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# INTERNET OF THINGS IN THE CONTEXT OF INDUSTRY 4.0: AN OVERVIEW

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## **ABSTRACT**

Due to successive technological advancements, developments and innovations, the global industrial landscape has drastically transformed over the last years. The fourth industrial revolution (Industry 4.0) aims at transforming traditional industries into intelligent ones by incorporating innovative technologies. Industry 4.0 enables physical assets to be integrated into intertwined digital and physical processes thus creating smart factories and intelligent manufacturing environments. Internet of Things (IoT) is a rapidly growing technology that has drastically contributed to the Industry 4.0 realization. IoT pursues to pervade our everyday environment and its objects, linking the physical to the digital world and allowing people and “things” to be connected anytime, anywhere, with anything and anyone ideally using any network and service. IoT is regarded as a dynamic and global network of interconnected “things” uniquely addressable, based on standard and interoperable communication protocols and with self-configuring capabilities. Despite still being at an early development, adoption and implementation stage, Industry 4.0 and IoT can provide a multitude of contemporary solutions, applications and services. Hence, they can improve life quality and yield significant personal, professional and economic opportunities and benefits in the near future. This study scrutinizes IoT in the Industry 4.0 context. More specifically, it presents related studies, describes the IoT concept and explores some of the numerous IoT application domains. Moreover, it presents and analyzes the concept of Industry 4.0 and the benefits it offers as well as the relevant key technologies (e.g. industrial internet of things (IIoT), cyber-physical systems (CPSs), cloud computing, big data and advanced data analytics). Furthermore, it describes the concept of intelligent manufacturing and highlights the main IoT and Industry 4.0 challenges and open research issues. Finally, the need for innovation in the industrial domain and the impact and benefits that IoT and Industry 4.0 provide to everyday life and industries is described.

**KEYWORDS:** Internet of Things, Industry 4.0, IoT applications, Industrial Internet of Things, Ubiquitous computing, Cyber-physical systems.

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## **INTRODUCTION**

Nowadays, due to the rapidly evolving technological advancements, smart devices are able to interconnect, communicate and interact over the Internet. Moreover, over the years, the size of these devices has been reduced whereas their processing power and storage capabilities have significantly increased. Contemporary, smart devices are equipped with advanced embedded systems and have the capabilities of communication, sensing, actuation as well as real-time data retrieval, collection, storage and processing. Internet of Things (IoT) is a rapidly growing innovative technology with various applications, functions and services in everyday life and in a wide variety of domains. IoT aims at pervading our everyday environment and its objects, linking the physical world to the digital world and allowing “*people and devices to be connected anytime, anywhere, with anything and with anyone*” (Vermesan et al., 2011; Perera et al., 2013). IoT and more specifically Industrial Internet of Things (IIoT) along with the digitalization and automation of industrial manufacturing are thought to be what truly have initiated the fourth industrial revolution (Industry 4.0). Industry 4.0 combines traditional manufacturing and industrial practices with innovative technologies, such as large-scale machine-to-machine (M2M) communications, IoT, cyber-physical systems (CPSs), etc. Moreover, it aims at fundamentally transforming traditional industries into intelligent ones by introducing self-maintainability, self-optimization, self-cognition, and self-customization into the industry. There is no doubt that by utilizing the advanced and dynamic network of interconnected devices, IoT can offer a magnitude of solutions to industries as well as multitude of contemporary and advanced applications and services that cannot only enhance life quality, but can also lead to personal, professional and economic opportunities and benefits (Li et al., 2011).

This study involves the analysis of IoT in the context of Industry 4.0. More specifically, it presents related studies (Section 1) and describes the concept of IoT (Section 2). Additionally, it explores some of the numerous IoT application domains (e.g. healthcare and sanitary, smart cities, industrial, smart environments, etc.) (Section 3) and presents the context of Industry 4.0 and the benefits it offers as well as the relevant key technologies, that is, industrial internet of things (IIoT), cyber-physical systems (CPSs), big data and advanced data analytics as well as cloud computing (Section 4). Furthermore, the concept of intelligent manufacturing is described (Section 5) and the main IoT and Industry 4.0 challenges and open research issues are highlighted (Section 6). Finally, the main viewpoints of this study as well as the need for innovation in the industrial domain and the impact and benefits that IoT and Industry 4.0 provide to everyday life and industries are presented and described (Section 7).

## **1 RELATED WORK**

Many elaborate studies which present and analyze the concept of IoT, its characteristics, application domains and key enabling technologies have been conducted. Atzori et al. (2010) conducted a survey in reference to IoT. They elaborated on different IoT visions and paradigms and reviewed key enabling technologies. Moreover, IoT application domains were analyzed and grouped into transportation and logistics, healthcare, personal and social, smart environment and futuristic domains. Finally, relevant open issues and challenges such as standardization activities, addressing and networking, security and privacy were examined (Atzori et al., 2010). Sundmaeker et al. (2010) presented the main vision and challenges for realizing IoT. More specifically, they analyzed the concept of IoT, its application domains as well as its supporting and enabling key technologies (Sundmaeker et al., 2010). In their study, Gubbi et al. (2013) presented a “Cloud” based centric vision for worldwide implementation of IoT. They also discussed the overall IoT vision as well as key enabling technologies and application domains along with some IoT trends and taxonomy. Moreover, they went through open challenges and future trends in IoT and they presented a case study of data analytics on the Aneka/Azure cloud platform. Finally, the need for convergence of wireless sensor network (WSN), the Internet and distributed computing was emphasized (Gubbi et al., 2013). Al-Fuqaha et al. (2015) carried out a study in which they focused on technical details that involve enabling technologies, the most relevant protocols (application, service discovery infrastructure etc.) and key IoT issues and challenges. A 5-layer model of IoT architecture comprising objects, object abstraction, service management, application and

business layers was presented. Furthermore, identification, sensing, communication, computation, services and semantics, which are the six main elements vital to promote IoT functionality, were analyzed (Al-Fuqaha et al., 2015). With the aim of emphasizing the need for advanced IoT middleware, Ngu et al. (2016) conducted a survey in reference to the capabilities, the issues and the enabling technologies of the existing IoT middleware. State-of-the-art middleware solutions to realizing IoT applications and a thorough analysis of the challenges and the enabling technologies in developing an IoT middleware were presented. Moreover, they classified the different architecture types of IoT middleware, they assessed and outlined relevant key research challenges and finally, they presented a comparative analysis of emerging IoT middleware systems (Ngu et al., 2016). In their study, Pereira & Romero (2017) presented a comprehensive definition about the concept of Industry 4.0 and provided several viewpoints regarding its vision. In addition, they described the key Industry 4.0 technology enablers and analyzed the impact and influence of this new industrial paradigm (Pereira & Romero, 2017).

## 2 INTERNET OF THINGS

According to Atzori et al. (2010), the semantic definition of IoT could be determined as *“a world-wide network of interconnected objects uniquely addressable, based on standard communication protocols”* (Atzori et al., 2010). Moreover, based on Vermesan et al. (2011), IoT can be regarded as a dynamic and global network infrastructure based on standard and interoperable communication protocols and with self-configuring capabilities. In this specific network infrastructure, physical and virtual “things” are interconnected, *“have identities, physical attributes, and virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network”* (Vermesan et al., 2011).

In the context of IoT, this new dimension of “things” can be considered as an extension of the existing human computer interaction and communication. More specifically, any physical or virtual entity, which *“exists and moves in space and time and is capable of being identified either by assigned identification numbers, names and/or location addresses”* and of being integrated into communication networks, can be regarded as a “thing” (Vermesan et al., 2011). Moreover, “things” become active participants and context aware, react autonomously and create services without the necessity of direct human intervention. IoT will provide a symbiotic interaction between the physical and virtual worlds and allow people and “things” to be connected anytime, anyplace, with anything and anyone, ideally using any path/network and any service (Atzori et al., 2010; Vermesan et al., 2011).

IoT aims at implementing autonomous, robust and secure connections and data exchange between devices and real-world applications. In addition, it contributes to the fulfillment of M2M communication and interconnectivity as well as to the integration of intelligence into devices. Thus, devices will be able to process information and data and make real-time autonomous human like intelligent decisions without requiring any human involvement and/or intervention (Khan et al., 2012). Hence, it can contribute to creating a potentially better world for people in which the “things” around them know what they like, what they want and what they need and act accordingly, without having to take explicit instructions from humans (Perera et al., 2014).

## 3 APPLICATION DOMAINS OF INTERNET OF THINGS

IoT is considered to be a rapidly growing innovative technology with various applications, functions and services in everyday life and in a wide range of markets and industries. Although the recent advances in ubiquitous computing and the potentialities offered by the IoT render the development of a tremendous number of applications feasible, only a few are currently available (Atzori et al., 2010). IoT applications aim at improving life quality for the end-user community and supporting infrastructure and general-purpose operations (Akpakwu et al., 2017). Hereby, while being designed, the

complexity and the scale of the problem to be solved as well as the particularities, requirements and characteristics of the specific domains in which they will be implemented should be taken into consideration as there is no one-fits-for-all solution. Moreover, they should be designed cautiously so as to satisfy multiple objectives and requirements while simultaneously increasing the quality of experience (QoE) and quality of service (QoS) levels.

IoT solutions can be applied to numerous domains and environments hence they can be grouped into application domains in various ways. Atzori et al. (2010) conducted a survey in which they categorized IoT applications in the following domains (Atzori et al., 2010):

- **Transportation and logistics domain:** Applications of this domain involve logistics, assisted driving, mobile ticketing, environment monitoring, augmented maps etc.
- **Healthcare domain:** Applications of this domain involve tracking, identification, authentication, data collection, sensing etc.
- **Smart environment domain:** Applications of this domain involve comfortable homes/offices, industrial plants, smart museum and gym etc.
- **Personal and social domain:** Applications of this domain involve social networking, historical queries, losses and thefts etc.
- **Futuristic domain:** Applications of this domain involve robot taxi, city information model, enhanced game rooms etc.

Gubbi et al. (2013) classified IoT applications into the following application domains: 1) personal and home, 2) enterprise, 3) utilities and 4) mobile, taking into consideration the impact, type of network availability, coverage, scale, heterogeneity, repeatability and user involvement (Gubbi et al., 2013). While, in their study, Sundmaeker et al. (2010) grouped IoT applications into the following three application domains (Sundmaeker et al., 2010):

- **Environmental domain:** It involves applications that protect, monitor and develop all natural resources, environmental management services, energy management, recycling, agriculture etc.
- **Industrial domain:** Applications of this domain involve financial or commercial transactions between enterprises, organizations and other entities. Moreover, they refer to manufacturing, logistics, banking, financial governmental authorities etc.
- **Social domain:** It involves applications with regard to the development and inclusion societies, cities, and people as well as governmental services towards citizens and other society structures etc.

A number of IoT applications are presented below based on (Atzori et al., 2010; Sundmaeker et al., 2010; Vermesan et al., 2011; Khan et al., 2012; Miorandi et al., 2012; Gubbi et al., 2013; Borgia, 2014; Xu et al., 2014; Zanella et al., 2014; Perera et al., 2015; Gilchrist, 2016):

### 3.1 Healthcare and sanitary

The medical domain is one of the first industries which adopted IoT and was heavily influenced. IoT technologies can create new opportunities, services and applications so as to improve the healthcare and sanitary domain. Moreover, IoT platforms and services enhance current living solutions and facilitate the realization of Ubiquitous healthcare vision that is “*healthcare to anyone, anytime, and anywhere by removing location, time and other restraints while increasing both the coverage and quality of healthcare*” (Lee & Shim, 2009). Furthermore, in the context of IoT, all objects in the healthcare industry will be equipped with sensors and patients will carry mobile medical sensors. Hence, through the interconnection of these heterogeneous sensors, objects and patients will be able to be remotely traced and monitored in real time. This fact will simplify and automate the process of collecting data thus generating an insurmountable quantity of data that can be utilized for further scientific and medical studies. With a view to preventing the onset of health problems more efficiently, IoT technologies improve patient treatment and well-being and personalize QoE and QoS. Moreover, they optimize and enhance

workflow, operations and drug management while simultaneously decrease operational costs. They also provide more effective methods for medical records and data analysis as well as ad hoc diagnosis by taking advantage of rapidly automated decisions and continuous advanced remote patient state monitoring. Finally, by offering a means of automation, supervision and communication for remote outpatients, IoT has an enormous impact on independent living and provides smart solutions for ameliorating life quality and supporting the aging population.

### 3.2 Smart cities

The rapid urban growth is already placing a considerable strain on the existing infrastructure and utilities and highlighting the need for more sustainable urban planning and public services. IoT applications and services are being exploited in order for these new requirements to be satisfied and the societal changes commensurate with this rapid growth to be responded to. Moreover, autonomic city and home networks will be intelligent and capable of sensing, monitoring and adapting to environmental changes as well as reacting to human activities. More specifically, through IoT, smart technologies and devices are interconnected and as a result, they are able to improve and enhance the quality and lifestyle for city dwellers as well as ensure that their essential services are provided. Furthermore, through IoT every aspect of urban life can be improved by creating smart cities that infuse the already established city services and utilities that residents interact with on a daily basis, optimizing the usage of city infrastructure, resources and facilities and enhancing city dwellers' life quality. Some of the many benefits of utilizing IoT applications and services in smart cities involve:

- Energy efficient utilities, buildings and facilities that will reduce the long-term costs and waste.
- Novel and effective systems of consuming, managing, distributing and renewing resources.
- Advanced traffic control and monitoring systems as well as more reliable public transportation means and pedestrian support.
- Advanced monitoring and security surveillance systems so as to improve public safety and security.

### 3.3 Smart environments

By utilizing fully interconnected technological devices and embedded systems, IoT aims at pervading our everyday environment and its objects and creating new ways to interact with these smart environments. The concept of smart environments evolves from ubiquitous computing and promotes the idea of "*a physical world that is richly and invisibly interwoven with sensors, actuators, displays, and computational elements, embedded seamlessly in the everyday objects of our lives, and connected through a continuous network*" (Weiser et al., 1999). Moreover, Cook & Das (2005) described smart environments as "*a small world where all kinds of smart devices are continuously working to make inhabitants' lives more comfortable*". Additionally, they defined that "smart" refers to the ability to autonomously acquire and apply knowledge, while "environment" refers to our surroundings (Cook & Das, 2005).

Through using IoT in combination with automated software agents for real time tracking and monitoring, smart environments become a technological ecosystem of various interconnected devices. These smart devices can securely communicate and interact as well as retrieve, process, store and exchange data in real time. By integrating these heterogeneous data into applications, the adaptation process to dwellers' and environmental continuously changing needs is facilitated. As a result, their requirements are being promptly and satisfactorily met. Moreover, IoT applications in this domain aim at improving the current environmental safety by reducing and mitigating the potential impact of damage and disaster. IoT technologies allow the development of innovative real-time monitoring and decision-making support systems and applications regarding environmental issues, such as early prediction and detection of natural disasters, weather conditions etc.



### 3.4 Transportation and logistics

Nowadays, vehicles as well as roads and transported goods, are equipped with more sophisticated technological devices such as on near field communication (NFC) tags, radio-frequency identification (RFID) tags, actuators, sensors etc. IoT technologies can be used to enhance the potential of these systems and optimize their use in the domains of transportation, logistics and suppliers, which are regarded as essential components to the productivity of many industries. Intelligent transportation systems (ITS) are able to communicate, share and exchange mission-critical information and data promptly, timely and accurately. Hence, they are used to ensure that the transportation network is efficiently monitored and controlled.

IoT offers several contemporary applications and services and in combination with the ubiquitous 5G mobile networks can provide industries with intelligent transportation and logistics systems. These systems provide solutions which are designed specifically for certain needs and goals, thus accelerating productivity, profitability and operations. Moreover, they offer real-time monitoring and tracking throughout the entire supply chain, thus helping enterprises increase end-to-end visibility as well as maintain efficient transportation control and cost-effective management. In addition, they conduct more effective route planning and optimization, allow for better energy efficiency and reduce the overall system downtime.

### 3.5 Industry

A specific category of IoT focuses on its applications and use cases in modern industries and intelligent manufacturing is Industrial Internet of Things (IIoT). It is considered to be a complex system of a wide variety of systems. Moreover, it comprises a key component to the industrial domain and is closely related to the fourth industrial revolution (Industry 4.0). It combines several innovative key technologies so as to produce a system that functions more effectively than the sum of its parts. This specific domain is characterized by its diverse innovative applications and services, its various interconnected devices as well as its novel manufacturing operations and is analyzed in detail in Section 4.1.1.

## 4 INDUSTRY 4.0 AND THE INVOLVED KEY TECHNOLOGIES

Over the last years, the global industrial landscape has drastically changed due to successive technological advancements, developments and innovations. The fourth industrial revolution (Industry 4.0) is characterized by its diverse innovative applications and services, its various interconnected devices as well as its novel manufacturing operations (Lampropoulos et al., 2018). Industry 4.0 can be regarded as a highly integrated, digitalized, automated and autonomous, and efficient manufacturing environment. Wee et al. (2015) defined Industry 4.0 as the “*digitization of the manufacturing sector, with embedded sensors in virtually all product components and manufacturing equipment, ubiquitous cyber-physical systems, and analysis of all relevant data*”. In addition, they quoted that Industry 4.0 is driven by the following four technological clusters: 1) data, computational power and connectivity, 2) analytics and intelligence, 3) human-machine interaction and 4) digital-to-physical conversion (Wee et al., 2015). Furthermore, according to Schmidt et al. (2015), Industry 4.0 combines the powers of traditional industries with cutting edge technologies enabling smart products to be integrated into intertwined digital and physical processes. These processes interact with each other and cross geographical and organizational borders (Schmidt et al., 2015). As reported by Geissbauer et al. (2016), Industry 4.0 focuses on the end-to-end digitalization of all physical assets and their integration into digital ecosystems, while enabling them to seamlessly generate, analyze and communicate data. Additionally, they stated that 1) the digitalization and integration of vertical and horizontal value chains, 2) the digitalization of product and service offerings and 3) the digital business models and customer access are the leading driving factors of Industry 4.0 (Geissbauer et al., 2016). Based on Koch et al. (2014), Industry 4.0 constitutes a new level

of organization and control throughout the entire value chain of the life cycle of products. Moreover, it is geared towards increasingly personalized customer requirements and enhances availability of all relevant information in real time by connecting all involved people, things and systems. Thus, it creates “a dynamic self-organizing, real-time optimized value-added connections within and across companies” (Koch et al., 2014). According to Hermann et al. (2016), the main design principles of the various Industry 4.0 components are: 1) interoperability, 2) virtualization, 3) decentralization, 4) real-time capability, 5) service orientation and 6) modularity (Hermann et al., 2016). Moreover, based on Pfohl et al. (2015), the main characterizing features of Industry 4.0 are: 1) digitalization, 2) autonomization, 3) transparency, 4) mobility, 5) modularization, 6) network-collaboration, 7) socializing (Pfohl et al., 2015). Additionally, Zhou et al. (2015) quoted that the following eight planning objectives are the prerequisites for achieving Industry 4.0 are: 1) standardization of systems, 2) efficient management, 3) establishment of a comprehensive and reliable industrial broadband infrastructure, 4) safety and security, 5) organization and design of work, 6) staff training and continuing professional development, 7) establishing a regulatory framework and 8) improving the efficiency of resource use (Zhou et al., 2015).

In accordance with MacDougall (2014), Industry 4.0 represents a paradigm shift from “centralized” to “decentralized”. By decentralizing intelligence, intelligent object networking and independent process management are developed. A crucial new aspect of the manufacturing and production process is the dynamic interaction between the real and virtual worlds in which the industrial production machinery no longer simply processes the products, but it also communicates with them. As a result, industry, production value chains and business models are radically transformed into intelligent ones, thus leading to the development of smart factories (MacDougall, 2014). Moreover, according to (Pereira & Romero, 2017), this new manufacturing paradigm lays high emphasis on creating smart products and developing smart processes by utilizing smart machines and transforming conventional manufacturing systems in smart factories. Smart factories allow the development of intelligent manufacturing environments throughout the entire value chain and they are the outcome of integration through digitalization, usage of flexible and adaptive structures and strategies as well as of artificial intelligence methods (Hajrizi, 2016; Pereira & Romero, 2017).

