intranet and extranet, sophisticated work software, e-commerce and online banking, technological advancements on work process, security etc. These channels have propensity to cause a change within organizations and the changes reflect in a continuum of organizational responses or what is referred to as organizational agility. Some of the reflections are in the size of the organization, speed of response of the organization, employee education and growth, management flexibilities and the burn out of bureaucracies, remote work life or freelancing, digitalization of work etc. Previously, lack of data was the long-lasting issue. Today, companies struggle with massive amounts of data they do not know how to handle or even less, how to process. There is a demand for solutions able to process massive amount of data in real-time and simultaneously draw its own conclusions. There is a need for dynamic technology that can manage, control and adapt different processes to sudden changes in the surroundings. Robots and algorithms have previously been able to perform tasks that are monotonous and static with poor abilities to adapt to alterations or changes. Previous technology has also lacked initiative.

The capability in these attributes has open the possibility to replace human labour in a greater extent than previously thought. By outsourcing well defined tasks with regular processes, employees are free to spend their precious time on qualified tasks rather than on routine work (Autor, 2015). This means that the requirements on organizations are increasing, to utilize their human capital full potentials to the greatest possible extent to create competitive advantage. The aim of this paper is to review the relationship between Artificial Intelligence and organizational agility. For the purpose of this study, Internet of Things, Neural Networks and Machine learning were adopted as dimensions of Artificial Intelligence. The measures of organizational agility used in this study were Human Resource Agility, Information Technology agility and Innovation Agility while Artificial Intelligence was the predictor variable with its dimensions sourced by the researcher and organizational agility was the criterion variable and its measures were obtained from Hagel and Brown (2001).

## Artificial intelligence

The name behind the idea of AI is John McCarthy, who began research on the subject in 1955. McCarthy assumed that each aspect of learning and other domains of intelligence can be described so precisely that they can be simulated by a machine. Artificial Intelligence describes the work processes of machines that would require intelligence if performed by humans. The term 'Artificial Intelligence' thus means 'investigating intelligent problem-solving behaviour and creating intelligent computer systems'.

Definitions relations to strong and week artificial intelligence are the definitions that differentiate between AI mind and AI partner where the AI partner is equivalent with weak Artificial Intelligence and the AI mind is comparable with strong Artificial Intelligence (Etzioni & Etzioni, 2017). The terms are equal in their scope, but AI mind and AI partner might be more intuitive to a noncomputer scientist. None of the definitions do however provide a framework of how to delimit and differentiate the technology, thus having no practical use. Etzioni & Etzioni (2017) while

discussing how to incorporate ethics into AI states that "there are two different kinds of AI. The first kind of AI involves software that seeks to reason and form cognitive decisions the way people do to be able to replace humans. One could call this kind of AI AI minds. The other kind of AI merely seeks to provide smart assistance to human actors— call it AI partners". Tarran & Ghahramani (2015) in looking at how machines learned to think statistically, adds that AI could be "weak or strong". He further posits that "weak Artificial Intelligence" are systems and applications that specialize in a particular area or niche. Conversely, "strong Artificial Intelligence" a computer that can perform any intellectual task that a human can". "Artificial intelligence is a computer programme designed to acquire information in a way similar to the human brain" Staub *et al*. (2015). Ramesh *et al*. (2004). Adds that "Artificial intelligence (AI) is defined as 'a field of science and engineering concerned with the computational understanding of what is commonly called intelligent behaviour, and with the creation of artefacts that exhibit such behaviour'"
In his report, Fredriksson (2018) defined artificial intelligence as "the ability to learn from training datasets and from this by itself, continue to learn and draw its own conclusions" (p.18). This definition does not imply how the technology is used, if it is cognitive or non-cognitive, provides no division between different technologies and is consistent with the operations of existing technology. The definition is also avoiding the discussion of how far the technology has come.
It is widely expected that Artificial Intelligence will have enormous impact on organizations. Some of which are power shifts; re-assignment of decision-making responsibility, cost reduction, enhanced service, personnel shifts and downsizing among others. However, in this paper, we review how artificial intelligence affects organizational agility. For the purpose of this, the following dimensions of Artificial Intelligence are used: Internet of Things, Neural Networks and Machine Learning.

**Internet of Things (IoT):** According to IERC (2010:pg), IoT is a "dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual "things" have identities, physical attributes, and virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network." Internet of Things (IoT) is a concept and a paradigm that considers pervasive presence in the environment of a variety of things/objects that through wireless and wired connections and unique addressing schemes are able to interact with each other and cooperate with other things/objects to create new applications/services and reach common goals. It is a feature of a smart world where the real, digital and the virtual are converging to create smart environments that make energy, transport, cities and many other areas more intelligent. The goal of the Internet of Things is to enable things to be connected anytime, anyplace, with anything and anyone ideally using any path/network and any service. Internet of Things is a new revolution of the Internet. Objects make themselves recognizable and they obtain intelligence by making or enabling context related decisions due to the fact that they can communicate information about themselves and they can access information that has been aggregated by other things, or they can be components of complex services.
**Neural Networks:** Neural Networks (NN) are models that attempt to mimic some of the basic information processing methods found in the human brain. As our brains perform complex tasks, NN modelled after the brain has also been found useful in solving complex problems (Samarasighe, 2006). Also, NN is a massively parallel distributed processor that has a natural propensity for storing experimental knowledge and making it available for use (Dey, 2008). Neural networks are developed by modelling the human brain, making them functionally similar in two ways. First, information is acquired by networks in neural networks. Secondly, connections between artificial neurons are used to store information. In neural networks, the artificial network is a processor used to store information and to make it functional (Gelir, 1994). Neural networks consist of the combination of constant non-linear functions (Chenoweth, Obradovic & Stephen, 1996) and the authority of neural networks express the capacity of neural networks (Krose &

Smagt, 1996). Neural networks, a simple copy of biological neural networks, have very impressive results despite the superficial connections between neural networks. Neural networks have been used in many areas (Gelir, 1994). NN performs a variety of tasks, including prediction or function approximation, pattern classification, clustering, and forecasting (He & Xu, 2009). Nevertheless, its performance is affected by how the setup of the neural networks structure is conducted, and by how data is prepared for it (Ogasawara et al., 2009). Information technology units available in neural networks might look like the neurons in the brain and neural networks consist of many information technology units which are inter-connected. Information processing units receive inputs from several different units and output is distributed to the other units as inputs.

**Machine Learning:** Machine learning has become one of the mainstays of the information technology in the past two decades and thus, an important, but hidden, part of our lives. The increasing amount of data that is being generated (and stored) daily by individuals and corporations, demands a smart analysis. It is here where machine learning comes to the stage as a necessary ingredient for technological progress (Smola & Vishwanathan, 2008). Machine learning involves computer algorithms capable of learning to improve their performance of a task on the basis of their own previous experience. It focuses on achieving smart programmable devices and "machines" which learn automatically, by themselves. Basically, it is all about systems learning from data. Machine learning is seen as the process of performing tasks by looking at historic data and from that draw generalized conclusions to respond to new situations. At the very core, machine learning is a "branch of artificial intelligence employing pattern recognition software that analyses vast amounts of data to predict … behaviour" (Mena, 2011, p. 1). The ultimate goal of machine learning is to transform apparently dissimilar problems to a set of relatively similar sorts of problems after which the problem can be solved using various algorithms and to – ultimately – generalize the algorithm to examples beyond those in the training set (Smola & Vishwanathan, 2008; Domingos, 2012; Frey & Osborn, 2013). In other words, machine learning algorithms continuously learn from context specific historical data and make future predictions with high internal validity and can autonomously perform routine and non-routine tasks. Humans are considered too lazy to spend all day in front of a screen and upload data into database so they invent a "machine" which can search, access, upload, save and create database - basically can "learn" by themselves. Another point which alludes to the human preference of machine learning is the Internet. Let's imagine the size of data in Internet, no one can sit in front of computer screen all day to upload those data into a machine, just connect that machine with Internet let them be. The question is how human teach a machine "learn" something? How can we define "learn"? The answer is Neural network. It is a computer system designed for classifying data in the same way human brain does with knowledge (Marr 2016). Based on recognizing image, color, size, text, all kind of elements which data contains, a machine can divide it into difference groups. Then depend on any requirement from human, the machine can give you the group of data you want. You can imagine how much time you can save with machine learning technology in all kind of industry, at the time of free access to internet at anywhere, anytime.