#### **4.1 Key technologies involved in Industry 4.0**

Industry 4.0 aims at enhancing and upgrading the current manufacturing facilities, management and maintenance systems and technologies to an intelligent level by utilizing key technologies such as IoT, Internet of Services (IoS), CPSs, autonomous, flexible and cooperative robotics, simulations that leverage real-time data and mirror real world into a virtual model, big data analytics, augmented reality (AR), additive manufacturing, information and communication technologies (ICT) and advanced networking technologies (e.g. cloud computing etc.) (Lasi et al., 2014; Lee et al., 2015; Pereira & Romero, 2017; Zhong et al., 2017). Moreover, it seeks to address the dynamic global market and the competitive nature of today’s industries in line with the continuously changing customers’ and market needs. Horizontal and vertical system integration will allow that capabilities, functions, departments and enterprises evolve in an interconnected network that enables an automated value chain. According to Zhong et al. (2017), intelligent manufacturing will pave the way for the advancement of modern industry and economy as it will apply cutting-edge technologies to various traditional products and systems (Zhong et al., 2017). In an Industry 4.0 context, data collection, analysis and comprehension from many diverse sources, including production systems and equipment, as well as customer management enterprise systems, will become the norm to support decision making in real time. Some of the key technologies involved in Industry 4.0 are briefly described and analyzed below:

##### **4.1.1 Industrial internet of things**

Industrial Internet of Things (IIoT) is a specific category of IoT which focuses on its applications and use cases in modern industries and intelligent manufacturing. IIoT, which is used in the context of Industry 4.0, can be considered to be a complex system of diverse systems and devices. More

specifically, with a view to producing a system which functions more efficiently than the sum of its parts, IIoT combines several contemporary key technologies (Lampropoulos et al., 2018).

Through the use of appropriate services, networking technologies, applications, sensors, software, middleware and storage systems, IIoT provides solutions and functions which develop insight and improve the potential and capability of monitoring and controlling enterprises processes and assets. IIoT services and applications provide vital solutions for more effective scheduling, planning and controlling of manufacturing operations and systems (Bi et al., 2014; Gilchrist, 2016). Additionally, through the various interconnected devices that are able to communicate and interact both with each other and with more centralized controllers, IIoT will decentralize analytics and decision-making, thus rendering real-time responses and reactions feasible (Şen et al., 2018). As a result, the overall availability and maintainability of enterprises is enhanced, their operational efficiency is improved, productivity is accelerated, their product time-to-market is decreased by reducing unplanned downtime and their overall operational efficiency is optimized accomplishing, thus, enormous potential for unprecedented levels of economic growth and productivity efficiency (Bi et al., 2014; Gilchrist, 2016).

#### **4.1.2 Cyber-physical systems**

Cyber-physical technologies and frameworks, also known as cyber-physical systems (CPSs), have been increasingly adopted in industry due to the significant technological advancements in the domains of computer science, ICT and manufacturing (Monostori, 2014; Lu & Cecil, 2015; Mourtzis et al., 2016). Unlike traditional embedded systems, CPS-enabled systems contain “*cybertwined services such as control algorithms and computational capacities*” (Zhong et al., 2017) along with specialized computational capabilities, physical assets and networked interactions (Lee et al., 2015) and involve a large number of transdisciplinary methodologies. The CPSs concept facilitate an ecosystem of cyber manufacturing, where smart machines process production data through a wireless embedded network system. Moreover, CPSs are defined as transformative technologies that can seamlessly link the physical with the virtual world through their advanced and novel systems (Mourtzis et al., 2016). Hence, they are designed and developed to have both physical inputs and outputs so as to enable and enhance the interaction with humans using innovative modalities (Baheti & Gill, 2011; Lu et al., 2017).

#### **4.1.3 Cloud computing**

Cloud computing or simply “Cloud” plays a leading role in enhancing and transforming the current industry as it is a kind of outsourcing that combines large numbers of compute servers and resources with a view to offering computer programs, high-level services and resources on an on-demand or pay-per-cycle basis in real time (Bhardwaj et al., 2010). According to Wang et al. (2010), cloud computing is “*a set of network enabled services, providing scalable, QoS guaranteed, normally personalized, inexpensive computing infrastructure on demand, which could be accessed in a simple and pervasive way*” (Wang et al., 2010). Cloud computing is divided into three levels of service offerings, namely Software as a Service (SaaS), Platform as a Service (PaaS) and Infrastructure as a Service (IaaS) which support different levels of virtualization and management of the solution stack (Bhardwaj et al., 2010).

The use of advanced applications and services that dynamically scale with the increased number of users is considered to be one of the main benefits of cloud computing (Lu & Cecil, 2015). Moreover, users and enterprises have prompt access to applications, programs and services which are rapidly provisioned with minimal management effort and are hosted in the “Cloud” at any time and from any place. Hence, enterprises in the industrial domain use various cloud-based applications widely in order to enhance the crucial for their effective function systems, such as Customer Relationship Management (CRM), Human Resource Management (HRM) etc. Furthermore, enterprises that utilize cloud computing can avoid the complexity of owning and maintaining their own Information Technology (IT) infrastructure and the up-front costs which can be accomplished by a “pay-as-you-go” method (Lu & Cecil, 2015) allowing, thus, the enterprises to start small and invest into more resources if there is

more service demand (Zhang et al., 2010; Zhong et al., 2017). Some further benefits and significant advantages include high availability and maintainability, consistent accessibility to data and services from any connected device as well as reduced development cost and product time-to-market. Taking into consideration the continuously evolving nature, the numerous application domains and multiple benefits of cloud computing, a lot of profits can be yielded in the industrial domain, thus, more and more enterprises of different sizes and types are rapidly adopting this advanced technology with the aim of enhancing their capabilities and capacity at a minimum cost (Zhong et al., 2017).

#### **4.1.4 Big data and advanced data analytics**

The digitalization of everyday life through the adoption of smart devices and advanced technologies (e.g. IoT, Artificial Intelligence (AI), Social Networks (SNS) etc.) has led to the increase of data sources and the diversity of digital content as well as data types, forms and structures (Gahi et al., 2016). Consequently, an enormous volume of heterogeneous data, named big data, is generated and increases exponentially on a daily basis. Volume, variety, veracity, velocity and value are the key factors which characterize and differentiate big data from traditional data (McAfee & Brynjolfsson, 2012; Gahi et al., 2016). Big data plays a key role in industries and intelligent manufacturing as it can provide enterprises with numerous advantages, merits and benefits through various predictive and prescriptive insights. Hence, enterprises, which want to remain competitive, should give priority to the implementation and utilization of contemporary advanced analytical tools, techniques, methods and applications with the aim of processing big data, gleaning intelligence and retrieving the value of the vital data in each case. These tools are named big data analytics (BDA) and use parallel and analytic techniques to analyze huge volume of diverse, rapidly transforming data enabling, thus, the collection, the process and the management of vital information and statistics (Gahi et al., 2016; Parwez et al., 2017). By far, the most effective way for enterprises to gain immense benefits over their competitors, optimize operations, enhance productivity, quality and efficiency and reduce operational costs is to use all the newly gained knowledge in order to generate invaluable insights and improve equipment service and maintainability (Gilchrist, 2016). Nonetheless, in order to fully utilize big data and exploit all of its benefits, enterprises must change their decision-making culture and take into consideration that no matter how much the potential of big data and analytic tools increase, the need for human insight should not be overlooked (McAfee & Brynjolfsson, 2012).

## **5 INTELLIGENT MANUFACTURING IN THE CONTEXT OF INDUSTRY 4.0**

Manufacturing comprises a core industrial component which has a vital impact on people's livelihood and a nation's economy. Additionally, it is one of the largest and highly interconnected IoT markets and it involves a wide variety of operations, processes, services, products etc. With the aim of enhancing the overall production, productivity and product quality management (PQM) throughout the various stages of the life-cycle of products, IoT offers applications and services which include advanced monitoring and tracking, performance and maintainability optimization and human machine interaction. Hence, it stands to reason that IoT can provide a lot of solutions to the manufacturing domain which is characterized by its complexity and breadth of applications, its diverse CPSs and its manufacturing operation management (MOM) methodologies (Zhong et al., 2017).

In the context of Industry 4.0, intelligent manufacturing, also known as smart manufacturing, uses Service-Oriented Architecture (SOA) and is considered to be a novel manufacturing model that takes advantage of and fully utilizes various advanced information and manufacturing techniques, methodologies and technologies (Zhong et al., 2017). It aims at fundamentally transforming traditional enterprises into intelligent ones so as to effectively respond to demand-dynamic economics keyed on *“customers, partners and the public; enterprise performance and variability management; real-time integrated computational materials engineering and rapid qualification, demand-driven supply chain services; and broad-based workforce involvement”* (Davis et al., 2012). Intelligent manufacturing uses the combined intelligence of

people, processes and machines so as to increase production, product quality and productivity efficiency. It offers smart solutions for the detection and monitoring of potential damage, malfunctions and breakdowns. Moreover, it enhances control and management, improves maintainability and availability and optimizes resource management and sharing. Additionally, it applies cutting-edge technologies to various traditional systems, services and products (Zhong et al., 2017). As a result, it is obvious that intelligent manufacturing has a drastic impact on the overall function and economics state of enterprises and will pave the way for the advancement of modern industries.

Intelligent manufacturing aims at developing real-time, autonomous and human like intelligent decision-making systems that reduce the need for human involvement and intervention. In order for this to be accomplished, artificial intelligence, machine learning, genetic algorithms and other advanced technologies, methodologies and techniques are used. This fact comprises a major distinguishing factor between intelligent manufacturing and traditional manufacturing. Nonetheless, the goal of both manufacturing domains remains the same, that is, to satisfy customers' requirements and market needs as well as maximize profits while simultaneously minimizing possible cost and waste (Kumar, 2002).

## **6 OPEN RESEARCH ISSUES AND CHALLENGES OF INTERNET OF THINGS AND INDUSTRY 4.0**

It is obvious that in the context of Industry 4.0, IoT can enhance and transform the current industries and yield a lot of benefits due to its advanced technologies, applications and services. It is also vital to point out that IoT not only aims at transforming industries and increasing their productivity but also at adding value to the core purpose of enterprises and mitigating the weaknesses caused by legacy systems. Hence, it should be compatible with existing devices, systems and infrastructure and be able to embed intelligence into them. As a result, enterprises that are undergoing digital transformation will be facilitated to adopt and implement IoT and exploit its numerous benefits and solutions without having to directly invest in totally brand-new equipment as cost might far outweigh the immediate benefits. Nonetheless, in order for Industry 4.0 to be fully implemented and for IoT to be adopted and fully utilized by industries and enterprises, a lot of challenges and open issues should be looked into and addressed.

### **6.1 Challenges and open research issues regarding internet of things implementation**

Many elaborate studies, which analyze vital IoT challenges, integration and implementation problems and open research issues, have been conducted. More specifically, open research issues involving standardization activities, addressing and networking as well as security and privacy were analyzed by Atzori et al. (2010). Key IoT challenges, such as interoperability and standardization, data and information confidentiality, encryption and privacy, naming and identity management, IoT greening as well as object and network security were described by Khan et al. (2012). Communication and identification technologies, distributed system technologies and intelligence and emphasized security issues such as data confidentiality, privacy and trust were some of the main research challenges that Miorandi et al. (2012) looked into. In their study, Gubbi et al. (2013) examined and analyzed open challenges such as secure reprogrammable networks and privacy, QoS, energy efficient sensing, architecture and protocols, Geographic Information System (GIS) based visualization, data mining and cloud computing (Gubbi et al., 2013). The open challenges and issues which Borgia (2014) went over were: object mobility, M2M communications, device and data management, network architecture and system design, addressing, naming and traffic characterization and security (Borgia, 2014). According to the study conducted by Perera et al. (2014), privacy and data analytics, interoperability on products and services as well as resources and energy management are considered to be key challenges. Key IoT challenges and QoS criteria such as availability and reliability, mobility, performance and management, scalability and interoperability as well as security and privacy were examined by Al-Fuqaha et al. (2015). Breivold & Sandström (2015) described the management of fault tolerance, functional safety, latency

and scalability of data, mixed criticality and scalable as well as secure real-time collaboration as key IIoT challenges (Breivold & Sandström, 2015). Data management and mining, security and privacy were regarded as the main challenges which enterprises face in IoT development by Lee & Lee (2015). Sadeghi et al. (2015) focused on security and privacy challenges in IIoT and their vulnerability to a variety of cyberattacks (Sadeghi et al., 2015).

To sum up, based on the above mentioned studies, the most significant and common IoT challenges and open research issues which industries and enterprises should be aware of are:

- Availability, reliability, mobility and other QoS criteria;
- Security, privacy and confidentiality of data;
- Interoperability and scalability;
- Fault tolerance and functionality safety;
- Management of operations, resources, energy and data;
- Networking addressing and identification;
- Architecture, protocols and standardization activities.

## **6.2 Challenges and open research issues regarding the implementation of Industry 4.0**

Many elaborate studies, regarding vital challenges, integration and implementation problems and open research issues of Industry 4.0, have been carried out. Wang et al. (2016) and Vaidya et al. (2018) defined several challenges and fundamental issues in various sections that occur throughout the implementation of Industry 4.0. The identified sections in their studies were: 1) intelligent decision-making and negotiation mechanism, 2) high speed industrial wireless network (IWN) protocols, 3) manufacturing specific big data and its analytic, 4) system modeling and analysis, 5) cyber and property security and 6) modularized and flexible physical artifacts, 7) Investment issues (Wang et al., 2016; Vaidya et al., 2018). Based on Zhou et al. (2015), some of science and technology challenges concerning the implementation of Industry 4.0 involve the development of smart devices, the construction of network environments, big data analysis and processing and digital production (Zhou et al., 2015). In his study, Schröder (2016) pointed out the lack of a digital strategy in line with resource scarcity as well as the lack of standards and poor data security as the main obstacles for the technological implementation of Industry 4.0 (Schröder, 2016). Küsters et al. (2017) claimed that some manufacturers and enterprises hesitate to implement Industry 4.0 due to certain concerns and barriers. These include uncertainties about financial benefits, lack of strategies of coordinating across different organizational units, missing talent, skills and capabilities, hesitation to go through radical transformation and concerns regarding the third-party providers' security (Küsters et al., 2017). According to Kagermann et al. (2013), the three greatest challenges connected with implementing Industry 4.0 are 1) standardization, 2) work organization and 3) product availability (Kagermann et al., 2013). Chen et al. (2017) quoted that there are still issues and challenges to be coped with in regard to equipment intelligent requirements, deep integration networks and knowledge-driven manufacturing (Chen et al., 2017). Lu (2017) regarded interoperability as the main open issue in Industry 4.0 and analyzed the main principles to ensure high accuracy and efficiency of processes, that is accessibility, multilingualism, security, privacy, subsidiarity, the use of open standards, open source software and multilateral solutions (Lu, 2017). Bauer et al. (2016) carried out a Global Expert Survey including 300 expert companies (with at least 50 employees), split evenly across the United States of America, Germany and Japan in both Industry 4.0 technology suppliers and manufacturers. The expectations and attitudes are positive and optimistic. In total 90% of the respondents believe their competitiveness will increase with Industry 4.0 or stay the same, 89% expect Industry 4.0 to impact their operational effectiveness, and 80% consider that Industry 4.0 will have an impact on their business model. Moreover, based on their survey the main challenges of Industry 4.0 are (Bauer et al., 2016):

- Lack of courage to push through the radical change needed for introducing Industry 4.0;
- Lack of necessary talents for making Industry 4.0 happen;
- Lack of a clear business case justifying investments in Industry 4.0 IT architecture;

- Difficulty in coordinating actions across different organizational units, such as research & development (R&D), IT, manufacturing, sales, and finance departments, due to poor interaction between them;
- Uncertainty about insourcing versus outsourcing and lack of knowledge about service providers;
- Concerns about cybersecurity when involving third-party technology/software and implementation providers;
- Concerns about data ownership when working with third-party providers;
- Challenges with integrating data from disparate sources to enable Industry 4.0 applications.

## 7 DISCUSSION

Technological advances and digitalization of everyday life have led to the increase of rapidly changing customers' needs and requirements. Simultaneously, the fierce competition which prevails in global markets has drastically risen. As a consequence, the need for flexibility and real time response to these changes is becoming vital. Therefore, with a view to fulfilling and satisfying these new demands, staying ahead of their competitors, enhancing their product and service quality and raising their profits, enterprises opt to implement new technological means, practices and methodologies and seek for new innovative approaches to increase their productivity. According to Francis & Bessant (2005) and Tidd et al., (2005), the four broad types of innovation that enterprises mostly target at are: 1) product innovation, 2) process innovation, 3) position innovation and 4) paradigm innovation (Francis & Bessant, 2005; Tidd et al., 2005). Generally, innovations result in more changes such as manufacturing paradigm shifts, progress in technologies etc., create new opportunities and bring about new challenges.

In order for enterprises to sustain in the context of globalization, create new values and drive innovation to achieve more competitive success in their business, they should adapt to the digital transformation and the virtualization process. Moreover, they should incorporate innovation in their manufacturing process and integrate technological and managerial approaches so as to strengthen their overall competence.

Industry 4.0 is a response to the newly created challenges in a fast-changing and evolving environment. It is regarded as a highly integrated, digitalized, automated, autonomous and efficient intelligent manufacturing environment and it constitutes a new level of organization and control throughout the entire value chains. More specifically, it puts emphasis on the development of smart factories and intelligent manufacturing and aims to deal with customers' and market changing needs and transform conventional industries into intelligent ones. In order for this to be achieved, Industry 4.0 combines the powers of traditional industries with cutting edge technologies (e.g. IIoT, CPSs), cloud computing, big data and advanced data analytics etc.) enabling physical assets to be integrated into intertwined digital and physical processes. The main contribution to the realization of Industry 4.0 was made by IoT. It allows people and "things" to be connected anytime, anywhere, with anything and anyone ideally using any network and service. Additionally, IoT pursues to pervade our everyday environment and its objects, linking the physical to the digital world. IoT which is regarded as a dynamic and global network of uniquely addressable interconnected "things" aims at implementing autonomous, robust and secure connections. Moreover, IoT provides various applications, functions and services in everyday life and in a wide range of markets and industries.

By implementing and adapting to Industry 4.0 and IoT technologies, unprecedented levels of economic growth and productivity efficiency can be achieved by enterprises, such as:

- Development of production systems which are characterized by interoperability, flexibility, adaptability, agility and proactivity.

- Optimization and improvement of efficiency, speed and quality particularly in engineering, operation, administration and decision-making.
- Enhancement of overall application, services and system availability and maintainability.
- Acceleration of productivity and reduction of lead time resulting in decreasing time-to-market.
- Facilitation of the adaptation to individualized customer requirements and market demands.
- Improvement of monitoring and controlling enterprises processes and assets.
- Reduction of overall cost and waste.
- Decentralization and digitalization of production.
- Capability of robust, enterprise-wide data analytics.

Industry 4.0 and IoT can provide a multitude of contemporary solutions, applications and services and can yield significant personal, professional and economic opportunities. Hence, enterprises and industries that are able to fully implement and adapt to Industry 4.0 and IoT will reap many benefits and profits and will be able to stay ahead of market competition. Nonetheless, IoT and Industry 4.0 are still at an early stage of development, adoption and implementation, therefore there are still various open issues and challenges that need to be addressed.

## **CONCLUSION**

IoT is an innovative and rapidly growing technology which offers various novel applications, services and solutions and links the physical to the digital world. It also allows people and “things” to be connected anytime, anywhere, with anything and with anyone ideally using any path/network and any service. Moreover, it improves the quality for the end-user community and our lives in general and supports infrastructure and general-purpose operations. In addition, it aims at transforming the current industries into intelligent ones utilizing the dynamic network of interconnected devices. Enhancing their operation and functionality, increasing their productivity and reducing their costs and waste are some of the many benefits and profits that enterprises can gain by using IoT. Moreover, enterprises that fully adopt IoT will be ahead of their competitors, become more agile, adapt to the continuously changing market, create products of higher quality that satisfy customers’ needs and requirements.

Moreover, in the context of Industry 4.0, IoT, and more specifically IIoT, can be utilized in combination with other innovative technologies such as big data, cloud computing, CPSs etc. in order to enhance and transform the current manufacturing systems into intelligent ones. Industry 4.0 allows for machines to become independent entities that are able to collect and analyze data and give advice upon it without requiring any human intervention as it introduces self-maintainability, self-optimization, self-cognition, and self-customization as well as intelligence to the industry. It seeks to cope successfully with the global competitive nature of today’s markets and industries in line with the ever-changing customers’ needs and requirements.