## Organizational Agility

While organizational flexibility has been studied for the last few decades and many attempts have been made to define agility in the business organizations, most definitions have focused on separate functional areas of the businesses. Only recently, organizational agility - as an entire enterprise phenomenon, gained more interest from researchers (Wendler, 2013). Review of various organizational agility definitions in the scientific literature allows identifying common themes and building blocks of organizational agility. In the simplest form, organizational agility can be defined as organization's ability to identify changes in the environment and respond quickly. Some authors (Sambamurthy *et al.*, 2003; Ren *et al.*, 2009; Raschke & David, 2005; Narasimhan *et al.*, 2006) identify agility as organizational capability – something that an organization is capable to do with its resources. It refers to organization's ability to identify changes and ability to

respond to them. Ability to respond to the changes in the environment depends on the know-how, experience, and knowledge of the organization and its decision makers. Dove (1999) refers to this ability as 'knowledge management'. Unexpected change is also present in many definitions of organizational agility (Ren *et al.*, 2009; Meredith & Francis, 2000; Lu & Ramamurthy, 2011a; Lin *et al.*, 2006; Brown & Bessant, 2003; Nagel & Dove, 1991) as 'competitive market opportunities' (Sambamurthy *et al.*, 2003), 'dynamic and continuous change' (Sarkis, 2001); and referred to as changes arising from competitor's actions, consumer preferences, regulatory or legal changes, economic shifts, technological advancements etc. (Overby, Bharadwaj & Sambamurthy, 2005). Ability to respond or 'seize' (Sambamurthy *et al.*, 2003) or 'reconfigure' (Sharifi & Zhang, 2001) is an ability to act in response to the changes and in the situation dictated by the environment and internal resources and abilities.

The main purpose of agility in an organization is to better adjust to change and gain competitive advantage and to take opportunities from changes in the environment and thrive in uncertainty and unpredictability. Therefore, agile enterprises need a set of capabilities and enablers to respond to such change. The framework of enablers and capabilities is based on the premise that agile organization can achieve competitive advantage in changing the environment.

**Human Resource Agility:** Human resource agility is the capability of the human resource function to respond more quickly and effectively to changing employee expectations, workplace disruptions, and business requirements. The complexity of the business environment, the increasing development of science and technology, the emergence of growing needs of environment, the diversity and composition of them, the various demands of customers, reduced time of product delivery, as well as the effects from accepting globalization, increased competition, and even de-globalization have led to instability and a tendency for ongoing change, and in general, the lack of predictability of the environment (Khosravi, 2011). Due to this situation, traditional models and past business priorities have lost their ability to face organizational and environmental challenges (Jafarinejad & Shahayi, 2007). Although agility in human resources has been mentioned as a profitable strategy in the dynamic business environment, the lack of agile workforce has been identified as one of the main reasons in organizations' failures in keeping with market and technology changes (Qin & Nembhard, 2015). Hence, achieving success at the organization level will not be possible unless human resource and the manner of its engagement processes are noted. The methods of managing and motivating the human capital play a key role in moving individuals towards agility.

Adoption of human resource agility approach comes with benefits such as increased autonomy and employee control, job enrichment, better performance, well-being (Abrisham, Kar & Abdollahi, 2006), improved quality, providing better customer service, accelerated learning curve, economic savings in all processes. Hence, the adoption of human resource agility approach by implication improve the organizational culture, which resultant effect leads to economic excellence (Hopp & Van Oyen, 2004). On the other hand, the lack of agility can lead to significant losses of opportunity and even threaten the survival of the organization in the long run (Qin & Nembhard, 2010). Unlike traditional methods, agile methods rely on employees and their creativity to fight against instabilities (Muduli, 2016). Therefore, the upgrading of skills and continued training of human resources is an integral part of the processes of an agile organization, as this is a viable investment for future success of the organization (Goldman *et al.*, 1995).

**Information Technology Agility:** IT agility, then, is a measurement of how efficiently the IT infrastructure of an organization can respond to external stimuli. This can mean how effectively it embraces the pressure to change or how successfully it creates a new opportunity. In the past, the IT function has often been viewed as a functional unit with the mere purpose of providing IT services to increase operational efficiency and making information readily available across the organization (Bharadwaj *et al.*, 2013).

In the contemporary business environment, IT agility makes up an indispensable part of successful business strategies, a development that amplifies the growing influence of IT on the

creation and capturing of business value for the firm (Bharadwaj *et al*., 2013; Kohli & Grover, 2008). This for instance, encompass the digitization of a firm's services (i.e., its products and services), the utilization of digital channels to interact with customers, digital customer engagement, and the provision of ancillary digital services to end-customers (Yoo *et al*., 2012). Eventually, organizations which are agile in information technology have the potential to transform traditional business models into digital business models (Hess *et al*., 2016; Matt *et al*., 2015). In addition to other potentials, an IT agile organization support transformative activities, aiming at digital value creation and innovation in addition to its traditional focus on automation and information (Dehning *et al*., 2003).

**Innovation Agility:** Driving innovation through agility involves experimenting in numerous areas while quickly prototyping to learn which of the ideas are viable to not only solve customer's issues but also, generate profitable business models. Innovation agility is the organization's ability to create products or solutions out of nothing, virtually straight out of their inspiration. In other words, innovation agility is the potential or developed capacity that any organization has to identify all the resources in their environment, and analyze, link and integrate them, to address a need. Innovation agility enables organizations to build a solution, a product or a service that breaks the old paradigms or dynamics of doing things.

Innovative firms and less innovative firms differ greatly in their risk propensity, attitude toward uncertainty, and acceptance of new technology. Organizations with high innovation agility are more likely to engage in learning and experimenting, are able to cope with high uncertainty and are more prone to taking risks. To achieve high innovation agility score and balance tensions that arise from innovative initiatives, tight coupling between the new initiatives and the core organization routines along with close intervention by the executives in the management of the innovation efforts are needed (Govindarajan & Trimble, 2005). Thus, the innovation capacity of a firm is both dependent on its innovativeness and the existing resource endowments of the firm.

## Artificial Intelligence & Organizational Agility

The study is set to review the effect of artificial intelligence in terms of Internet of Things, neural networks and machine learning on organizational agility measured in terms of human resource, information technology and innovation agility. These dimensions of the two variables are laid out in the conceptual framework, Figure 1.