Although IoT offers a magnitude of solutions to industries as well as multitude of contemporary and advanced applications and services, it is still at an early stage of development, adoption and implementation. Thus, in order for the various current challenges and open issues to be encountered and solved, further research should be carried out. All in all, the complete implementation and prompt adoption of IoT along with appropriate utilization of its novel technologies, applications and services cannot only improve life quality, but can also yield significant personal, professional and economic opportunities and benefits in the near future.



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# ENTREPRENEURIAL INTENTION AMONG POLYTECHNIC STUDENTS IN NIGERIA: THE ROLE OF SELF- EFFICACY AND SOCIAL NETWORKS

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## ABSTRACT

This study was carried out to examine the role of self-efficacy and social networks on entrepreneurial intention among polytechnic students in Ile - Ife Osun state, Nigeria. Theory of Reasoned action was used as a theoretical framework for this study. A survey design was adopted. The data for this study was collected in 2018 via a purposive sampling technique, where 240 students (81 females and 159 males) with age range of 21–35 years ( $M = 23.61$ ,  $SD = 2.63$ ) were selected from one polytechnic. Inferential statistics (t-test for independent measure) was used to test the hypotheses in this study. Result showed that there was significant difference between entrepreneurial intention of polytechnic students with low self-efficacy and high self-efficacy. There was significant difference between entrepreneurial intention of polytechnic students with low social network and high social network. Therefore, to improve entrepreneurial intention among polytechnic students, psychologists should organize psycho-educational interventions aim at increasing self-efficacy and social networks of polytechnic students.

**KEYWORDS:** Entrepreneurial intentions, self-efficacy, social networking, polytechnic students

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## INTRODUCTION

Few decades ago, research on entrepreneurial activities has attracted attention by researchers from various fields such as psychology, sociology, and business administration. This is because of the important entrepreneurship has on the growth and development of any nation (Muhammad, 2012; Vivarelli, 2012; Kaegon & Nwogu, 2012). In any developing economy, the role of entrepreneurial activities in achieving sustainable economic growth and development cannot be over-emphasized. Entrepreneurship promotes rapid economic growth and also minimizes the rate of unemployment in any country. Entrepreneurship can be said to be any effort at producing new business such as self-employment, creating new business or the extension of existing business by an individual, or group of people (Reynolds, Camp, Bygrave, Autio, & Hay, 2001). Entrepreneurship is as a result of complex balancing of prospect initiatives, risks and rewards. It can be viewed as a process by which individuals

look for opportunities, enjoyable needs and wants through innovations, without regard to the resources they currently control. Through the practice of entrepreneurship, it is possible to maintain the scope of capital formation, job establishment and aid industrialization in a country (Asaju, Arome & Anyio, 2014). On the other hand, an entrepreneur is a person who hunts for change, responds to it and exploits it as an opportunity.

In every society, entrepreneur is known to be a business front-runner and not just owner of capital. Such person is often driven with telescopic faculty, energy and ability that see business prospects and immediately explore them for opportunity (Ojewumi, Oyeleke, Agberotimi & Adedayo 2018). An individual who wish to venture into entrepreneurship often begins with planned thought, desires and ideas which is often referred to as entrepreneurial intention in the literature. According to Abubakar, Salwa and Amina (2014) Entrepreneurial intention refer to individual willingness to start a new business. On the other hand Entrepreneurial intention is also described as the readiness of an individual to perform entrepreneurial behaviour, to engage in entrepreneurial action, to be self-employed, or to establish new business (Dohse & Walter, 2010). Furthermore, entrepreneurial intention is a reliable measure of entrepreneurial behaviour and entrepreneurial activity (Krueger, 2000). Generally, entrepreneurial intentions are a state of mind which directs and guides the actions of the individual towards the development and implementation of new business concepts (Bird, 1988). An individual may have potential to be an entrepreneur but may not make any transition into entrepreneurship unless they have such intentions (Mohammad, 2009).

Over the year, the level of unemployment in Nigeria is on an alarming rate despite different programmes set by government of Nigeria (NBC, 2016). Many polytechnic students despite having practical knowledge in their course of study always have the perception of getting a white collar job after graduation which on reality the job opportunities are not readily available. It therefore becomes pertinent to inculcate entrepreneurial intention among polytechnic students in order to reduce the menace of unemployment and improve wellbeing among intending graduates especially in a developing country like Nigeria. Many available studies have investigated many factors that could make individual have the intention of starting up his or her business such as personality traits (Akanbi, 2013; Owoseni, 2014), Values, attitudes and beliefs (Gasse & Tremblay, 2011), entrepreneurial educational support and informal network (Amos, Oluseye & Bosede 2015), fear of failure and entrepreneurial self-efficacy (Okoye 2016) creativity and age (Agbim, Oriarewo & Owocho 2013), demographic variables such as gender, and age (Deh, assume & Agyemang, 2013) and student level of studies (Bhandari, 2013). Although, these studies contribution are significant to entrepreneurial literature, however, to our knowledge no study have jointly investigated the influence of self-efficacy and social networks on entrepreneurial intention especially among less explored sample of polytechnic students in Nigeria. This represents a research gap in the literature which this present study hopes to fill.

## **THEORETICAL BASES**

This section basically has three sub division where section one examine the concept of self-efficacy and social networks in relation to entrepreneurial intention. The second section also explores the theory of reasoned action as a theoretical framework. Lastly, the study explored past empirical studies that have been done on self-efficacy and entrepreneurial intention and social networks with entrepreneurial intention.

The concept of self-efficacy and its impact on entrepreneurial intention has been well documented in the literature (Chen, Greene, & Crick, 1998; Lee Wong & Foo, 2005). Self-efficacy is defined as an individual perception about their capabilities to create designated levels of performance that exercise influence over events that affect their lives (Bandura, 1986, 1997). Self-efficacy determines how people feel, think, and behave. Such beliefs yield this diverse effect through four major processes. A strong sense of efficacy produces human accomplishment and personal well-being in many ways. Bandura (1997) noted that people with high assurance in their capabilities approach difficult tasks as challenges

to be mastered rather than as threats to be avoided. According to Lee et.al (2005), self-efficacious individuals are likely to perceive entrepreneurial environment positively and make the best out of the situation. In other words, high self-efficacy individuals are likely to exercise control over entrepreneurial events, while an individual low on self-efficacy may not be willing to exert extra effort in the face of obstacles and setbacks (Fu 2011).

Literature have showed that social networks have become essential for entrepreneurship and have also become a major paradigm for the mobilization of resources and the building of trust that is needed in business (Klyver & Schott 2011; Hmieleski & Corbett, 2006; Ripolles & Blesa, 2005; Davidsson & Honig, 2003). According to Ogunnaike and Kehinde (2013), social networks are nodes of individuals, groups, organizations, and related systems that tie on one or more types of interdependence: these include shared values, visions and ideas, social contacts, kinship, conflict, financial exchanges, trade, joint membership in organizations and group participation in events, among numerous other aspects of human relationship. Social networks help entrepreneurs to acquire the human, financial and social capital they need to achieve their goals (Welter & Kautonen, 2005). This is because social networks can be used to gain access to valuable resources including advice, credibility/reputation, funding, information, knowledge/skills, social legitimacy, or social support (Klyver, 2005). Entrepreneurs' social networks connections may include advisors, business partners, buyers, customers, employees, friends/relatives, investors, mentors, shareholders, and suppliers (Klyver, 2007), with social networking activity differing according to the entrepreneur's particular needs and/or strategies (Ostgaard & Birley, 1994). Social networking create avenue for acquiring new information concerning innovations and new trends in entrepreneurship. As a result of technological development, people are now making use of social media sites in advertising, giving information, sharing ideas etc. All these activities in one way or another could promote entrepreneurial intention among polytechnic students. It is from this foregoing that this paper examines the influence of self-efficacy and social networks on entrepreneurial intention among polytechnic students.

The theory of reasoned action was propounded by Ajzen (1991). The theory emphasized on behaviour intentions rather than attitudes as the main causes of behaviours (Ajzen & Fishbein, 2005). The author of the theory asserts that people think rightly and make systematic use of information and facts accessible to them. Often time individual look at the implications of their action before they are willingly to take part or not take part in a given behaviour (Ajzen & Fishbein, 2005). According to the theory, the most vital predictor of a person's behaviour is a combination of intention toward performing the behaviour and subjective norm. If an individual think that the outcome from performing behaviour is positive, such persons will have a positive attitude towards performing that behaviour. The opposite can also be stated if the behaviour is thought to be negative. Subjective norm is seen as a combination of perceived expectations from relevant individuals or groups along with intentions to comply with these expectations. Theory of reasoned action works most successfully when subjected to behaviours that a person can control. Behaviour that are not fully under an individual control, even though such person may be highly driven by his or her own attitudes and subjective norm, could make such individuals not to perform the behaviour. This could be due to some intervening environmental conditions. Relating this theory to this study people who have higher self-efficacy and better social networks may have the intention of starting up their own personal business because this attributes (self-efficacy and social networking) could push them toward having the intention which invariably would make them engage in the behaviour of starting their own personal business. It therefore means that understanding the role that self-efficacy and social networks would have on entrepreneurial intention remain paramount in this study.

## **EMPIRICAL REVIEW**

Tarus, Kemboi, Okemwa and Otiso (2016) examine some variables such as (education support, social network, innovativeness and self-efficacy) on entrepreneurial intention among 1,649 undergraduate

business students. The result found that self-efficacy was positively associated with entrepreneurial intention. Ojiaku, Nkamnebe and Nwaizugbo (2018) examined entrepreneurial intention among 288 National Youth Service Corp members (NYSC) in Anambra State, Southeast Nigeria using one of the mooring variables (self-efficacy). The study found that mooring variable of self-efficacy significantly influence entrepreneurial intentions among the sampled respondents. Ojewumi, Oyeleke, Agberotimi and Adedayo (2018) examine the influence of self-efficacy on entrepreneurial intention among One hundred and forty (140) students. The results revealed that there is significant difference between respondents with high self-efficacy and those with low self-efficacy on entrepreneurial intention. Okoye (2016) investigated the role of psychosocial factors (entrepreneurial self-efficacy) on entrepreneurial intention among 210 Nigerian graduates. The study found that those respondents with high entrepreneurial self-efficacy have higher significant entrepreneurial intention than respondents with low entrepreneurial self-efficacy. Afsaneh and Zaidatol (2014) examine the relationship between entrepreneurial self-efficacy and entrepreneurial intention among 722 private and public Malaysian university students. The study revealed that student entrepreneurial self-efficacy has positive impact on the intention to own a business.

Kuehn (2013) found that high self-efficacy positively influences entrepreneurial intention among sampled respondents. Similarly Ali, Topping, and Tariq (2010) explored self-efficacy on entrepreneurial attributes among Islamic University of Bahawalpur students. The study found that self-efficacy influence entrepreneurial intentions among the sampled respondents. Olanrewaju (2013) investigated the relationship between self-efficacy and entrepreneurial intentions among some Nigerian adolescents. The study found a positive significant relationship between self-efficacy and entrepreneurial intentions among the sampled adolescents. Baum and Locke (2015) found that self-efficacy was determined to have direct effect for venture growth among some selected adolescents. Carmen and Joaquín (2012) found that the higher the perceived self-efficacy of Latin adolescents the greater the entrepreneurial intention

In the study of Akanbi (2013) he found that self-efficacy linearly contributed to the prediction of entrepreneurial intention. Zhao (2015) found that self-efficacy was significantly related to career interests, career choice goals (intentions), and occupational performance. However, Lent (2012) also found that self-efficacy is the sole mediator between a person's abilities and his or her career interests. Self-efficacy may be used to predict the intended career-related intentions and behavior of individuals. It has been established that self-efficacy is the major influence on career-related behavior in Bandura's social cognitive theory. Despite the above-cited empirical researches, no study has investigated the influence of self-efficacy on entrepreneurial intention using data from polytechnic students; therefore, this study aims to overcome the limitation of earlier studies. Hence, we expect that:

Hypothesis one: The self-efficacy of the students is positively associated with their entrepreneurial intention.

Okafor and Ameh (2017) examined social networks and entrepreneurship orientation among 94 undergraduates. The findings revealed that a significant relationship exists between social networks density and proactiveness among student entrepreneurs in Nigerian universities. Felzensztein and Gimmon (2009) revealed that social networking is important in facilitating entrepreneurial orientation. Fairuz, Hibrobumi and Tanaka (2010) examine dimension of social network on entrepreneurial orientation among small and medium scale enterprises of Hambantota district in Sri Lanka. The study revealed a significant relationship between proactiveness, innovativeness, risk-taking on entrepreneurial orientation. Zafar, Yasin and Ijaz (2012) examined social networking on entrepreneurial intentions among entrepreneurs in Pakistan using survey design. The study revealed that social networking influence entrepreneurial intention. Klyver and Schott (2011) conducted a study on how social networks structure shapes entrepreneurial intention in Denmark. The study found that bridging social networks play an important role in shaping individuals' entrepreneurial intentions.

Ameh and Udu (2016) explain the relationship between social networks size and risk disposition among student entrepreneurs. The findings revealed that a significant relationship was existing between social networks size and risk disposition among student entrepreneurs in Nigerian universities. Kacperczyk (2012) carried out a study on social influence and entrepreneurship. The study revealed that among individuals exposed to similar organizational influence, those exposed to entrepreneurial university peers are more likely to transit to entrepreneurship. Konrad (2013) conducted a study on cultural entrepreneurship. The study revealed that founders as well as managers can overcome numerous barriers through their engagement and activity in social networks, and thereby exercise to a significant degree a positive influence on establishing their enterprise. Felzensztein and Gimmon (2013) found that social networking is important in facilitating inter-firm cooperation in marketing activities and that informal meeting and weak ties are useful for sharing marketing information among managing directors. Jawahar and Nigama (2011) revealed that the structural dimension of social capital is the most important in influencing knowledge acquisition behaviour of opportunity recognition. Based on the pattern of relationships reported between social network and entrepreneurial orientation in the literature we expect that:

Hypothesis two: The social networks of the students is positively associated with their entrepreneurial intention

## **AIM AND METHODOLOGICAL BASES**

Survey design was used to collect data which involve the use of questionnaire from a sample of population within a short period of time. The independent variables in the study are self-efficacy and social network while the dependent variable is entrepreneurial intention. The population of the study was polytechnic students in Ile - Ife Osun state, Nigeria. The reason why this population was used is because this set of individuals has polytechnic education characterized with practical orientated skills which could transform them to a potential entrepreneur. Purposive sampling technique was used to select two hundred and forty respondents (240) from the population of final year polytechnic students. The sample represents the population of the study because the researcher already knows the characteristic of this population to be polytechnic students and not university students. Therefore the sample for this study is 240. Questionnaires were used to gather data from the participants in the study after the required permissions was obtained from the polytechnic management. Ethical issues of assurances were given on the bases of confidentiality and discretion of the study. The participants were informed of the purposes and/or objectives of the study. Direction on how to complete the questionnaires was also given by the researcher. The researcher assured the respondents that they can withdraw from the study at any time they so wish to do so. Questionnaires were disseminated to the respondents after their lecture free time at different departments visited by the researchers. A total of two hundred and fifty copies of questionnaires were distributed to the participants, but only two hundred and forty were retrieved as ten questionnaires were either badly filled and/or missing. The distribution of the questionnaires lasted for one week. The collected data was first coded and analysed using the IBM-SPSS version 22 software application. t-test for independent measures was used to test the two hypotheses postulated in the study. A structured questionnaire was used to collect data in this study. The questionnaire consists of one self-developed section and three standardised psychological scales. The first section comprises items that seek information on respondents' socio-demographic variables which include age, gender, religion and ethnicity. The validated scales consist of entrepreneurial intention, social-network scale and self-efficacy. Entrepreneurial intention was measured using the 15-item Entrepreneurial Intention Questionnaire developed by Lee, Lim, Lim, Ng, and Wong (2012). Some sample on the scale reads "I'd rather be my own boss than have a secure job" and "A career as entrepreneur is attractive for me". 5-Likert scale was used for scoring the scale which ranges from 5=strongly agree, to 1= strongly disagree. The scale has been used both locally and internationally, for instance Zeng, Liu, Zheng and Cao (2017) obtained a reliability coefficient of 0.89 while Ayedun, and Ajayi (2018) also reported a Cronbach Alpha coefficients ranging from 0.78 to 0.89.



The author reports co-efficient reliability of 0.87. In this study a Cronbach alpha of 0.93 was reported Social network was measured using the 15 item social network scale developed by the researchers. The items were validated using the content and expert validity before the final items were used for collecting data. 5-point likert scale formats ranging from 1-strongly agree, 2-agrees, 3-undecided, 4-disagree, 5-strongly disagree was used for scoring on the scale. A confirmatory factor analysis on the 15 items showed that all items loaded significantly on their constructs ( $p < .001$ ), with weights ranging from 0.51 to 0.83. The reliability analysis of social networking scale produced a Cronbach alpha of 0.85.

Self-esteem was measured using the 10 item self-esteem scale developed by Rosenberg, (1965). Sample of the item reads "I feel that I'm a person of worth, at least on an equal plane with others" and "I wish I could have more respect for myself ". All items were answered using a 4-point Likert scale format ranging from strongly agree to strongly disagree. The author reports a reliability coefficient of 0.72. Items 2, 5, 6, 8, and 9 are reverse scored. Higher scores on the scale indicate higher self-esteem, while lower scores indicate lower self-esteem. For the present study, a Cronbach alpha of 0.81 was established.

## RESULTS AND DISCUSSION

The study examined the influence of self-efficacy and social network on entrepreneurial Intention among polytechnic students in Ile-Ife Osun state Nigeria. Two hypotheses were tested in this paper. The first hypothesis revealed that there was significant influence of self-efficacy on entrepreneurial intention meaning that polytechnic students who have high self-efficacy have higher entrepreneurial intention than polytechnic student with low self-efficacy.

**Table 1 Summary table of independent sample t-test showing the influence of self-efficacy on entrepreneurial intention**

	Self- efficacy	N	Mean	Std	df	t-value	Sig
Entrepreneurial intention	Low	94	37.29	7.64	238	-7.82	<.01
	High	146	45.23	7.75			

(Source: own)

Table 1 showed that self-efficacy have significant influence on entrepreneurial Intention,  $t(238) = -7.82$ ;  $p < .01$ . The result showed that polytechnic students with high self-efficacy (Mean = 45.23; SD = 7.75) have higher entrepreneurial Intention than polytechnic students with low self-efficacy (Mean = 37.29; SD = 7.64). The hypothesis was accepted in this study.

The second hypothesis revealed that there was significant influence of social network on entrepreneurial intention meaning that polytechnic students who have high social network have higher entrepreneurial intention than polytechnic student with low social network

**Table 2 Summary table of independent sample t-test showing the significance influence of social networks on entrepreneurial intention**

	Social networks	N	Mean	Std	df	t-value	Sig
	Low	111	36.46	7.18			

Entrepreneurial intention					238	-11.81	<.01
	High	129	46.99	6.54			

(Source: own)

Table 2 showed that social network have significant influence on entrepreneurial Intention,  $t(238) = -11.81, p < .01$ . The result showed that polytechnic students with high social network (Mean = 46.99; SD = 6.54) have higher entrepreneurial Intention than polytechnic students with low social network (Mean = 36.46; SD = 7.18). The hypothesis was also accepted.

The study examined the influence of self-efficacy and social network on entrepreneurial Intention among polytechnic students in Ile-Ife Osun state Nigeria. Two hypotheses were tested in this paper. The first hypothesis revealed that there was significant influence of self-efficacy on entrepreneurial intention meaning that polytechnic students who have high self-efficacy have higher entrepreneurial intention than polytechnic student with low self-efficacy. This finding was in line with Ojewumi, Oyeleke, Agberotimi and Adedayo (2018) where their study found that there is significant difference between respondents with high self-efficacy and those with low self-efficacy on entrepreneurial intention. This finding was also in line with Okoye (2016) who found that those respondents with high entrepreneurial self-efficacy have higher significant entrepreneurial intention than respondents with low entrepreneurial self-efficacy. Lent (2012) found that self-efficacy was significantly related to career interests, career choice goals (intentions), and occupational performance. However, Lent (2012) also found that self-efficacy is the sole mediator between a person's abilities and his or her career interests. Self-efficacy may be used to predict the intended career-related intentions and behavior of individuals. It has been established that self-efficacy is the major influence on career-related behavior in Bandura's social cognitive theory. In the study of Zhao's (2015) he provided evidence that individuals choose to become entrepreneurs because they are high in entrepreneurial self-efficacy—the belief that they can succeed in this role. The possible explanation for this finding may be unconnected with the fact that individual who believe in their strength and capacity, always believe they will be successful in having their own business, they are often prone to take on business despite the risk involved in starting or doing a business. The high efficacy could make them have the intention of starting up a business even in the face of stiffer competition and frustration.

The second hypothesis revealed that there was significant influence of social networks on entrepreneurial intention among polytechnic students. This implies that polytechnic students who have high social networks have higher entrepreneurial Intention than polytechnic students who have low social networks. The finding was also in accordance with study done by Zafar, Yasin and Ijaz (2012) who examined social networking on entrepreneurial intentions among entrepreneurs in Pakistan using survey design. The study revealed that social networking has significant influence on entrepreneurial intention. The finding was also in accordance with Fairoz, Hibrobumi and Tanaka (2010) who examine dimension of social network on entrepreneurial orientation among small and medium scale enterprises of Hambantota district in Sri Lanka. The study revealed a significant relationship between proactiveness, innovativeness, risk-taking on entrepreneurial orientation. Also the study of Okafor, and Ameh (2017) found that there was significant relationship between social networks and Entrepreneurship Orientation among Nigerian undergraduates. The study of Klyver and Schott (2011) found that only bridging social networks represented by low dense network, business size and entrepreneurial network play an important role in shaping individuals' entrepreneurial intentions. The study was also in line with Kacperczyk (2012) who revealed that among individuals exposed to similar organizational influence, those exposed to entrepreneurial university peers are more likely to transit to entrepreneurship. The study was also in accordance with Konrad (2013) who revealed that entrepreneur can overcome numerous barriers through their engagement and activity in social networks, and thereby exercise to a significant degree a positive influence on establishing their enterprise. The justification for this finding maybe unconnected with the fact that individual who want

to owes personal business in Nigeria, must be able to first network in various ways either from friends, family or clients, this will give opportunity for experience, diversity of information, risk management as well as access and promotion of synergy.

## CONCLUSION

It can be seen from our study that entrepreneurship can be enhanced through entrepreneurial intention which invariably could go a long way to reduce the problem of unemployment and improve the standard and wellbeing of students and youths especially students with polytechnic education. From the findings of this study, it was concluded that self-efficacy and social network have influence on entrepreneurial intention among polytechnic students. Based on these conclusions, the study recommended that psychologists should organize psycho-educational interventions aim at increasing self-efficacy and social networking of polytechnic students. It also recommended that policy maker such as government should introduce meaningful entrepreneur education into the polytechnic curriculum such that it will enhance students to have the intention of wanting to venture into entrepreneur business. Theoretically, findings of this study lend support to and extend the theory of reasoned action such that individuals who have higher self-efficacy and better social networking may have the intention of starting up their own personal business. Despite the significant contribution of this study to literature, it still has some limitations. Firstly, the study was conducted using just one polytechnic in southwest Nigeria, this thereby limit the generalization of the result to other polytechnics in Nigeria and outside Nigeria. Secondly, the issue of data collection which was based on self-report gave room for participant's bias response to the questions. Thirdly, the method of data collection and statistical analysis used for this study was inferential statistic (t-test for independent measure) which was also a major limitation. Lastly, time constraint was also a limitation in this study. Therefore, future studies should put the foregoing limitations into account when investigating factors that could predispose entrepreneurial intention among students.

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# ASSESSMENT OF THE RELATIONSHIP BETWEEN ENTREPRENEURIAL ORIENTATION, ORGANISATIONAL CULTURE ADAPTABILITY AND PERFORMANCE OF CHRISTIAN FAITH-BASED HOTELS IN KENYA

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## ABSTRACT

Organisational culture has been the focus in both theory and practice and has captured attention throughout the last decade because of its substantial relationship between the concept itself and its outcomes such as gaining competitive advantage and performance in businesses. Entrepreneurial Orientation refers to the strategy making processes that it provides organisations with a basis for entrepreneurial decisions and actions. Despite of its importance and being a popular entrepreneurship concept there is little evidence of research that has been done to determine the relationship between Entrepreneurial Orientation, organisational culture adaptability and performance in hotels and where applied it is minimal. The purpose of this study was to determine the relationship between Entrepreneurial Orientation, organisational culture adaptability and performance of Christian Faith-Based Hotels in Kenya. This study was anchored on the epistemology philosophy and adopted a positivist approach. The study used the mixed methods approach guided by a cross-sectional survey research design. The variable items for organisational culture adaptability and performance were measured using the five-point Likert scale and using the Denison's organisational survey instruments. The population of the study included 72 managers and 1878 junior staff from 24 Christian faith-based hotels in Kenya. Structural equation models (SEM) and an MMR model were fitted to assess the objective of the study. Based on the SEM and MMR models, the study found that adaptability has a significant positive influencing on the performance of Christian Faith Based Hotels  $\beta = 0.520$ ,  $t = 2.444$ ,  $p\text{-value} = 0.018$ ). The study also found that Entrepreneurial Orientation had a moderating role on the relationship between organisational culture adaptability and performance of Christian Faith Based Hotels based on the MMR model that had a significant change in R due to addition of the interaction term (R-square change = .063, F-change = 4.293,  $p\text{-value} = 0.043$ ). The study is important to a business because it will encourage it to adapt to the environment to improve performance.

**KEYWORDS:** Organisational culture Adaptability, Entrepreneurial Orientation and performance.

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## 1 INTRODUCTION

Organisational culture can be defined as the set of values, beliefs, attitudes, expectations, understandings, norms shared by members of an organisation. It is passed from one generation of employees to the next and determines the standards for appropriate behaviour within the organisation (Hayton, 2010). Dasanayake and Mahakalanda, (2008) argue that organisational culture forms in response to the need for external adaptation and survival as well as internal integration. External adaptation and survival involve finding a niche to enable the organisation to cope with the changing environment. The reason for the popularity of organisational culture adaptability is the substantial relationship between the concept itself and its outcome such as gaining competitive advantage, enterprise's effectiveness and performance (Tidor, Gelmereanu, Baru and Morar, 2012). Thus, the purpose of this study was to determine the relationship between, Entrepreneurial Orientation, organisational culture adaptability and the performance of Christian faith-based hotels in Kenya.

Entrepreneurial orientation is the strategy-making processes that provide enterprises with a basis for entrepreneurial decisions and actions. The prime dimensions in entrepreneurial orientation are innovativeness, risk-taking, pro-activeness, competitive aggressiveness and autonomy (Mossete, 2013). Innovativeness is the pre-disposition to engage in creativity, problem solving and experimentation through the introduction of new products and services as well as technological leadership in new processes. Risk taking involves making bold decisions into the unknown and relatively emerging areas while borrowing heavily and committing significant resources to ventures in new environments. Pro-activeness is an opportunity-seeking, forward-looking perspective symbolized by introduction of new products and services ahead of the competition and acting in anticipation of future. Autonomy is described as an independence of an individual or team to develop business vision and carry it to completion (Bhuian, Mengus, & Bell 2005). Competitive aggressiveness refers to enterprise's tendency to compete with its competitors directly and intensely. It also refers to entrepreneurs who live in culture of achievement oriented (Bhuian, Mengus, & Bell 2005).

Organisational performance is the outcome achieved in meeting internal and external goals of an organisation (Wei, Liu and Herndon 2011). Organisational performance is also a multidimensional construct including Customer-focused performance, product or service performance, financial and market performance, human resource performance and organisational effectiveness (Singh, 2011). Performance has become the most comprehensively researched dependent variable in past studies (Rauch et al., 2009; Wales et al., 2013a). In their early theorizing, Covin and Slevin (1991) reinforced this course in the literature by suggesting firm performance to represent the ultimate dependent variable in their model of organisation-level entrepreneurship.

The relationship between organisational culture adaptability and performance has been established, and an increasing body of evidence supports a linkage between an organisation's culture adaptability and its business performance (Denison and Fey, 2003). Interestingly, the study and the findings are emanating from a developed economic environment and very little is known about its relevance and applicability in a developing countries (Kotter and Heskett, 1992). It is against this background that the current study seeks to investigate the moderating role on the relationship between organisational culture adaptability and performance in Christian Faith-based hotels in Kenya as an attempt to replicate the Denison's model of culture in a developing country's context.

Hotel is one of the known forms of accommodation in tourism industry where accommodation is a place for someone to stay for a while away from home. Investments in the Christian faith based hotels by Christian organizations in Africa are spurred by the need to provide the missionaries and other workers from the church propagating gospel with amiable environments to spend their time during visits (Global Generosity Network, 2014). The need to generate revenues for Christian faith-based organisations has forced them to invest in businesses including hotels in the quest of realizing proceeds for the organisation. This assures greater growth of the organisations without relying heavily on the



individual's contributions made by members and other benefactors (Evers, 2004). Hotels operate in a dynamic business environment characterised by intense Competition for resources and market share hence have become more challenging to manage and sustain their growth rate (Wandongo, 2008). Therefore the purpose of this study was to determine the relationship between Entrepreneurial Orientation, organisational culture adaptability and performance for Christian Faith Based Hotels in Kenya.

### **1.1 Statement of the Problem**

There is a close relationship between organisational culture adaptability and performance though this relationship has not been researched exhaustively (Schneider, 2012). Over the past decade, a great deal has been written about adaptability (creating change, organisational learning and customer focus) and the important role it plays in successful performance of organizations (Denison 1990, Denison and Mishra 1995; Denison and Fey 2003; Daft 1998, Fisher and Alford 2000; Denison, Haaland & Goeltzer 2004; Denison, Ward & Lief 2004, Denison 2007, Amah, 2009, and Ongori, 2009). Despite this growth of scholarly publications on adaptability and organizational performance little empirical evidence exist in developing countries especially Kenya. There has been also a call by Denison, Haaland, and Goelzer, (2004) to investigate the organisational culture phenomenon in different cultural contexts, particularly in non-western Nations. To bridge this gap in literature this study sought to determine the relationship between entrepreneurial orientation, organisational culture adaptability and performance in Christian faith-based hotels in Kenya where Entrepreneurial Orientation was the moderating variable.

### **1.2 Research Objective**

The objective of this study was to determine the Relationship between entrepreneurial orientation, organisational culture adaptability and performance of Christian faith-based hotels in Kenya.

## **2 THEORETICAL BASES**

### **2.1: Organisational culture adaptability concept**

Adaptability is one of the four organisational culture traits that profoundly influence the performance of an organisation. It deals with the relationship between the organisation and its environment and it acknowledges Schein's idea that organisations have to balance internal processes with external adaption processes (Loisch, 2007). The adaptability trait consists of three sub-points (Denison Consulting, retrieved in May 2013). According to Calori and Sarnin (1991), in a highly adaptive organisation the satisfaction and fulfilment of customer demands have utmost importance. To reach that goal, to stay in the market and be competitive, the organisation is willing to adapt to any changes and to try out new ideas (Caroli and Sarin, 1991, cited by Loisch, 2007).

### **2.2: Entrepreneurial Orientation Concept**

Several studies have tested the moderating role of entrepreneurial orientation, including Ndungu (2012) in his study on role of entrepreneurial on relationship between information security management and firm performance, Lumpkin & Sloat (2001) in their study on do family firms have entrepreneurial orientation? Wiklund & Shepherd (2003) in their study on knowledge-based resources, entrepreneurial orientation and the performance of small and medium-sized businesses and Richard, Barntt, Dwyer, and Chadwick (2004) in their study on cultural diversity in management, firm performance, and the moderating role of entrepreneurial orientation on dimensions.

### **2.3: Theoretical Framework**

#### **2.3.1 The Schumpeterian theory on innovation**

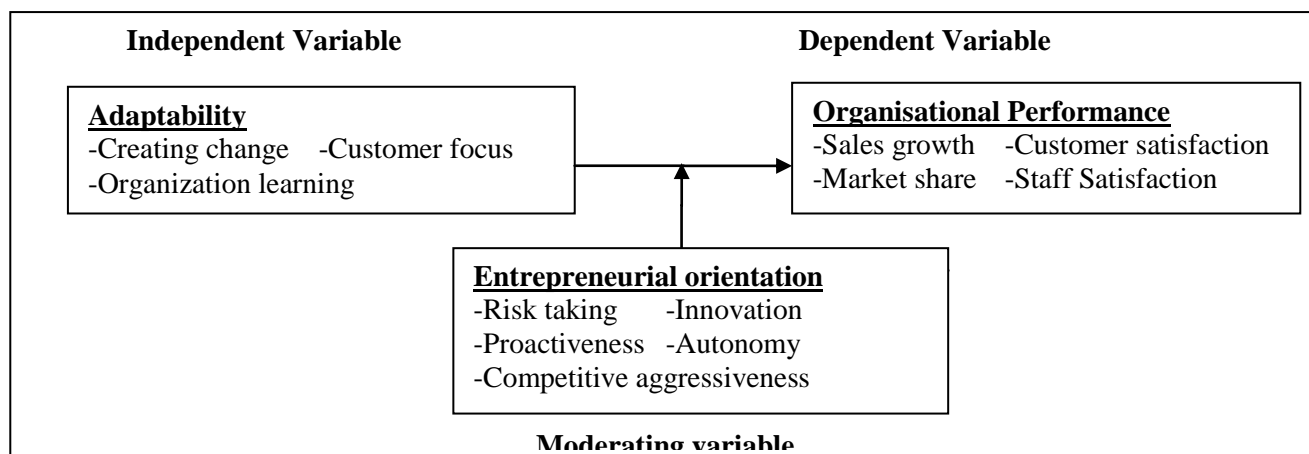
Schumpeter portrayed entrepreneurship as one making a difference. The entrepreneur breaks up with established practices and destroys the status quo while moving the market forward in a different direction (Mintzberg et al., 1998). The theory is relevant to this study since there is a relationship between product and process innovation to the business performance.

### 2.3.2 Denison Organisational Culture Model

This study adopted Denison Organisational culture Model where adaptability trait was one of the key characteristics. Adaptability is based on the idea that norms and beliefs that enhance an organization's ability to receive, interpret and translate signals from the environment into internal organizational and behavioural changes promote its survival, growth and development (Denison, Janovics, Young & Cho, 2006). Adaptable organizations are driven by their customers, take risks and learn from their mistakes and have the capability and experience at creating change (Nadler, 1998; Senge, 1990). Such organizations are continuously changing their systems to promote improvements and provide value for their customers (Stalk, 1988).

## 2.4 Conceptual framework

Figure 1. Conceptual framework



(Source: Research Data 2018)

The conceptual framework shows the moderating role of entrepreneurial orientation on the relationship between organizational culture adaptability and performance of Christian faith based hotels in Kenya. The study adopted Denison Organizational culture Model.

## 2.4 Empirical review

### 2.4.1 Adaptability and organisational performance

Wilkins and Ouchi (1983) and Denison (2000) explored the relationship between culture and organisational performance, arguing that cultures are more adaptive and more easily developed than previously thought. Anand and Ward (2004) discussed the idea of environmental fit and manufacturing flexibility in a study of U.S. manufacturers. Their research indicated the culture plays a crucial role in the type of required flexibility to best fit the enterprise and impact performance. Researchers do note that culture can remain linked with performance only if they are capable of adapting to the changing environment (Ogbonna & Harris, 2000). According to Swanson and Davis (2003) in their study of customer quality practices they state that the customer is always right this in reference to the fact that the customer generates revenue to the company in which the company benefits through profits. This

applies to government entities that may be providing services where the end result is the customer satisfaction rating.

Performance is a complex and dynamic concept which has been conceptualized in two ways namely the drivers of performance and the results of performance (Olsen, 2008). Organisational performance is concerned with the overall productivity of an organisation regarding stock turnover, customers, profitability and market share. Both quantitative and qualitative methods may measure performance. This study used financial measures such as profitability and sales growth and non-financial measures such as market share, service quality as well as customer and low staff turnover (Olsen, 2008). Researchers do note that culture can remain linked with performance only if they are capable of adapting to the changing environment (Ogbonna & Harris, 2000). Researchers postulate organisational behaviour (flexibility and speed) is a reflection of this environmental change (Eisenhardt & Brown, 1998; Lamberg, Tikkanen, Nokelainen, & Suur-Inkeroinen, 2009), and fully adaptive enterprises will imitate its pace.

### **2.5.2 Moderating Role of Entrepreneurial Orientation**

Several studies have tested the moderating role of entrepreneurship orientation, including Wiklund & Shepherd (2003) in their study on knowledge based resources, entrepreneurial orientation and the performance of small and medium sized business: and Richard, Barntt, and Chadwick (2004) in their study on cultural diversity in management, firm performance, and the moderating role of entrepreneurial orientation on dimensions. Shihab, Wismiarsi and Sine (2011) investigated the relationship between organizational culture (OC) and entrepreneurial orientation (EO). Ndungu (2012) evaluated the role of entrepreneurial orientation on relationship between information security management and firm management.

## **3 AIM AND METHODOLOGICAL BASES**

This study was guided by an epistemological research philosophy and employed the positivistic research paradigm. A mixed methods research guided by a cross-sectional survey design was used which extensively tested the analysis of the relationship between variables. The target population of this study was composed of 72 managers from 24 registered Christian faith-based hotels in Nairobi and Mombasa. Stratified sampling was used to select the hotels of each category of the study. That is the rated hotels and unrated hotels. The study used the entire population of the general managers and two departmental managers as a sample size for the managers. Krejcie & Morgan table for the predetermined population as the basis for sample size determination was used to sample the employees. In the case of the employees' population, the study had a sample size of 72 managers and 322 subordinate staffs that were evenly distributed in the two study areas based on the strength of the population making a total sample size of 394.

This study used a self-administered questionnaire to obtain primary data. The questionnaire consisted of close-ended questions and was based on a 5 Likert's scale. Face validity was estimated by use of correlations between the objective and subjective items utilized in the scales. Content validity was assessed through review and verification of the extant literature for the items contained in the questionnaire. Finally, construct validity was assessed from the correlations of items. A pilot test was conducted to enhance the questionnaire design by modifying the survey based on feedback from the pilot test and subsequently implementing the revised survey. To establish the reliability of the research instruments, the test-retest method whereby the pilot study respondents were issued with questionnaires for them to fill and the same questionnaires were subjected to a retest to see how the response was. The reliability coefficient was computed using Pearson's Product Correlation Coefficient.

This study used a Likert scale as developed by Rensis Likert, to examine how strongly subjects agree or disagree with a statement (Cooper & Schindler, 2011). Statistical Package for Social Sciences (SPSS) version 21.0 was used for data entry, data cleaning and data analysis. Descriptive statistics were used to describe the characteristics of the sample and Structural Equation Models (SEMs) were fitted for inferential analysis. SEM is a combination of confirmatory factor analysis and multiple regression analysis used to assess causal relationships between constructs that are unobserved directly but measured using indicators. AMOS (Analysis of Moment structures) software was used for SEM. A Moderated Multiple Regression analysis (MMR) was carried out using Ordinary Least Square model (OLS) to assess the moderating effect. Interaction effects were tested in the MMR Model equations involving scores of a continuous predictor variable Y, scores for predictor variable X and scores for a second predictor variable Z hypothesized to be a moderator (Aquino & Gottfredson, 2010). The study models were assessed for the assumptions of normality, linearity, homoscedasticity, non-autocorrelation and non-multicollinearity.

## 4 RESULTS AND DISCUSSIONS

The total questionnaires completed and returned were 292 out of the 394 that were administered. This translates to a response rate of 74.1%. Babbie (1990) stated that a response rate of 50% is adequate while Bailey (1987) set an adequate response rate at 75%. According to Edwards *et al* (2002), a response rate of below 60% is considered poor while of between 60% and 80% is adequate. Therefore, the Response rate of 74.1 as reflected in this study was adequate to enable the researcher draw conclusions and generate the research findings.

### 4.1 Adaptability to the External Business Environment in Christian Faith Based Hotels

The responses to the questions used to measure adaptability as shown in table 1 were coded in to an ordinal scale from 1=strongly disagreement to 5 strongly agreement. On adaptability to external environment, the respondents rated creating change at a mean of 2.7 with a standard deviation of 1.2. This is an indication that the respondents in Christian faith-based hotels believe that there is a moderate creation of change in these hotels to adapt to the external environment. The respondents feel that the Christian faith-based hotels are not effective in adapting to change in the external environment. The respondents also rated the significance of customer focus in Christian faith-based hotels at a mean of 3.5 with a standard deviation of 1.2. This implies that customer focus has moderately been put in place in the Christian faith-based hotels and that in Christian faith-based hotels, there is significant customer focus in adapting to changes in the external environment. The significance of organisational learning in Christian faith-based hotels was rated at a mean of 3.6 with a standard deviation of 0.9. This indicates that there is moderate organisational learning in the Christian faith-based hotels and that in Christian faith-based hotels, organisational learning is quite involved in adapting to changes in external environment.