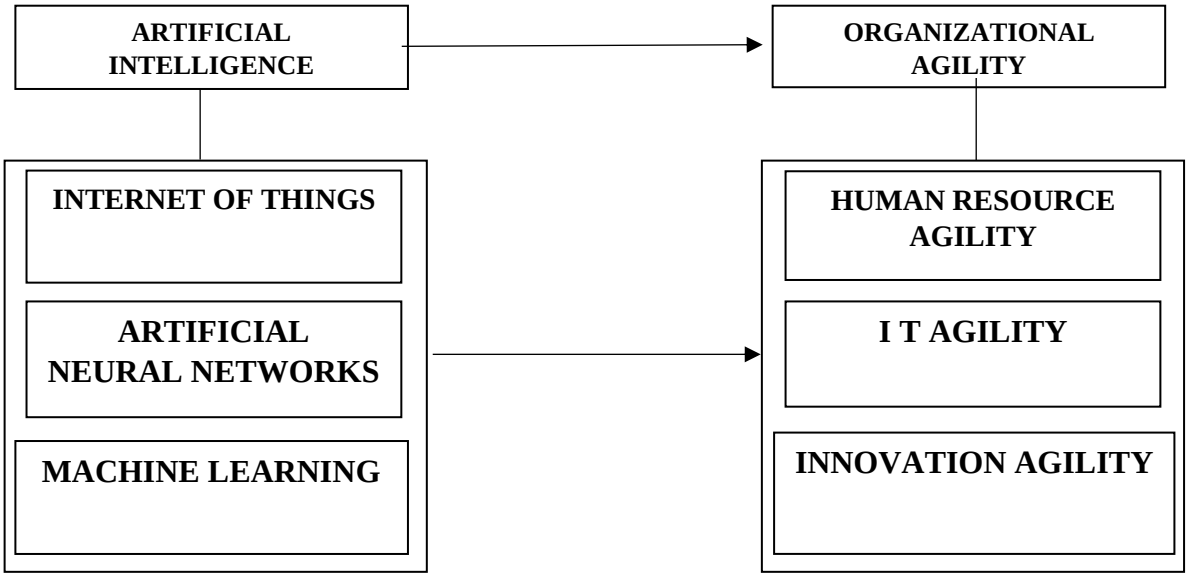


Figure 1: Conceptual Framework of Artificial Intelligence and Organizational Agility.
Source: Research Conceptualization, 2019.

**Internet of Things and Organizational Agility**

IT resources such as internet of things have been identified as one important type of resources in weaving organizational agility (Overby et al., 2006). Agarwal and Sambamurthy (2002) stated that internet plays an important role in corporate agility. Information technology is expected to have major effects on organizational agility. In recent times research on information system and practice is subscribing to a common message of agility which consists of: recognition of a business environment that fluctuates quicker than conventional strategic planning cycles; the need to sense environmental fluctuations; the need to respond with options using existing information systems; and organizational readiness to effect the sensing and response. Recognition of an environment and its fluctuations and quick response to them requires information systems. First, the IoTs function fuses business and technical knowledge to sense the environment; and respond with IoTs-enabled options for future needs (Sambamurthy et al., 2003). Second, the IoTs function senses current use of information systems, monitoring and improving the value realized (Overby et al., 2006)

Internet of Things organizes suppliers, manufacturers and customers in a virtual, vertically and horizontally integrated, value chain, so organizations are able to introduce and use the appropriate technologies to avoid losing their position and to fully integrate into the customer's network (Stock & Seliger, 2016). Overall, the significant amount of data generated through digitization affects all areas of the company's business, thus improving transparency, integration, and designability, and providing much more information on customer needs and the individual tasks needed to fulfil them.

**Neural Networks and Organizational Agility**

In today's business world, with an ever-increasing need for profitability and efficiency, the terms of competition and market dynamics change rapidly and naturally. Accordingly, it is now needed more than ever to have all business processes keep up with this dynamism. Within the framework of adjusting to this dynamism, the use of Neural Networks will perfectly meet the changing business demands since they reveal practical and profitable products and/or results in a rapid and constant way.

Organizations uses neural network to manage the changes emerging in project processes harmoniously and ensures that rapid, profitable products and results are created. So as to meet the current business demand, it is a requirement to release products (and/or results) in a constant and rapid way, within short cycles. Neural networks ensures that active, agile, profitable and product-focused management/organizations has an interactive format via applications, workshops and best-management practices (Projeegitimmerkezi, 2014). It is important for institutions and enterprises to adopt a more flexible approach in their projects and to become more agile in a constantly changing world. Nevertheless, flexible agile approaches like the use of neural networks might be perceived as daunting or risky for certain institutions which base their projects and programmes on a specific system. Mature agile approaches (agility within the concept of delivery) are required for these project-focused institutions. In addition, agility also offers rapid improvement, change and authorization skills for the team. The use of Neural Networks is now notable and applicable to different works of life. As such, statisticians and Economists have used Neural Networks in the estimations of on time series which are frequently used in classification (Vriend, 1994). Financial corporations have been found to have their own IT experts who prepare a software tailored for their company and they never leak any information outside the company (Seker, Yildirim, & Berkay, 2004). Also, Insurance and Finance experts especially in the banking sector can use Neural Networks for developing credit applications, for customer analysis, for credit application assessments, and for the estimations on budget investment. Additionally, Neural Networks are also used for product optimization, development of application policy, valuation, analysis of organizational agility, budget estimates, targeting, and estimation methods (Kharabe, 2013).