**Table 1: Descriptive analysis of Adaptability**

Statement	Mean	Sdv
<b>Creating Change</b>		
The way things are done is very flexible and easy to change	2.5	1.3
We respond well to competitors and other changes in the business environment	2.2	1.2
New and improved ways to do work are continually adopted	2.6	1.3
Attempts to create change seldom meet with resistance	3.2	1.1
Different parts of the organisation often cooperate to create change	2.9	1.3
<b>Average</b>	<b>2.7</b>	<b>1.2</b>

<b>Customer Focus</b>		
I view failure as an opportunity for learning and improvement	4.2	0.7
I view failure as a disarrangement and defeat	1.8	1.0
In this hotel, innovations and risk-taking are encouraged and rewarded	3.9	1.0
Learning is an important objective in the hotels day-to-day work	4.2	0.8
<b>Average</b>	<b>3.6</b>	<b>0.9</b>
<b>Organisational Learning</b>		
I view failure as an opportunity for learning and improvement	4.2	0.7
I view failure as a disarrangement and defeat	1.8	1.0
In this hotel, innovations and risk-taking are encouraged and rewarded	3.9	1.0
Learning is an important objective in the hotels day-to-day work	4.2	0.8
<b>Average</b>	<b>3.6</b>	<b>0.9</b>

(Source: Research Data 2018)

## 4.2 Measurement model

To assess the objectives of the study, the researcher used Structural equation modelling (SEM) for inferential analysis. The process used a 2 step approach which included carrying out analysis measurement model and confirmatory structural SEM model of the study constructs (Miles & Shevlin, 2003; Anderson and Gerbing, 1988). The measurement model involved the assessment of the unidimensionality of the constructs by studying the underlying structure of the constructs and variables for the data collected. The summary statistics of the measurement model from the subordinate employees' data is shown in table 8. From Exploratory factor analysis, 7 indicators that had factor loadings less than 0.4 were expunged while the rest were retained. Cronbach alpha statistics were above 0.7 for each construct and retained indicators, the Keiser-Meyer Olkin (KMO) statistics were above the 0.5 threshold and the Bartlett's test of sphericity had p-values less than 0.05 (Hair et al., 2010). Construct validity was confirmed by assessing for convergent validity using the Average variances extracted (AVEs) which were all found to be above 0.5 and discriminant validity was shown by the squared multiple correlations which were all less than the relative AVEs (Fornell & Larcker, 1981). These analyses confirmed that the measurements were reliable and exhibited construct validity hence unidimensionality of the construct.

**Table 2: Measurement model summary statistics**

		<b>Factor Loading</b>	<b>Squared multiple correlations</b>	<b>AVE</b>	
Adaptability	AdaptabilityA1	-0.621	0.200	0.771	KMO = 0.615
	AdaptabilityA3	-0.513	0.107		Bartlett's $\chi^2 =$ 450.301
	AdaptabilityB1	0.930	0.589		
	AdaptabilityB2	0.872	0.762		P-value = 0.000
	AdaptabilityB3	0.832	0.706		
	AdaptabilityB4	0.696	0.360		
	AdaptabilityB5	0.873	0.770		
Performance	AdaptabilityC3	0.831	0.488		
	Performance1	0.806	0.612	0.700	KMO = 0.671
	Performance3	0.570	0.233		Bartlett's $\chi^2 =$ 481.169
	Performance4	0.697	0.445		
	Performance5	0.726	0.522		P-value = 0.000

	Performance6	0.837	0.741		
	Performance7	0.735	0.495		
	Performance8	0.543	0.225		
	Performance9	0.566	0.273		
	Performance10	0.677	0.360		
	Performance11	0.781	0.495		
	Performance12	0.709	0.471		
Entre Orientation	EntreOrientation1	0.580	0.186	0.700	KMO = 0.612
	EntreOrientation2	0.656	0.333		Bartlett's $\chi^2 =$ 605.35 P-value = 0.000
	EntreOrientation3	0.690	0.522		
	EntreOrientation4	0.830	0.410		
	EntreOrientation5	0.791	0.616		
	EntreOrientation6	0.437	0.176		
	EntreOrientation7	0.531	0.206		
	EntreOrientation8	0.795	0.568		
	EntreOrientation9	0.703	0.391		
	EntreOrientation10	0.818	0.703		
	EntreOrientation11	0.800	0.573		
	EntreOrientation12	0.597	0.244		

(Source: Research Data 2018)

### 4.3 Structural equation model

The confirmatory structural models were constructed in steps. The models were tested for fitness using both absolute and incremental fit indices. Table 9 represents the fitness indices from both datasets. All the models fitted met the desired fitness thresholds. The Root Mean Squared Error of approximation (RMSEA) was found to adequately be below the desired threshold of 0.08 for all the models which also met the other fit indices requirements such as the normed fit index (NFI), comparative fit index (CFI), goodness of fit index (GFI) and parsimony fitness PGFI and PNFI.

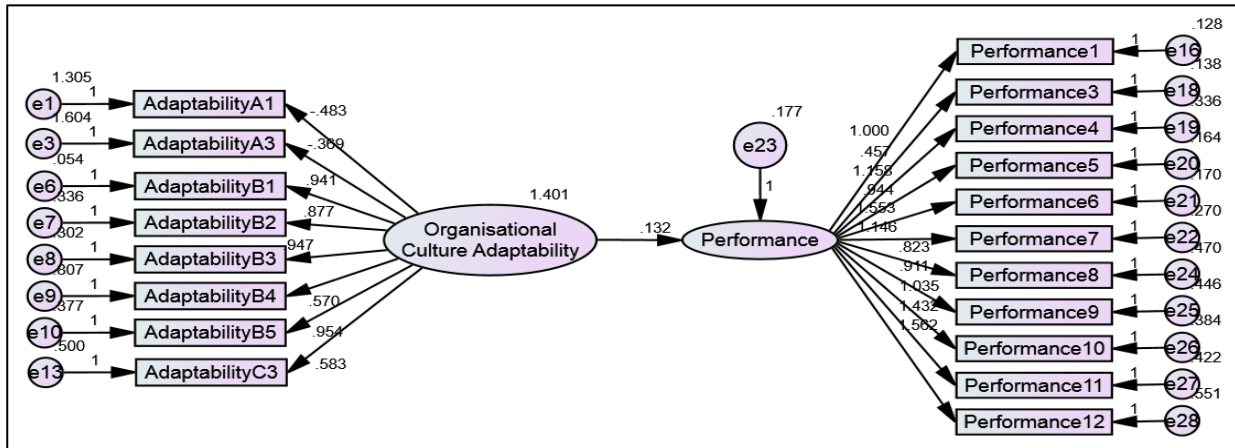
**Table 3: Model fit indices**

Data		Chi-square		CFI	NFI	GFI	SRMR	RMSEA	PGFI	PNFI
		$\chi^2$	Sig.							
Mgt.	Statistic	545.941	0	0.891	0.824	0.854	0.065	0.068	0.536	0.594
Sub	Statistic	545.941	0	0.916	0.848	0.866	0.076	0.063	0.546	0.614
	Cut-off	P-value <0.05		≥0.9	≥0.9	≥0.9	≤0.08	≤0.08	≥0.5	≥0.5

(Source: Research Data 2018)

This relationship between organisational culture adaptability and performance of CFBHs was confirmed by the model fitted from the data collected. The coefficient regression weight estimate of adaptability on performance as shown on the path diagram in figure 2 is 0.132. other coefficients show the coefficient estimates of the retained observed indicators measuring the constructs.

Figure 2: Path diagram on adaptability and performance



(Source: Research Data 2018)

The coefficient of adaptability on performance based on the management data was found to be significant as shown in table 11. The path coefficient estimate of adaptability is 0.132 with a critical ratio (CR) of 2.455. The CR is greater than the tabulated 1.96 Z score at 0.05 level of significance thus implying a significant coefficient estimate. This confirms the results also found based on the subordinate employees data that organisation culture adaptability has a significant influence on performance of CFBHs in Kenya. The results yields the equation below.

$$Y = .132X + \epsilon$$

Where Y - performance  
X - adaptability

Table 4: Regression Weights on adaptability and performance

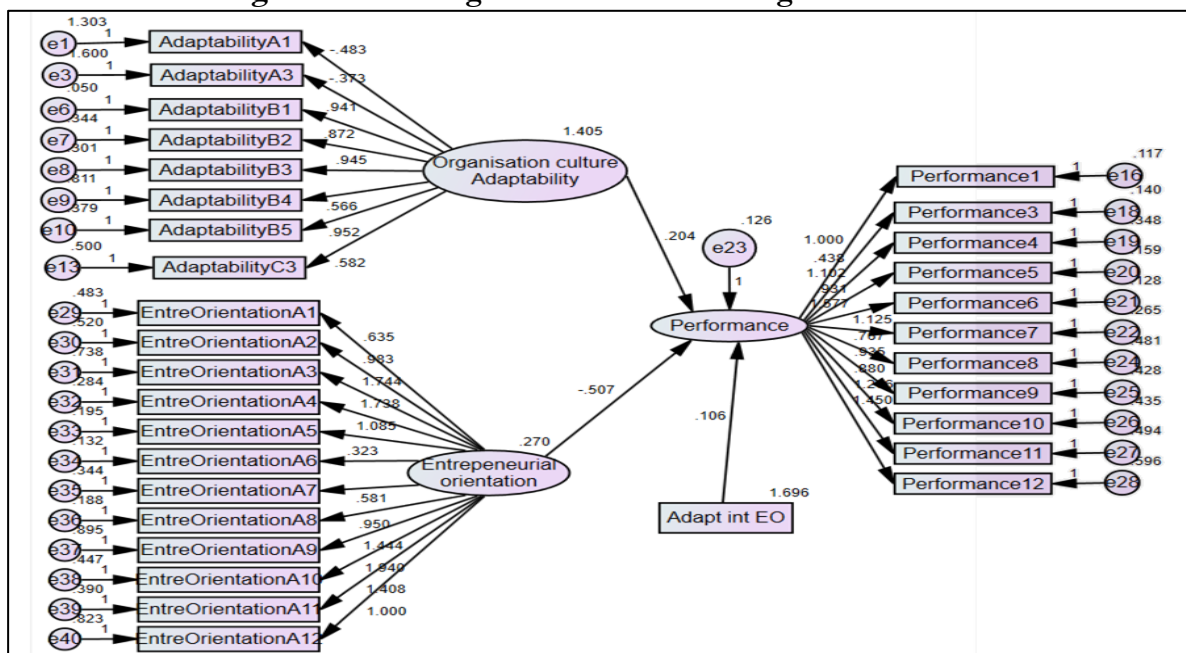
			Estimate	S.E.	C.R.	P
Performance	<---	Adaptability	.132	.054	2.455	.014
AdaptabilityC3	<---	Adaptability	.583	.085	6.884	***
AdaptabilityB5	<---	Adaptability	.954	.079	12.133	***
AdaptabilityB4	<---	Adaptability	.570	.106	5.353	***
AdaptabilityB3	<---	Adaptability	.947	.072	13.183	***
AdaptabilityB2	<---	Adaptability	.877	.074	11.874	***
AdaptabilityB1	<---	Adaptability	.941			
AdaptabilityA3	<---	Adaptability	-.369	.148	-2.494	.013
AdaptabilityA1	<---	Adaptability	-.483	.134	-3.597	***
Performance1	<---	Performance	1.000			
Performance3	<---	Performance	.457	.129	3.534	***
Performance4	<---	Performance	1.158	.228	5.075	***
Performance5	<---	Performance	.944	.169	5.574	***
Performance6	<---	Performance	1.553	.225	6.903	***
Performance7	<---	Performance	1.146	.212	5.403	***
Performance8	<---	Performance	.823	.237	3.465	***
Performance9	<---	Performance	.911	.237	3.848	***
Performance10	<---	Performance	1.035	.230	4.489	***

Performance11	<---	Performance	1.432	.265	5.398	***
Performance12	<---	Performance	1.562	.298	5.246	***

(Source: Research Data 2018)

The moderating variable and interaction terms were added the model to assess the moderating effect of entrepreneurial orientation. The interaction term was a computed variable as an interaction between the latent variables organisational culture adaptability and entrepreneurial orientation was generated and included in the structural equation model. Figure 4 shows the path diagram of the model including EO and the interaction term as predictors. The path coefficient estimate of entrepreneurial orientation on performance is -0.507 while the path coefficient estimate the interaction term between adaptability and EO on performance is 0.106.

Figure 3: Path diagram on the moderating effect of EO



(Source: Research Data 2018)

The path coefficient estimate of EO -0.507 has a critical ratio (CR) of 4.190 which is greater than the tabulated 1.96 Z score at 0.05 level of significance. This implies that the coefficient estimate is significant. The coefficient estimate of the interaction term between entrepreneurial orientation (EO) and adaptability was found to be significant as shown in table 12. The path coefficient estimate 0.106 was found to have a critical ratio (CR) of 2.549 which is greater than the tabulated 1.96 Z score at 0.05 level of significance. This implies that the coefficient estimate is significant. The significance of the interaction effect implies a significant positive moderating effect of EO on the relationship between adaptability and performance.

$$Y = .204X - 0.507Z + 0.106X * Z + \epsilon$$

- Where Y - performance  
 X - adaptability  
 Z - entrepreneurial orientation

Table 5: Regression Weights on the moderating effect of EO

			Estimate	S.E.	C.R.	P
Performance	<---	Adaptability	.204	.049	4.190	***
Performance	<---	EO	-.507	.168	-3.009	.003



Performance	<---	Adaptability interaction EO	.106	.042	2.549	.011
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(Source: Research Data 2018)

#### 4.4 Moderated multiple regression

To confirm the moderating effect, a moderated multiple regression (MMR) was carried out which was a three-step hierarchical Ordinary least squares (OLS) regression analysis. Model 1 of the MMR only included the adaptability as a predictor. The second model included entrepreneurial orientation as a predictor while model three included the interaction term as a predictor. The change in R-square was assessed in each step of the analysis. The R-square (the explanatory power) is the variation in performance explained by the variation in the predictors in a given model. Model 1 has an R-square of 0.106 implying that 10.6% of the variance in performance is explained by the variation of adaptation. The change in R in model 2 is 0.084 and the F-change has a p-value of 0.024 implying that the addition of entrepreneurial orientation has a significant improvement to the explanatory power of the model. The addition of the interaction term also has a significant improvement on the model as shown by the R-square change of 0.063 and the F-change with a p-value of 0.043. The significant change in the R-square due to addition of the interaction term between entrepreneurial orientation and adaptability shows that EO has a moderating effect on the relationship between adaptability and performance.

The MMR model confirms that EO has a significant positive moderating effect on the relationship between adaptability and performance. The interaction term between adaptability and EO has a coefficient estimate of 0.241 with a p-value of 0.043. The p-value is less than 0.05 level of significance thus implying that the interaction is significant hence a significant moderating effect. The coefficient estimates of adaptability and EO in model 3 were found to be 0.520 and 0.385 respectively. These coefficients were significant based on the p-values of the estimates which were 0.018 and 0.009 respectively which are both less than 0.05 level of significance. The equation based on the final MMR model is given by;

$$Y = .520X - 0.385Z + 0.241X * Z + \epsilon$$

Where Y - performance  
 X - adaptability  
 Z - entrepreneurial orientation

**Table 6: Moderated Multiple Regression**

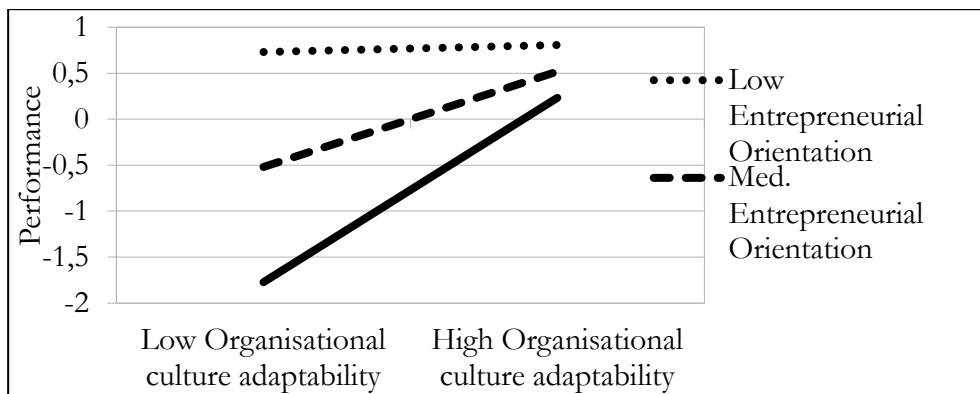
	Model 1			Model 2			Model 2		
	Beta	T	P-value	Beta	T	P-value	Beta	T	P-value
Independent variable									
Constant	0.000	0	1	0.000	0	1	0.035	0.276	0.783
Adaptability	0.326	2.509	0.015	0.283	2.243	0.029	0.52	2.444	0.018
Entrepreneurial Orientation				-0.292	-2.318	0.024	-0.385	-2.711	0.009
Interaction Effect									
Adaptability intersection Entrepreneurial Orientation							0.241	2.072	0.043
R	.326a			.436b			.503c		
R Square	0.106			0.19			0.253		
Adj R Square	0.089			0.159			0.224		

ANOVA F	6.296		0.015	6.099		0.004	5.758		0.002
R Square Change	0.106			0.084			0.063		
Change in F	6.296		0.015	5.373		0.024	4.293		0.043

(Source: Research Data 2018)

Figure 5 shows a graphical presentation generated by plotting the estimates of the MMR model. The graph shows the positive moderating effect on the relationship between adaptability and performance. The slope of the graph between organisational culture adaptability and performance when EO is low is slow depicted by an almost flat line implying a very slow influence of adaptability on performance. When the level of EO is increased, the slope becomes steeper as depicted by medium EO and an even steeper slope at high EO. This shows that as the level EO increases, the relationship between organisation culture adaptability and performance of Christian faith-based hotels becomes stronger as adaptability has a higher influence on the performance with higher levels of EO.

Figure 4: graphical presentation of the moderating effect of EO



(Source: Research Data 2018)

## 5 CONCLUSION

Customer focus has moderately been put in place in the Christian faith-based hotels while organisational learning is quite involved in adapting to changes in the external environment; where they emphasize on organisational learning in adapting to changes in external environment.

Operations in Christian faith-based hotels are flexible thus positively influencing the performance of these organisations. They are manageable and are easy to change and there is cooperation in change creation and employees welcomes changes as long as it is for the good and growth of the hotel. Moreover, Christian faith-based hotels are effective in some aspects of creating change to adapt to the external business environment.

In the case of innovation, most of the hotels find non-product ways to create value for a new or existing customer, such as advertising, distribution, or other communications. Most of the hotels improve the quality or the number of features of their products or services to curb competitors. It seems that a large number of Christian faith-based hotels takes the risk of missing an opportunity with the same weight at the risk of failure. On competitive aggressiveness, the most of the faith-based hotels come up with new ideas/innovations to counter their competitors.

### 5.1 Recommendation

Christian Faith Based Hotels in Kenya need to learn how to create new advantages that will keep them new step ahead of their competitors through differentiation.

The faith-based hotels' management should welcome innovation from the skilled employees and allow them to enact their work freely.

Faith-based hotels need to possess unique advantages to their competitors if they are to survive especially in the global competitive environment and if they are to improve their market share.

Managers in the Christian faith-based hotels should see to it that different parts of the organisation often cooperate to create change.

Faith-based hotels Managers need to ensure that the strategies they put in place can respond well to competitors and adapt to other changes in the business environment.

## 5.2 Suggestion for Further Studies

Given the study limitations, it is important that other studies should be carried out focusing on the following dimensions:

A similar study should be conducted in a different regions other than Nairobi and Mombasa County to check for consistency in the findings and incorporate a more diverse perspective for more insights on how to enhance the performance of Christian faith-based hotels

Other studies should also be conducted focusing on other potential determinants of organisational culture in faith-based hotels other than adaptability to the external business environment.

More Studies should be done on other types of faith-based organisations in relation to entrepreneurship.

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# THE IMPACT OF KNOWLEDGE CAPTURE AND KNOWLEDGE SHARING ON LEARNING, ADAPTABILITY, JOB SATISFACTION AND STAYING INTENTION: A STUDY OF THE BANKING INDUSTRY IN BANGLADESH

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## ABSTRACT

The Knowledge Management (KM) has been defined as performing activities in discovering, capturing, sharing and applying knowledge in a more effective and efficient way. This study looks at only two such processes namely: capturing and sharing knowledge and their sub-processes. The purpose of this study is to conduct exploratory research to investigate the extent to which the sub-processes of knowledge capture and knowledge sharing of knowledge management impact the employee learning, adaptability, Job satisfaction and intention to stay on the job. This research was conducted using a purposive sample from financial services firms in Bangladesh. The sample consisted of 254 respondents from 23 different branches of eight commercial banks drawing from all levels of employees in the organizational hierarchy. The partial least squares (PLS) approach using Smart PLS has been used to test both the measurement and structural models. The findings of this study confirm that it is not the KM processes rather the sub-processes of KM process that can positively impact on employees' outcomes. This study involved self-administered questionnaires and was open to all levels of staff and measured perceptions of the employees as opposed to actual behavior. This study suggests that employees' learning and adaptability depend on the usability and comfortability of the knowledge management initiatives undertaken by the management. Practitioners may employ the same experimental method using the instruments developed for this study to analyze the impact of the sub-processes of knowledge capture and knowledge sharing on employee outcomes. This study contributes to the existing literature of knowledge management that how the sub-processes of knowledge capture and knowledge sharing motivate employees to learn and adapt and how learning and adaptability contribute to job satisfaction and staying intention.

**KEYWORDS:** Knowledge capture, knowledge sharing, employee learning, employee adaptability, job satisfaction, intention to stay.

**JEL CLASSIFICATION:** D83, J28, J64

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## INTRODUCTION

Knowledge Management (KM) is not entirely a new concept. It has progressed from a new idea to an increasingly common function in business organizations and has been the subject of several studies in various settings as companies seek more effective ways of increasing organizational capability for competitive advantage (Zack, 1999). Knowledge Management focuses on organizing and making available essential knowledge, wherever and whenever it is needed. Becerra-Fernandez et al. (2004) have described four types of KM processes such as Knowledge Discovery, Knowledge Capture, Knowledge Sharing, and Knowledge Application. Each of the four sets of KM Processes proposed by Becerra-Fernandez et al. (2004) consists of sub-processes. The sub-processes of combination and

socialization enable knowledge discovery. In Combination, we can combine existing knowledge to create new knowledge, and through Socialization subprocess, tacit knowledge is combined with interactions between individuals and groups to develop new knowledge. Knowledge Capture can take place through externalization and Internalization.

In externalization, tacit knowledge is converted to explicit knowledge, and through internalization sub-process, explicit knowledge is converted into tacit knowledge. Knowledge sharing can happen through socialization and exchange. Through Socialization, sub-process tacit knowledge is shared or transferred between individuals and through exchange subprocess, explicit knowledge is transferred between individuals. Knowledge sharing can take place across individuals, groups, departments, or organizations. Tacit knowledge is shared through socialization, and explicit knowledge is shared by the exchange process. Tacit knowledge forms the background necessary for assigning the structure to develop and interpret explicit knowledge. The inextricable linkage of tacit and explicit knowledge suggests that only individuals with a requisite level of shared knowledge can indeed exchange knowledge (Becerra-Fernandez et al., 2004). The knowledge application process takes place through the sub-process of direction and routines. Direction refers to the process through which individuals possessing the knowledge direct the action of another individual without transferring to that person the knowledge underlying the direction and Routines involve the utilization of knowledge embedded in procedures, rules, and norms that guide future behavior.

Knowledge management can impact an organization at different levels such as: impact on People in terms of employee learning, employee adaptability, and employee job satisfaction, impact on processes in terms of process effectiveness, efficiency and innovation, impact on Products in terms of value added products as well as knowledge-based products, all of which in turn impact organizational performance (Becerra-Fernandez et al., 2004). KM can affect employee learning through internalization, externalization, socialization, and exchange. Internalization and externalization sub-processes work together to help individuals learn. Socialization and exchange also help individuals acquire knowledge through meetings and informal conversations. As for the impact of KM on employee adaptability, employees are likely to adapt when they interact with each other. They are more likely to accept change. They are more prepared to respond to change. KM efforts are intended to expose employees to new ideas and employees continually are ready for change as they are in touch with latest ideas and developments and increased employee's adaptability die to KM enabled company to become a fast-changing organization. As for the impact of KM on jobs satisfaction and intention to stay, an organization having more employees sharing knowledge, turnover rates are reduced, thereby positively affecting revenue and profit. KM also provides employees with solutions to problems they face in case those same problems have been encountered earlier and adequately addressed. By enabling knowledge reuse, employees can be more productive. Employees facing problems in performing their jobs become de-motivated. Improvement in skills also increases its market value.

Although the implementation of knowledge management has been cited widely as a challenge in organizational effectiveness and performance, there is a little research on the broader aspects of the nature and means through which internalization and externalization sub-processes of knowledge capture, as well as socialization and exchange sub-processes of knowledge sharing, can impact on employee learning, adaptability and how employee learning and adaptability lead to job satisfaction and how job satisfaction leads to employees' intention to stay on the job.

With that in mind, this study has tried to examine the following:

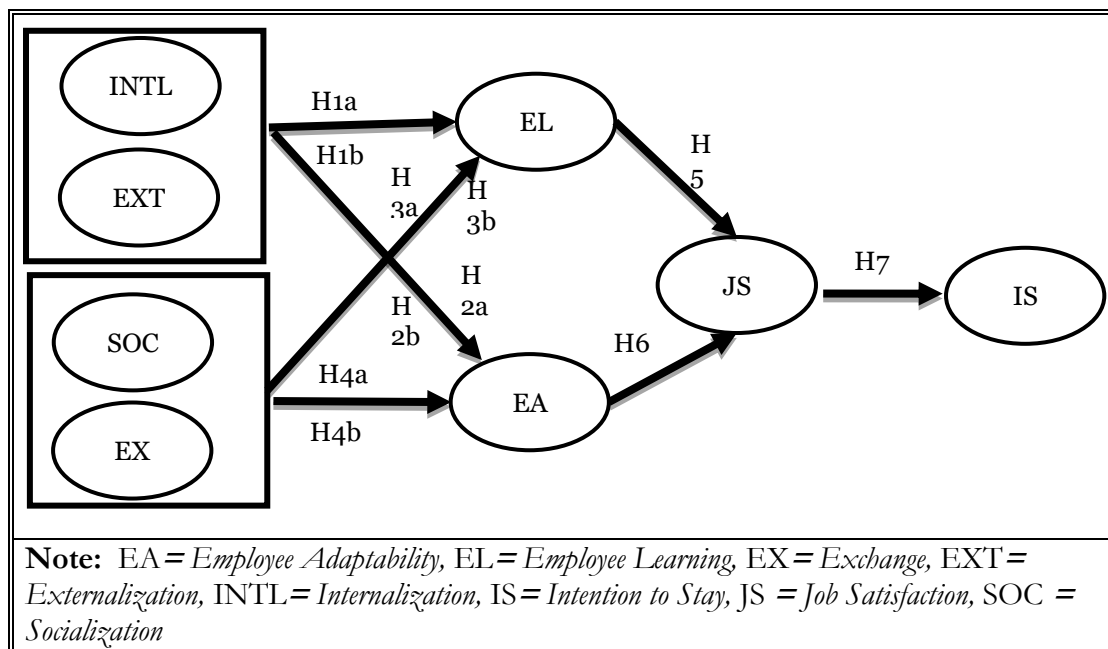
1. Impact of internalization and externalization sub-processes of knowledge capture and socialization and exchange sub-processes of knowledge sharing on employee learning and adaptability.
2. Impact of employee learning and adaptability on employees' job satisfaction.
3. Impact of job satisfaction on employees' intention to stay.

1 RESEARCH MODEL, CONSTRUCTS AND HYPOTHESES

The study of possible effects of introducing KM in the firms has centered on determining whether it can carry out quantifiable improvements. Marques and Simon (2006), Ho (2008), have discussed the relationship between KM, KM processes and performance of organizations at length. However, a study conducted by Zack et al. (2009) have found no direct relationship between KM and financial performance but KM to related to Organizational performance which in turn linked to financial performance. Studies undertook by Dibella and Navis (1998) Salazar et al. (2003), Singh et al. (2006), Lundvall and Nielsen (2007) examined the use of KM and the competitive advantages in an organization. They have demonstrated that organizations with knowledge management orientation outperformed organizations with market orientation and suggested that competitive advantage comes from the way organization performs knowledge activity. Sabherwal & Becerra-Fernandez (2003), Yang (2007), Marques and Simon (2006), demonstrated that knowledge stock accumulate knowledge assets that are internal to the firm and knowledge sharing facilitates the transformation of the collective individual knowledge to organizational knowledge which results in the advancement of organizational learning and eventually the enrichment of organizational effectiveness. Boumarafi and Jbnoun (2008) stated some studies conducted by some authors (Skyrme and Amidon, 1997; King et. al.; 2002; Hung et. al., 2005; Koh et.al., 2005; Mahnke et.al., 2005) who found evidence of a positive correlation with the successful implementation of knowledge management systems (KMS) in business organizations. Kianto et al. (2016), Teh & Sun (2012), Lee-Kelley et al. (2007) studied how the implementation of KM processes help improve employees' job satisfaction and retention (Intention to stay). They have demonstrated through empirical studies how organizations that adopted KM initiatives were able to improve employees' job satisfaction and retention.

Based on the review of the prior literature, the following conceptual model is developed:

Figure 1: Conceptual Model





<b>Constructs</b>	<b>Items</b>	<b>Reference</b>
<p><b>Internalization:</b> The degree of tacit knowledge accumulation through personal experiences, simulations, and experimentation.</p>	<p>INTL1: I believe learning by continuous self-refinement through on the job training can help accumulate tacit knowledge            INTL2: I share and try to understand management visions through communications with other employees            INTL3: I agree that learning by doing (which means that written procedures and rules/practices have to be carried through action), training and exercises allow the individual to access the knowledge dominion of the organization.            INTL4: I collect tacit knowledge (Belief, perception, the point of view) by increasing the use of formal knowledge (explicit knowledge) in real life or computer-generated applications.            INTL5: I can use the knowledge repository (Internet/Database/Library) to obtain knowledge for my job.</p>	<p>New</p>
<p><b>Externalization:</b> The degree of articulating tacit knowledge (Ideas or images) in the form of words, concepts, visuals, or figurative language.</p>	<p>EXT1: I believe my organization recognize contradiction through metaphor/symbol and resolve them through analogy.            EXT2: I agree with the notion that my organization encourages dialogue, Listening and contributing to the benefit of all participants' within the organization.            EXT3: I produce and document/record concepts in by screening ideas from others.            EXT4: For the efficiency and effectiveness of my work, I record/document subjective opinions of other employees of my organization.            EXT5: I capture and translate tacit knowledge (ideas, beliefs, perception) of customers or experts into readily understandable forms (write them down or record them).            EXT6: I create manuals/handbooks/booklets and documents on products and services.</p>	<p>New</p>
<p><b>Socialization:</b> The degree of tacit knowledge sharing between individuals through social interaction related to the task and task efficiency.</p>	<p>SOC1: I share the information and knowledge necessary for the tasks.            SOC2: I improve task efficiency by sharing information and knowledge.            SOC3: I promote the sharing of information and knowledge with other teams in my organization            SOC4: I promote and organize brainstorming retreats or camps for knowledge sharing to solve the problem            SOC5: I believe employee rotation across areas for knowledge seeking and sharing should be encouraged.            SOC6: I believe employees from various functional units should work together to achieve a common goal.</p>	<p>New</p>

<p><b>Exchange:</b> The degree of sharing explicit knowledge among individuals, groups, departments or organizations.</p>	<p>EX1: I use information systems, like intranet and electronic bulletin boards developed by my organization to share information and knowledge with other employees. EX2: I use repositories of information (database), best practices, and lessons learned to share explicit knowledge related to the task. EX3: I prefer to exchange explicit knowledge through computerized communication networks (Social Media). EX4: I am happy the way my organization uses Memos, manuals, letters, and presentations to share information with employees. EX5: My Company creates/produces materials by gathering management figures and technical information to share with employees. EX6: I feel the need for reconfiguration of existing documents through sorting, adding, combining and categorizing of explicit knowledge.</p>	<p>New</p>
<p><b>Employee Learning:</b> The degree of opportunity, variety, satisfaction, and encouragement for learning and development in an organization.</p>	<p>EL1: I get various formal training programs for performance of duties provided by my organization. EL2: I receive informal individual development other than formal training such as work assignments and job rotation provided by my organization. EL3: Employees are encouraged to seek professional development (attending seminars, symposia, and so on). EL4: I consider employees' development through learning as the key to success rather than a cost to the organization. EL5: I am continuously learning and trying to improve myself.</p>	<p>New</p>
<p><b>Employee Adaptability:</b> Degree to which employees accept change based on organizational circumstances.</p>	<p>EA1: I can take on new tasks. EA2: I can step in for co-workers when needed. EA3: I consider myself useful in adjusting to changes. EA4: I am open to doing things in a new way. EA5: My organization encourages employees to adjust to changing situations through innovation and creativity.</p>	<p>New</p>
<p><b>Job Satisfaction :</b> Degree to which employees' reaction results from an appraisal of one's job situation.</p>	<p>JS1: All things considered, I feel very satisfied when I think about my job JS2: I am made to believe that I am an essential part of the company. JS3: I have good working relationships with my co-workers. JS4: I enjoy working in this organization. JS5: My job is rewarding/ I get a sense of personal accomplishment from my work.</p>	<p>Hair et al.(2010)</p>
<p><b>Intention to Stay :</b> The extent to which an employee intends to continue working for an organization and is not participating in activities that make quitting more likely.</p>	<p>IS1: I am not actively searching for another job. IS2: I seldom look at the job listings online. IS3: I have no interest in searching for a job in the next year. IS4: It is very likely that I will be working at my company one year from today?</p>	<p>Hair et al.(2010)</p>

Literature review shows that there is not only a dearth of studies related to the impact of knowledge management and its impact on people, but there is an absence of empirical research that examined the role of internalization and externalization sub-processes of knowledge capture and socialization as well as exchange sub-processes of knowledge sharing on employee learning, adaptability, job satisfaction, and intention to stay in an organization in the context of Bangladesh. Knowledge of employees in an organization is the base that ensures core competencies that help improve the efficiency of the employees and reduce the overall costs of the organization (Davenport & Prusak, 1998). Employees with inadequate knowledge of the organization's products will increase the overall costs of the organization (Benton, 2014). So, Knowledge management through externalization and internalization can enhance employee learning. Based on this, this study hypothesizes that:

- H1a: Internalization leads to employee learning.
- H1b: Externalization leads to employee learning.

Learning allows employees to grow continuously and change in response to the market and the technology and by doing so; it causes employees to be more flexible. Once the quest for learning new things among employees is instilled and they start adapting based on the new knowledge, it will enable effective organizational performance by making it possible for people to handle situations in ways that are in the organization's best interest. So, understanding the knowledge, competence, expertise, as well as skills help an employee to adapt to the new knowledge (Becerra-Fernandez et al., 2004). Employees are likely to adapt, accept change, and prepare to respond to changes when they interact with each other. So, KM efforts are intended to continually expose employees to new ideas and making employees ready for changes as they are in touch with the latest ideas and development. Increased employee adaptability can make an organization as a fast-changing organization. Thus, this study hypothesizes that:

- H2a: Internalization facilitates employee adaptability.
- H2b: Externalization facilitates employee adaptability.

Sharing tacit knowledge such as insights, intuitions, and hunches in the form of cognitive and technical elements and explicit knowledge that is expressed into words, numbers, symbols, and diagrams in symbolic form or/and natural language can improve employee learning. The process of active learning by way of sharing information and knowledge among organizational members, enables individuals and organizations to reflect on the consequences of their behaviors and actions, to obtain insights from an environment where they operate, to understand the situation, and hence to interpret the meaning and react to it in more accurate approaches (Jones et al., 2003). Thus, this study hypothesizes that:

- H3a: Socialization facilitates employee learning.
- H3b: Exchange facilitates employee learning.

As it has been stated earlier knowledge sharing supports the process through which explicit or implicit knowledge is communicated to other individuals through socialization and exchange subprocesses. Knowledge sharing enables managers to keep the individual learning flowing throughout the company and integrate it for practical applications. Besides, people within an organization, by way of sharing their thoughts, beliefs, knowledge, and experience, mutually establish their common understandings. These practical applications and common perceptions are organizational knowledge. This results not only in the enhancement of employees' capabilities but also the contribution to overall organizational effectiveness and bottom-line profit (Yang, 2007). Sharing knowledge can continually expose employees to new ideas and ideas and developments can make employees ready for the change. Therefore, improvement in skills and employees' adaptability of new knowledge and skills can increase their market value as well as can make an organization as a fast-changing organization. This study thus hypothesizes that:

- H4a: Socialization facilitates employee adaptability.
- H4b: Exchange facilitates employee adaptability.

Employee learning is defined by Cheung (2011) as the activities that an employee engages in acquiring new knowledge and skills within his or her current job. Job satisfaction, on the other hand, is the level of contentment employees feel about their work, which can affect performance. This feeling of job satisfaction is mainly based on an individual's perception of satisfaction (Anon., 2015). For any organization to flourish, it must be able to improve employees' job satisfaction. When KM processes encourage the employee to learn from each other, they are likely to possess the knowledge needed to adapt whenever organizational circumstances require. Being better prepared for change and more knowledgeable, employee job satisfaction is impacted, thereby reducing the turnover rate. Although it is sometimes difficult to quantify an employee's job satisfaction, this study hypothesizes that:

H5: Employee learning increases job satisfaction

Cullen et al. (2014) defined adaptability as an individual's ability, skill, disposition, willingness, and motivation, to change or fit the different task, social, and environmental features. Cullen et al. (2014) argued that individual differences in adaptability predict the extent to which employees perceive organizational support for at least two reasons: i) adaptable employees are proactive in their approach and take responsibility for adjusting to the situation which includes learning the skills necessary to function efficiently, and ii) adaptable individuals are more likely to perceive situations in a positive light and are more sensitive to environmental cues, which increases their ability to notice and appreciate even small supportive actions by their organizations. According to Murray (1999) as cited by Suliman and Al-Hosani (2014), researchers have attempted to correlate job satisfaction with performance, turnover, and absenteeism but the relationship between Employee adaptability and job satisfaction in the knowledge management context have not been heavily discussed in the literature. With this in mind, this study hypothesizes that:

H6: Employee adaptability facilitates job satisfaction.

Job satisfaction refers to the pleasurable or positive emotional state resulting from the appraisal of one's job or job experiences (Bang, 2015). The organizational behavior literature is replete with both theoretical and empirical evidence that organizational commitment fully or partially mediates the relationship between job satisfaction and turnover intention (Preez and Bendixen, 2015). Turnover intention is defined as the intention of an organizational member, and if individuals are not satisfied with their jobs, they are less likely to stay with the organizations, which eventually causes a turnover (Bang, 2015). The opposite of turn over intention is the intention to stay that refers to the extent to which an employee intends to continue working for an organization and is not participating in activities that make quitting more likely (Hair et al., 2010). Thus, this study hypothesizes that:

H7: Job satisfaction leads to Intention to stay.

## **2 ANALYSIS STRATEGY AND DISCUSSION**

### **2.1 Sample Description**

A survey has been developed to explore those research question elucidated above. All measures, including the performance measure, are based on respondents' perception. A questionnaire developed in this regard was primarily composed of the following dimensions: internalization, externalization, socialization, exchange, learning, adaptability, job satisfaction and intention to stay. Reliability and validity tests have been conducted for each construct with measures. Cronbach Alpha ( $\alpha$ ) reliability estimates have been used to measure internal consistency. To ensure that the instrument has reasonable construct validity, both exploratory and confirmatory factor analyses have also been used.

The sample for this study consisted of 254 respondents from 23 different branches of eight commercial banks namely: Mutual Trust bank, BASIC Bank, Arab Bangladesh Bank, Dutch Bangla Bank, Shahjalal Islami Bank, United Commercial bank Limited, Premier bank and Meghna Bank in Bangladesh. For the survey, the respondents indicated their agreement or disagreement with the statement concerning each construct. A 5-point Likert scale was used. Every organization under study has over 100

employees. The respondents were from many different departments, including Finance, Customer Service, Information Systems, Human Resources, and Administration, etc. Out of 300 questionnaires, 254 were returned, and this represented 84.66% of returned surveys.