Furthermore, in the aviation, Automotive and Correspondence, Neural Networks is applied as a system to analyse and to detect failure, Neural Networks are capable of learning the regular and proper way of functioning for a system, a device, or a component. Thus, they are capable of detecting any possible breakdowns in a system. As a result, Neural Networks are used in the failure analysis of electrical machinery, planes or their compounds as well as integrated circuits. They are being implemented in the automation of the defence industry, weapons and target monitoring, detecting and differentiating objects/visuals, new detector designs and noise prevention (Duji-ene, 2004).
More so, in medical profession, Neural Networks have been developed in the form of professional medical system to provide an answer for the structural problems in medical areas. Professional medical systems are developed upon the recommendations of one or more medical experts. The purpose of professional medical systems is not to replace physicians, rather to make suggestions and provide advice based on patient data. They have several areas of application, such as the analysis of medical signals like EEG and ECG, analysis of cancer cells, prosthesis design, optimization of transplantation timing and optimization of hospital costs (Demirhan, Kilic, & Guler, 2010). Chemical engineering, construction and structural engineering, electrics and electronics engineering, manufacturing and machinery engineering, systems and control engineering are additional fields of use.

## Machine Learning and Organizational Agility

The field of AI, short for Artificial Intelligence, has been gaining much attention due to its ability to effectively analyse and act upon a vast amount of collected data (Bughin et al., 2017). The technology has been recently featured frequently both in media and in companies' public relations. However, as a research subject, it has been around since the 1950s, during which it has survived a few "winters" of deflated interest and is now experiencing a summer again (Ning & Yan, 2010). This spike in interest is mostly due to the advances in the subfield of machine learning and supporting factors such as data storage and computational power (Quan & Sanderson, 2018).
The science of machine learning is translated to business applications in numerous ways which influence business models and employees. Marketing, risk management, logistics, legal departments, finance departments, health care and even education have started to use machine learning applications (Baesens, 2014; Frey & Osborne, 2013). Machine learning have the potential to transform virtually any business (McAfee & Brynjolfsson, 2012; Yeomans, 2015) and machine learning is "likely to change the nature of work across a wide range of industries and occupations" (Frey & Osborne, 2013, p. 17). However, unlike in other business domains, Human Resource Machine Learning (HRML) is not – yet – commercially ready. In addition, organizations can acquire competitive advantage by adapting learning capabilities that include assets and perceivable or unperceivable capacities (Alikhani & Fazlollahtabar, 2014). Weerawardena (2003) stated, "Learning processes must be translated into the acquisition of managerial competencies that permit the organization to be more efficient than competitors" (p. 411). Correspondingly, Prieto and Revilla (2006, p. 169) "conceptualize learning capability as the potential to explore and exploit knowledge through learning flows that make possible the development, evolution and use of knowledge stocks that enact organizations and their members to add value to the business".

## Conclusions and Recommendations

Various papers have, in the past couple of years discussed the effects of Artificial Intelligence bon organizations and the outcomes are diverse and oftentimes conflicting. This paper addresses that same questions but Adopts a micro perspective and focusses exclusively on the effect of AI on Organizational Agility. The most important position of this paper is that adoption of AI is a veritable tool for organizational agility in achieving high performance score and gaining competitive advantage. Hence, it could be concluded that there is a positive relationship between Artificial Intelligence and organizational agility however, the magnitude of this relationship needs

to be empirically determined. Hence, it is recommended that a full-scale empirical research be carried out to ascertain the dimensions and magnitude of these relationships. Secondly, business organizations who are victorious in their organizational agility, adapt to relevant artificial intelligences systems. Thirdly, it is noteworthy that the use and adoption Artificial Intelligence requires the rethinking of technology, skill and process throughout the entire value chain. Therefore, organizations need to realistically see what capabilities it can develop and what is required in order to be involved which in the future will remain a basic requirement for staying competitive. Lastly, it makes sense for organizations to invest in human resource professionals who are knowledgeable and possesses an analytical thinking style as it is important for managers to consider and plan for technical, business and organizational aspects in order to effectively utilize Artificial intelligence.

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