## 2.2 Analysis and Results

This study used SmartPLS. The PLS algorithm using SmartPLS was run four times to drop items that loaded poorly. All together fifteen items were dropped in 4 iterations until the loadings of all the remaining items on their intended constructs were found to be 0.7 or higher. The internal consistency of each construct was assessed using composite reliability and Cronbach alpha. The average variance extracted (AVE) was calculated for each latent construct; and all constructs exceeded Chin's (1988) guideline of 0.5, meaning at least 50% of the variance in indicators was accounted for by its construct (as cited in Bateman et al. 2011).

## 2.3 Demographic Data

The demographic characteristics of the sample included age, education, gender, rank, number of promotions, years of service, and the organizational unit as shown in table 2.

*Table 2: Demographic Characteristics (N = 254)*

<b>Gender</b>	<b>Age</b>	<b>Education</b>
Male: 190 (74.8%)	<=30 Years: 52 (20.5%)	Graduate: 254 (100.0%)
Female: 64 (25.2%)	31-40 Years: 169 (66.5%)	
	41-50 Years: 29 (11.4%)	
	>50 Years: 4 (1.6%)	
<b>Job Rank</b>	<b>Years of Service</b>	<b>Business Unit</b>
Senior Management: 8 (3.2%)	0 - 1 Year: 44 (17.3%)	Information System: 6 (2.3%)
Middle Management: 126 (49.6%)	2 - 3 Years: 99 (39.0%)	Finance: 111 (43.7%)
Technical Staff: 31 (12.2%)	4 -6 Years: 57 (22.5%)	HRM: 7 (2.8%)
Support Staff: 89 (35.0%)	>= 7 Years: 54 (21.2%)	Customer Service: 66 (26.0%)
		Administration: 17 (6.7%)
		Others: 47 (18.5%)

In this study among the respondents, the majority were male 75% and female 25%. As far as the distribution of age among respondents are concerned, the majority of the respondents (66.5%) were in the age group of 31 to 40 years old. 20.5 percent of the respondents were 30 years or below, 11.5 percent in the age group of 41-50 years old and 1.5 percent respondents were above 50 years old. It may also be mentioned here that all the respondents in this study have a Graduate Degree. As for job ranking, the majority of the respondents in this study were middle management staff (49.5%). The second largest were support staff (35%) followed by technical staff (12.5%) and senior management staff (3%). When asked about the years of service in their respective organization, 39 percent respondents have been with their organization for 2 to 3 years, followed by 22.5% for 4 to 6 years 21% for over seven years and 17.5% of the respondents have been with their respective organization for one year or less. When it comes to respondents' business unit, the majority of the surveyed respondents were from Finance (44%), followed by Customer service (26%), Others (18%), Administration (7%), HRM (3%) and Information system (2%).

## 2.4 Measurement Model

A measurement theory specifies how measured variables logically and systematically represent constructs involved in a theoretical model. In other words, measurement theory determines a series of relationships that suggest how measured variables represent a latent construct that is not measured directly (Hair et al., 2010). The PLS factorial validity of the measurement model deals with whether the pattern of loadings of the measurement items corresponds to the theoretically anticipated factors (Gefen and Straub, 2005). Using Chin's (1998) approach, as cited in Bateman et al. (2011), this study tested the adequacy of the measurement model using three standard tests of convergent validity. First, the PLS algorithm was run four times to drop items that loaded poorly. After the first run, seven items were dropped due to poor loadings (EL5, EX6, EXT6, INTL1, IS2, SOC5, SOC6). After the second run, three items were dropped due to poor loadings (EL4, EXT4, JS3) and after the third run, five items were found to have loaded poorly (EA5, EX3, EXT3, EXT5, INTL 3). All together fifteen items were dropped in four iterations until the loadings of all the remaining items on their intended constructs were found to be 0.7 or greater. Table 3 shows indicators are loaded high on their respective constructs and low on other constructs and shows no presence of cross-loadings.

Second, the internal consistency of each construct was assessed using composite reliability and Cronbach alpha. Third, the average variance extracted (AVE) was calculated for each latent construct; and all constructs exceeded Chin's (1988) guideline of 0.5, meaning at least 50% of the variance in indicators was accounted for by its respective construct (as cited in Bateman et al. 2011).

*Table 3: Factor Loadings*

	EA	EL	EX	EXT	INTL	IS	JS	SOC
EA1	<b>0.8142</b>	0.294	0.2612	0.2292	0.2259	0.1212	0.3764	0.3195
EA2	<b>0.7973</b>	0.2227	0.2789	0.2418	0.3308	0.1727	0.2521	0.3927
EA3	<b>0.7614</b>	0.3116	0.3014	0.2644	0.3128	0.2111	0.3544	0.3998
EA4	<b>0.8433</b>	0.3515	0.3394	0.2343	0.3834	0.1729	0.4772	0.4781
EL1	0.268	<b>0.7809</b>	0.4882	0.405	0.2073	0.3124	0.4301	0.3132
EL2	0.2939	<b>0.8492</b>	0.5638	0.5419	0.327	0.2098	0.3609	0.3484
EL3	0.3507	<b>0.8308</b>	0.5258	0.5187	0.3288	0.1958	0.4948	0.3943
EX1	0.2717	0.4134	<b>0.6957</b>	0.4139	0.2755	0.2996	0.3342	0.2747
EX2	0.388	0.386	<b>0.7436</b>	0.2923	0.3617	0.1617	0.2996	0.4204
EX4	0.1583	0.5806	<b>0.7676</b>	0.4471	0.2961	0.2982	0.4375	0.314
EX5	0.3103	0.5358	<b>0.8035</b>	0.3984	0.4297	0.2684	0.4608	0.3617
EXT1	0.1972	0.498	0.41	<b>0.8501</b>	0.2499	0.2985	0.311	0.3032
EXT2	0.3182	0.544	0.4846	<b>0.8947</b>	0.2649	0.305	0.422	0.3055
INTL2	0.2975	0.2802	0.2958	0.2387	<b>0.7558</b>	0.0667	0.1909	0.4011
INTL4	0.275	0.256	0.3264	0.2176	<b>0.7718</b>	0.2576	0.2195	0.3477
INTL5	0.3395	0.2825	0.4265	0.2275	<b>0.7908</b>	0.2031	0.2951	0.4565
IS1	0.1466	0.1538	0.2335	0.2243	0.1577	<b>0.7469</b>	0.2541	0.1833
IS3	0.1414	0.298	0.3212	0.3629	0.1349	<b>0.8547</b>	0.3463	0.1436
IS4	0.2233	0.2344	0.2723	0.2486	0.2517	<b>0.8383</b>	0.3623	0.2421
JS1	0.2747	0.4151	0.3779	0.3464	0.1772	0.3609	<b>0.7946</b>	0.2295
JS2	0.3755	0.4395	0.5138	0.3721	0.3035	0.3118	<b>0.8221</b>	0.3283
JS4	0.4393	0.4002	0.3581	0.2889	0.2441	0.2856	<b>0.7961</b>	0.3725
JS5	0.4268	0.459	0.4304	0.3803	0.2748	0.352	<b>0.861</b>	0.3391
SOC1	0.4038	0.3253	0.3923	0.2424	0.4258	0.1581	0.2594	<b>0.8117</b>
SOC2	0.4844	0.3302	0.3404	0.2907	0.3524	0.1797	0.3373	<b>0.8472</b>
SOC3	0.387	0.3922	0.3933	0.2653	0.4791	0.176	0.3069	<b>0.8356</b>
SOC4	0.3443	0.3543	0.3552	0.3373	0.4524	0.2495	0.3617	<b>0.7498</b>

*Table 4: Bolded values are the SQRT of AVE for each latent construct.*

	EA	EL	EX	EXT	INTL	IS	JS	SOC
EA	<b>0.805</b>	0	0	0	0	0	0	0
EL	0.373	<b>0.821</b>	0	0	0	0	0	0
EX	0.371	0.641	<b>0.754</b>	0	0	0	0	0
EXT	0.301	0.599	0.516	<b>0.873</b>	0	0	0	0
INTL	0.395	0.354	0.456	0.295	<b>0.773</b>	0	0	0
IS	0.212	0.288	0.341	0.346	0.225	<b>0.815</b>	0	0
JS	0.465	0.524	0.514	0.424	0.307	0.400	<b>0.819</b>	0
SOC	0.501	0.431	0.455	0.348	0.523	0.233	0.389	<b>0.812</b>

As a rule of thumb, the square root of the AVE of each construct should be much larger than the correlation of the specific construct with any of the other constructs in the model (Grefen and Straub, 2005). The results of the square root of AVE on the PLS algorithm (Table 4) for each construct was found to be above 0.75 and larger than the correlation of that construct with other constructs. Therefore, it can safely be concluded that, in the case of these data, all the square roots are much larger than any correlation, which shows a necessary aspect of the discriminant validity of the latent constructs.

*Table 5: t-values*

<b>Indicators-construct</b>	<b>Correlations</b>	<b>T statistics</b>
EA1 <- EA	0.8142	31.5
EA2 <- EA	0.7973	23.5682
EA3 <- EA	0.7614	24.4346
EA4 <- EA	0.8433	46.5318
EL1 <- EL	0.7809	23.0625
EL2 <- EL	0.8492	35.6904
EL3 <- EL	0.8308	24.5293
EX1 <- EX	0.6957	14.0851
EX2 <- EX	0.7436	20.4167
EX4 <- EX	0.7676	19.6644
EX5 <- EX	0.8035	31.3776
EXT1 <- EXT	0.8501	30.2519
EXT2 <- EXT	0.8947	43.0608
INTL2 <- INTL	0.7558	22.0976
INTL4 <- INTL	0.7718	16.7892
INTL5 <- INTL	0.7908	21.421
IS1 <- IS	0.7469	15.7208
IS3 <- IS	0.8547	29.943
IS4 <- IS	0.8383	35.9956
JS1 <- JS	0.7946	27.0567
JS2 <- JS	0.8221	33.7493
JS4 <- JS	0.7961	24.8109
JS5 <- JS	0.861	38.293
SOC1 <- SOC	0.8117	31.9059
SOC2 <- SOC	0.8472	40.3135
SOC3 <- SOC	0.8356	35.3272
SOC4 <- SOC	0.7498	17.5515



Convergent validity is shown when each measurement item loads with a significant t-value on its latent construct and correlates strongly with its assumed theoretical construct. Typically, the p-value of the t-value should be significant at least at the 0.05 alpha protection levels (Gefen and Straub, 2005). At the 95% confidence level or the 0.05 significance level, the t-value must be greater than 1.96 for each of the loadings of the corresponding constructs. So, convergent validity is shown when the t-values of the outer model loadings are above 1.96. The t-values of the loadings are, in essence, equivalent to t-values in the least-squares regression (Grefen and Straub, 2005). The above bootstrap report in Table 5 shows that for every measurement item in this study, the corresponding t-statistic is considerably greater than 1.96. Table 5, therefore, shows evidence of convergent validity in the measurement model.

*Table 6: Descriptive Statistics*

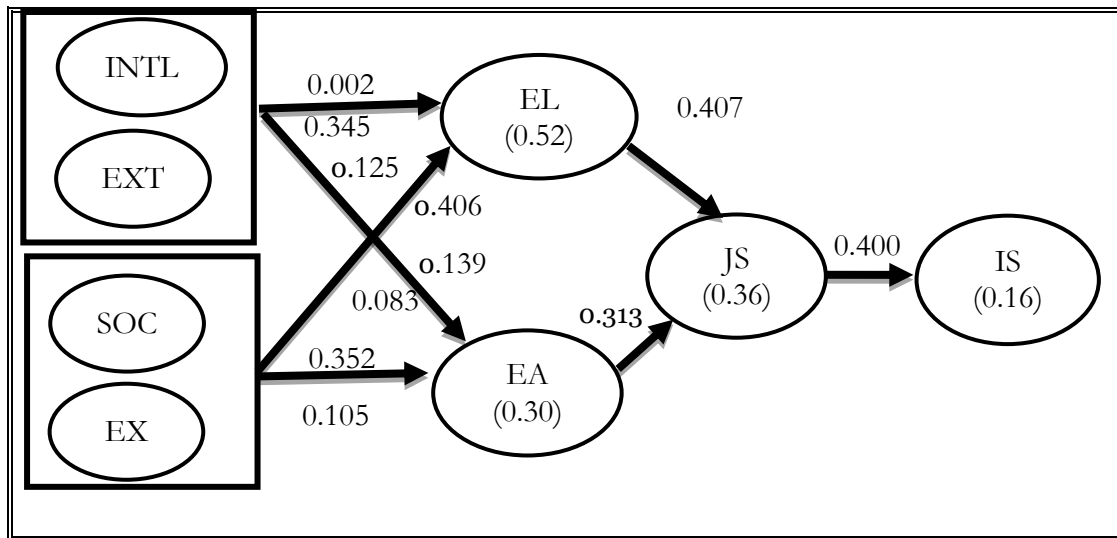
	EA	EL	EX	EXT	INTL	IS	JS	SOC
AVE	0.65	0.67	0.57	0.76	0.60	0.66	0.67	0.66
Composite Reliability	0.88	0.86	0.84	0.86	0.82	0.86	0.89	0.89
Cronbach's Alpha	0.82	0.76	0.75	0.69	0.66	0.75	0.84	0.83

Two estimates of reliability are the Cronbach's alpha and the composite reliability shown in Table 6. The generally agreed upon lower limit for Cronbach's alpha is 0.70, although it may decrease to 0.60 in exploratory research (Hair et al., 2010). In analyzing the current study, Table 6 shows the lower limit of Cronbach's alpha is 0.66, and the composite reliability is 0.817 for each latent construct an upper limit of Cronbach's alpha is 0.83 and composite reliability 0.89 which indicate the reliability of the measurement model. High construct reliability means that internal consistency exists (Hair et al., 2010).

## 2.5 Hypotheses Test

The results of the PLS model are explained in Figure 2. The model indicates significant ( $p < 0.05$ ), and non-significant path coefficients and the variance explained in the predicted constructs. Constructs included in the model determines each endogenous construct, and so each one is seen as an outcome based on the hypothesis listed above. It is noted here that EL (Employee learning), EA (Employee adaptability), and JS (Job satisfaction) are listed as outcomes in some hypotheses and as predictors in others. As for hypotheses 1 (the effect of internalization and externalization on employee learning), the results indicate that externalization (EXT) positively affect employee learning (EL) in an organization ( $\beta = 0.345$ ,  $p < 0.05$ ) but not internalization (INTL). Thus hypothesis 1b is supported but not 1a. For hypotheses 2, when it comes to employee adaptability (EA), the findings of this study show that internalization (INT) positively affect employee adaptability ( $\beta = 0.139$ ,  $p < 0.05$ ) but not externalization (EXT). Thus hypothesis 2a is supported but not 2b. As for hypotheses 3, both socialization (SOC) and exchange (EX) significantly affect employee learning ( $\beta = 0.125$ ,  $0.406$   $p < 0.05$ ). Thus hypotheses 3a and 3b are supported. As for knowledge sharing (SOC) and employee adaptability (EA) only socialization (SOC) turns out to significantly affect employee adaptability (EA) ( $\beta = 0.352$ ,  $p < 0.05$ ) but not exchange (EX). Thus hypothesis 4a is supported but not 4b. This study also finds that willingness to learning (EL) positively affect employees' job satisfaction (JS) ( $\beta = 0.407$ ,  $p < 0.05$ ). So hypothesis 5 is also supported. In addition to employee learning, this study also finds a significant relationship between employee adaptability and job satisfaction ( $\beta = 0.313$ ,  $p < 0.05$ ) as well as job satisfaction and intention to stay ( $\beta = 0.400$ ,  $p < 0.05$ ). Thus both the hypotheses 6 and 7 are supported.

Figure 2: Path Coefficients (Number within the parentheses represent R<sup>2</sup>)



### 3 DISCUSSIONS

The result of the measurement and structural model test lend support for the proposed research model. All the paths, except three, in the model, appear to be statistically significant. In this study, two research questions that have been delineated above, have been tested using eleven hypotheses. Since eleven hypotheses have been derived from two research questions and three are found to be not significant, there is no way to conclude that research questions 1 and 2 are both significant. As far as the impact of internalization and externalization sub-processes of knowledge capture on employee learning is concerned, the only externalization has been found to lead to employee learning significantly. As it has been explained above, externalization is the process when tacit knowledge is converted into explicit knowledge. Externalization is the key to knowledge creation as it creates new explicit knowledge from tacit knowledge (Nonaka et al., 2001). Conversion of tacit knowledge into explicit knowledge can be influenced by dialogue and mutual reflection, and the effectiveness of externalization can be reinforced by learning and motivation (Nonaka and Takeuchi, 1995). Employees engage in learning activities and develop the knowledge base for the cognitive systems and shared memories, which lead to organizational learning. The positive impact of externalization on employees learning may cause employees to focus on learning for their job, resulting in a knowledge base that focuses on a relatively narrow domain of interest (i.e., one's job) and also outside their current job, resulting in a knowledge base that broadly covers several areas of interest (Cheung, 2011). The significant relationship of externalization and employee learning may develop a learning culture within the organization that can encourage collaboration and team learning and establishes systems to capture knowledge for the more significant benefit of the organization.

As for employee adaptability, in this study, the only internalization of knowledge capture process of knowledge management has been found to have a significant relationship with employee adaptability. Adaptability as defined by Ployhart and Bliese (2006) as an individual's ability, skill, disposition, willingness, and motivation, to change or fit the different task, social, and environmental features (as cited in Cullen et al., 2014). Adaptable individuals take responsibility for adjusting to the situation. In the case of using new technology, this would include learning the skills necessary to operate the equipment efficiently. The proactive, resourceful, and resilient nature of adaptable employees allows them to acquire these skills on their own and also to seek out and use support from their organization (Cullen et al., 2014). Knowledge internalization as mentioned above is the process of embodying explicit knowledge into tacit knowledge, and it is through internalization; explicit knowledge created is

shared throughout an organization and converted into tacit knowledge by individuals (Tsai and Lee, 2006). Sabherwal and Becerra-Fernandez (2003) found in their study that both the internalization and externalization processes of knowledge capture mainly focus at the individual level, internalization is intrinsically related to learning, and externalization is essential to articulation. However, this study finds that in the context of the banking industry in Bangladesh, while externalization leads employees to enhanced learning, internalization, on the other hand, helps employees to be more adaptable. The above findings could be related to the specific nature of the banking industry. The qualitative interviews indicated that the banking industry under the survey emphasizes the conversion of tacit knowledge to explicit knowledge for employee learning and the conversation of explicit knowledge to tacit knowledge for employee adaptability. This finding is surprising because internalization, as explained by Sabherwal and Becerra-Fernandez (2003), is intrinsically related to learning and externalization is essential to knowledge articulation, which can help facilitate employee adaptability.

As for the two sub-processes of knowledge sharing: socialization and exchange have been found to be significantly related to employee learning in an organization. While internalization and externalization both focus mainly at the individual level - socialization and exchange focus at the individual, group, or organizational levels (Sabherwal and Becerra-Fernandez, 2003 and Becerra-Fernandez et al., 2004). Knowledge sharing through socialization and exchange occurs when an individual is willing to assist as well as to learn from others in the development of new competencies. As mentioned by Bornemann and Sammer (2003) knowledge could increase its value when it is shared with and transferred to others (cited in Yang, 2007). The process of learning by way of sharing information and knowledge among the employees in an organization may enable individuals and organizations to reflect on the consequences of their behaviors and actions, to obtain insights from an environment where they operate, to understand the environment, and hence to interpret the meaning and react to it in more accurate approaches (Jones et al., 2003 cites in Yang, 2007). As the organization provides opportunities for its members to share their experiences and new learning and perspectives with others, individuals learning should stimulate organizational learning (Yang, 2007).

As for knowledge sharing and employee adaptability, only socialization sub-processes of the knowledge sharing process turns out to be significantly related to employee adaptability in the case of the banking industry under study. That means tacit knowledge shared between employees enable employees to be more adaptable. This is consistent with hypothesis H2a that was also found to significant in this study. Internalization, which is the conversion of tacit knowledge from explicit knowledge, is significantly related to employees' adaptability and socialization, which is sharing of tacit knowledge, is found to be significantly related to employees' adaptability in the banking industry of Bangladesh under study.

With regard to the employees' willingness to learn and employees' job satisfaction, this study finds the relationship between willingness to learn and job satisfaction are significantly related to each other. Employees' willingness to learn may provide employees domain-specific knowledge skills and may be used for the production of novel ideas with the potential utility to the particular domain of interest (Cheung, 2011). These domain-specific knowledge skills of employees increase the level of contentment that employees feel about their work. In addition to employee learning, this study also finds a significant relationship between employee adaptability and job satisfaction. This study also supports the relationship between job satisfaction and employees' intention to stay. Employee turnover as mentioned by Abelson and Baysiner (1994), Dalton et al., (1981) may at times benefit firms by reducing stagnation, improving innovation, eliminating poor performers and reducing costs (cited in Droege and Hoobler, 2003). The potential disadvantage of employee turnover as also mentioned by Droege and Hoobler (2003) is the loss of organizational level tacit knowledge, and as a result, employee turnover is considered a major obstacle for many organizations. A similar study conducted by Bang (2015) among some nonprofit sports organizations' volunteers found that job satisfaction among volunteer predicted intention to stay with their organizations.

### **3.1 Theoretical Implications**

The results of this study have important theoretical implications that impact academics within the KM community. The findings of this study contribute to further the understanding of how knowledge

management initiatives should be implemented in organizations especially financial organizations. From a theoretical perspective, the results confirmed that knowledge capture and knowledge sharing play a significant explanatory role in how employee learning and adaptability influence employees' job satisfaction and intention to stay. The current study contributes theoretically to the existing literature of knowledge management that how knowledge capture and knowledge sharing motivate employees to learn and adapt and how learning and adaptability contribute to job satisfaction and staying intention. The results also revealed that knowledge management initiatives shape the employees' quest for knowledge and adaptability. The results of this research also confirm that for the financial service firms studied, knowledge management plays an important role in employees' job satisfaction and intention to stay in the job. A successful knowledge capture and knowledge sharing processes would result in employees interacting and serving customers better. The results of this study show that not all the sub-processes will have equal impact on employees.

### **3.2 Practical Implications**

The findings of this study suggest that to have a positive impact on employees, the focus of an organization should not be specific knowledge management processes, instead focus should be sub-processes of specific knowledge management processes.

A major takeaway for practitioners especially the management or managers from this study is that employees may be nurtured to create, capture, and share the type of knowledge desired by the organization. Managers can establish platforms for employees within the same functional area and across different functional units to engage in knowledge and experience sharing. This study also suggests that employees' learning and adaptability depend on the usability and comfortability of the knowledge management initiatives undertaken by the management. Practitioners may also employ the same experimental method using the instruments developed for this study to analyze the impact of internalization and externalization of knowledge capture and socialization as well as the exchange of knowledge sharing on employee learning, adaptability, job satisfaction and finally employees' intention to stay in the job. Practitioners may also employ the same experimental method using the instruments developed for this study as the knowledge management assessment instrument developed in this study have passed the tests of reliability and validity.

## **4 LIMITATIONS**

As with any empirical study, this study has some limitations. First, the sample in this study can be considered as purposive sampling. This study involved self-administrated questionnaires and was open to all levels of staff. The second limitation of this study is the sample size. The sample size in some of the eight commercial banks from 23 different branches was small and might not be representative of all the players who might be instrumental in the effective utilization of knowledge management initiatives. Third, it can be safely stated that, since the hypotheses were tested only with a sample from the financial institutions in Bangladesh, it may not be appropriate to generalize the results to other cultures and countries.

## **5 DIRECTIONS FOR FUTURE RESEARCH**

This study mainly focused on only two processes of knowledge management. The empirical model that was presented and studied in this research opens up multiple opportunities for future research. The model examined knowledge capture and knowledge sharing from banks' employees' perspectives and used that as an indication of the success of a knowledge management initiative. This study has demonstrated a strong positive relationship between knowledge capture, knowledge sharing, and job satisfaction, and intention to stay via learning and adaptability. It is recommended that future research should explore other two process of knowledge management or all the processes of knowledge management at a much more granular level as elucidated by Becerra-Fernandez et al. 2003 and the

impact on four endogenous variables that were studied in this paper. Researchers could also explore the effects of other variables such as organizational climate, leadership behaviors, and organizational commitment on knowledge sharing and knowledge capture and how knowledge sharing and knowledge capture impact employee learning, adaptability, job satisfaction and intention to stay. In addition, future research could take larger sample sizes from all different management levels across various industries. More conclusive results are needed to see which knowledge management impacts and supports job satisfaction and intention to stay in different industries. This will further help us understand how knowledge workers improve their learning and adaptability using different knowledge management processes across diverse business industries.

Researchers in future research should also look at a more detailed approach of knowledge capture and knowledge sharing processes. As mentioned by Kulkarni et al. (2006-7) those KM processes should be treated at a much more granular level by addressing the nature of identification and vetting processes, and by analyzing workflow steps that facilitate capture and sharing of identified knowledge as separate constructs to understand the antecedents of KM success.

Another area where future research might be conducted is how the usage of IT artifacts can help improve employees' learning and adaptability - thereby job satisfaction and intention to stay. Future research should investigate IT artifacts in terms of system quality, information quality, and service quality and user satisfaction and how they impact knowledge management processes.

## **6 CONCLUSION**

Knowledge capture and knowledge sharing lie at the core of knowledge management, and it reflects employees' willingness to learn and share their valuable knowledge as well as their actions facilitating the exchange of relevant information with other members across the organization (Trivellas et al., 2015). Building on the shared values, norms, accepted practices or perceptions held by employees within an organization, knowledge capture and knowledge sharing are evolved and treated as a knowledge-centered culture which molds individual behavior (Trivellas et al., 2015). The findings of this study clearly show that knowledge capture and knowledge sharing are the precursor of employee learning, adaptability, job satisfaction and intention to stay. To understand the financial institutions' employees' perceptions and how knowledge capture and sharing help enhance learning and adaptability and thereby job satisfaction and intention to stay on the job, this study resulted in several theoretical and practical contributions that will help guide management or organizations to select and implement the appropriate knowledge management processes. There is a need for management or organizations to adopt knowledge capture and sharing techniques, practices, and nurture knowledge management culture through proper mechanisms and technologies to improve employees learning quest and adaptability. To remain competitive in a very competitive world, knowledgeable and adaptable employees are essential resources. As KM evolves and new factors are introduced, knowledge (both the tacit and explicit) must be captured through internalization and externalization and shared through socialization and exchange. Since organizations need to become smarter and faster, intellectual capital is the means for transferring the knowledge to knowledge workers. The information is captured and transferred so that relevant data are transmitted from one individual to another (Misuraca, 2013). As organizations shift toward a dynamic workforce that applies knowledge management mechanisms to foster learning and adaptability among employees in the organization, it becomes crucial that these organizations understand the impact of knowledge capture and knowledge sharing on job satisfaction and intention to stay.

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# SOCIAL AND CULTURAL FACTORS AND THEIR IMPACT ON THE QUALITY OF BUSINESS ENVIRONMENT IN THE SME SEGMENT

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## ABSTRACT

A stable, prosperous and competitive economic system in every developed country requires a high-quality business environment in the SME sector. The quality of the business environment is a key factor in the economic development of countries, as it is of a great importance for the growth of the economy's competitiveness and also for its future and sustainable economic growth. The aim of the article was to quantify the significant social and cultural factors creating the quality of the business environment in the SME segment and to compare their importance in the Czech and Slovak Republic. Within the context of the stated aim of the research, questionnaire survey was carried out among the enterprises operating in the SME segment. Within the research, 312 companies in the CR and 320 companies in Slovakia were addressed. The Z-score method was used to verify the established scientific hypotheses. The research has brought up some interesting results. The research results point to a significant finding that the entrepreneurs in both countries have experienced a relatively low public and political acceptance. On the other hand, the entrepreneurs stated that the family environment motivates them to do business and helps them with their entrepreneurial activities. The assessing of the media impact on the business is quite negative in both countries. Entrepreneurs have largely thought that the media misrepresent doing business in general and do not help to shape the business environment, e.g. through the presentation of business success stories. More than the two-thirds of entrepreneurs in both countries have agreed that the doing business' advantages outweigh the disadvantages. This research has some limitations, but it has brought interesting findings and a potential inspiration for further research to explore the issue of the quality of the business environment of SMEs.

**KEYWORDS:** business environment, cultural factors, quality of business environment, social climate, social factors

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## INTRODUCTION

A stable, prosperous and competitive economic system in every developed country requires a high quality business environment in the SME sector. (Dobeš et al., 2017; Kozubíková et al., 2017; Ključnikov and Popesko, 2017; Belas et al., 2015).

Small and medium-sized enterprises - enterprises up to 250 employees and annual turnover of 50 mil. EUR, make up the most numerous type of enterprises in Europe, as shown by statistics – 99% of businesses in Europe are SMEs, while SMEs employ almost 75% of all people working in the private sector. For this reason, not only Slovakia but also the EU as a whole has a strong interest in creating favorable conditions for their functioning and development (Slovak Business Agency, 2018).

The quality of the business environment determines significantly the decision of individuals to start their own entrepreneurial activities while creating the basic conditions for the development of small and medium-sized enterprises.

The quality of the business environment is often regarded as a major factor in the long-term economic competitiveness and sustainable development of small and medium-sized enterprises. According to the OECD, factors influencing the business environment can be divided into 4 main areas: institutional and regulatory framework, market access, access to resources and business culture (Slovak Business Agency, 2018).

This article examines the significant social and cultural factors in the business environment and quantifies their significance in the Czech Republic and Slovakia, and compares their intensity in both countries.

The structure of the article is as follows. The theoretical part presents the results of research in the field of social and cultural factors of business environment. The next section defines the research goal, methodology and data. The third part presents the results of the research and a short discussion on the given issue. In the final part of the article, the basic conclusions of the research are formulated.

## **1 THEORETICAL PART**

The quality of the business environment is a key factor in countries' economic growth, as it plays an important role in the economy's competitiveness growth and future economic sustainability (Wruuck, 2015, Bunoa et al., 2015, Chládková, 2015). In this context, it is extremely important to shape a good business environment for the SME segment.

According to Bunoa et al. (2015), the business environment within an enterprise comprises economic, political, institutional, legal, technological, and cultural conditions that enable and shape the enterprises' business activities. Similar conclusions are also given by Conorto et al. (2014), who highlight the importance of social and cultural factors in creating a high quality business environment in the SME segment.

*The Entrepreneurship 2020 Action Plan* (European Commission, 2013) states: "*Potential entrepreneurs in Europe generally do not have a business-friendly environment: education does not provide the right basis to start a business career, difficult access to credit and markets, difficulties in transferring businesses, concerns about criminal penalties and burdensome administrative procedures. In addition, support measures for SMEs remain unbalanced, as a large number of EU Member States still do not take into account the characteristics of small businesses, especially micro-enterprises, when preparing legislation, nor do they offer a second chance to honest bankrupt entrepreneurs. Not only is this environment problematic, but there also dominates a culture that does not recognize or reward entrepreneurial efforts enough and does not refer to successful entrepreneurs as patterns that create jobs and income. Europe must go through a thorough and extensive cultural change to drive entrepreneurship to grow our economy.*"

Entrepreneurship can be seen as a factor affecting the social and cultural environment and as a factor that can be influenced by them (Powell & Rodet, 2012). Entrepreneurship leads to social, technological and economic development and growth. Individuals involved in entrepreneurial activities are those who operate on them in different ways. In this context, Zahra and Wright (2016) argued that, given the growing recognition of the role of entrepreneurship, its possible social impact is also apparent.

Scholars have paid attention to the social values that entrepreneurship adds to society. Zahra and Wright (2016) have developed five pillars that could affect the social role of entrepreneurship. The first

pillar was to link entrepreneurship with other societal endeavors that point to the achievement of a better standard of living, advancement in development and enrichment of one's existence.

Secondly, exploring ways to reduce the dysfunctional impact of entrepreneurship on stakeholders. The third pillar is related to the need for a new definition of the entrepreneurship scope as a scientific arena. The fourth pillar is the need to know the social multiplier of entrepreneurship. Finally, the fifth pillar points to the company level that is concerned with balancing the creation of environmental, social and financial wealth.

As mentioned earlier, entrepreneurial activity can be influenced by social and cultural environment in which it operates. Schumpeter (1934) claimed that entrepreneurship is influenced by profits and social climate, that is, the economy, sociological and institutional dimensions of a society. It consists of a social dimension known as the social environment in which individuals engage in entrepreneurial activity and its progress. As a result, it also includes social values among other things. In the view of this, it is essential that the person involved in the entrepreneurial activity is familiar with and admits the rules of the game, i.e. the environmental circumstances. Schumpeter (1934) argued that the distribution in terms of income in a society represents the *social climate*. Social stress would be present in an unequal society, unions would force the government to introduce other forms of taxation distribution, and would not positively affect entrepreneurs to increase their activities. Cultural aspects are also covered by the concept of social climate.

Scholars have examined the social and cultural factors in their analyses concerning their role on entrepreneurship (Castaño, Méndez, & Galindo, 2015; Curado, Henriques, & Bontis, 2011; C. Huang & Kung, 2011; Y. Huang & Jim Wu, 2010; Naranjo-Valencia, Jiménez-Jiménez, & Sanz-Valle, 2011). To do that, Nissan, Galindo and Picazo (2012) suggest to include culture in the Schumpeterian social climate. Consequently, in a society, through culture, models of behaviour and conduct enabling the associations among people are introduced. Because of the culture factor that could be perceived as a way of doing business in a particular society, the intentions of individuals to innovate could differ. (Y. Huang & Jim Wu, 2010; Rowley, Baregheh, & Sambrook, 2011). Institutions stimulating a business culture among households, businesses and the government support entrepreneurial activity. Innovation is an important driver that may lead to these results (Nissan et al., 2012).

Powell and Rodet (2012) and Castaño et al. (2015) found empirical evidence emphasizing the impact of the cultural environment on entrepreneurial activity. The social and cultural environment would thus influence economic development through entrepreneurship and innovation. Culture and the social environment can motivate individuals to engage in entrepreneurial activity.

## **2 THE AIM, METHODOLOGY AND DATA**

The aim of the article was to quantify the important social and cultural factors creating the quality of the business environment in the SME segment and to compare their importance in the Czech Republic and Slovakia.

In regards to the defined aim, a survey-based research was conducted with enterprises operating in the SME segment. 312 enterprises in CR and 329 enterprises in SR were approached during this research. Data collection took place in 2018. The method of random choice using the "Randbetween" mathematical function was used to select enterprises from the "Albertina" database comprising enterprises in the Czech Republic. Slovak enterprises were randomly selected from the "Cribis" database containing the list of enterprises, organizations, and entrepreneurs. The enterprises were approached via email asking them to fill out the online questionnaire. The questionnaire was intended for business owners or top management (hereinafter entrepreneurs). The response rate in the Czech Republic was approximately 4 % (out of over 7800 enterprises). The number of approached enterprises

in the Slovak Republic was more than 9400, and the response rate was approximately 3.5 %. The structure of respondents within the Czech Republic (312 enterprises) was the following: business area: services 109 enterprises, retail 73 enterprises, manufacturing 53 enterprises, construction 29 enterprises, agriculture 9 enterprises, transportation 19 enterprises, other business area 23 enterprises. Time period of operating a business: 56 enterprises 1 – 5 years, 48 enterprises 5 – 10 years, 208 enterprises more than 10 years. Size of business: 258 micro-enterprises (up to 10 employees), 43 small enterprises (up to 50 employees), and 11 medium-sized enterprises (up to 250 employees). Highest attained education level of the entrepreneur: 50 high school without diploma, 135 high school with diploma, and 127 college education. Gender of entrepreneurs: 236 men, 76 women.

The structure of respondents within the Slovak Republic (329 enterprises) was following: business area: services 122 enterprises, retail 69 enterprises, manufacturing 51 enterprises, construction 39 enterprises, agriculture 20 enterprises, transportation 11 enterprises, other business area 17 enterprises. Time period of operating a business: 104 enterprises 1 – 5 years, 78 enterprises 5 – 10 years, and 147 enterprises more than 10 years. Size of business: 234 micro-enterprises (up to 10 employees), 71 small enterprises (up to 50 employees), and 24 medium-sized enterprises (up to 250 employees). Highest attained education level of the entrepreneur: 10 high school without diploma, 95 high school with diploma, and 224 college education. Gender of entrepreneurs: 251 men, 78 women.

Within the research, four groups of social and cultural factors were defined through the following statements:

#### Social factors (SF)

SF1: Entrepreneurs' views and evaluation of the social environment

SF11: Our society appreciates entrepreneurs.

SF12: Politicians and the public correctly understand how entrepreneurs contribute to the society.

SF13: My close environment (family, friends, acquaintances) help me in doing business.

SF14: Good business practices help shape the quality of business environment.

SF2: Family environment

SF21: The family environment motivates people to start a business.

SF22: It is easier to do business if close relatives are in business.

SF23: I acquired many skills in my family that help me in my business.

SF24: My family helps me in my business.

SF3: Media and communication environment

SF31: Media (television, broadcast, and other media) truthfully inform about entrepreneurship.

SF32: Media help shape the quality of business environment using presentations of good business practices.

SF33: Media adequately inform about the business environment.

SF34: Media support entrepreneurs' communication with the public.

SF4: Entrepreneurs' social stance

SF41: The advantages of doing business outnumber the disadvantages.

SF42: An entrepreneur is wealthier and has a higher social status.

SF43: Entrepreneurship enables a better career growth and leads to interesting work opportunities.

SF44: Conducting business allows for a full utilization of one's skills.

**In developing this paper we have established four scientific hypotheses:**

H1: There are statistically significant differences in the evaluation of the social environment (SF1) by Czech and Slovak enterprises.

H2: There are statistically significant differences in the evaluation of the family environment(SF2) by Czech and Slovak enterprises.

H3: There are statistically significant differences in the evaluation media environment(SF3) by Czech and Slovak enterprises.

H4: There are statistically significant differences in the evaluation of social attitudes (SF4) by Czech and Slovak enterprises.

To evaluate H1, H2, H3 and H4, the method of Z score was used. Statistically significant differences between the positive answers of Czech and Slovak respondents were compared through Pearson statistics at the significance level of 5 %. If the calculated p-value was lower than 5 %, the null hypothesis was rejected, and the alternative hypothesis was adopted. The calculations were made through the free software available at <http://www.socscistatistics.com/tests/ztest/Default2.aspx>.

### **3 RESULTS AND DISCUSSION**

The research results are listed in the tables below.

**Table 1 – Evaluation of social factors (SF1) in CR and SR**

Factor	The proportion of positive responses (CR/SR index)	Z-score p-value
SF11	0.199/0.280	<b>0.003</b>
SF12	0.090/0.155	<b>&lt;0.001</b>
SF13	0.827/0.821	0.833
SF14	0.503/0.657	<b>&lt;0.001</b>

(Source:own processing)

19.9 % of respondents in the Czech Republic and 28 % of respondents in Slovakia agreed with the statement that the society appreciates entrepreneurs (SF11).

Only 9% of Czech and 15.5% of Slovak entrepreneurs agree that politicians and the public correctly understand the contribution of entrepreneurs to society (SF12).

26% of respondents in the Czech Republic and 28% of respondents in the Slovak Republic agreed that My close environment (family, friends, acquaintances) support me in business (SF13).

50.4% of entrepreneurs in the Czech Republic and 65.7% of entrepreneurs in the Slovak Republic agreed that SF14: Good business practices help shape the quality of the business environment (SF14).

The results of the testing criterion p-value(0.003; <0.001; 0.833; <0.001) confirm that there are statistically significant differences between respondents' answers in the two countries. Slovak entrepreneurs are more positive about the support from society, politicians and the public compared to the Czech entrepreneurs. At the same time, Slovak entrepreneurs have more intensely agreed that good business practices help shape the quality of the business environment.

*H1 was confirmed.*

**Table 2 – Evaluation of social factors (SF2) in CR and SR**

Factor	The proportion of positive responses (CR/SR index)	Z-score p-value
SF21	0.545/0.620	<b>&lt;0.001</b>
SF22	0.657/0.729	<b>0.047</b>
SF23	0.542/0.687	<b>&lt;0.001</b>
SF24	0.817/0.796	0.503

(Source:own processing)

The results in the Table 2 highlight the importance of a family environment for entrepreneurs. 54.5% of Czech entrepreneurs and 62% of Slovak entrepreneurs said that the family environment motivated them to do business. The majority of entrepreneurs have said that it is easier to do business if one of the close relatives does business. More than half of entrepreneurs have confirmed that they have gained a lot of knowledge in the family that helps them in business. Around 80% of respondents in both countries said the family was helping them in business.

The results of the testing criterion p-value(<0.001; 0,047; <0.001; 0.503) confirm that there are statistically significant differences between respondents' answers in the two countries. Slovak entrepreneurs perceive positively the role of a family environment in business (statistically significant differences in respondents' positive responses were recorded for SF21, SF22 and SF23).

*H2 was confirmed.*

**Table 3 – Evaluation of social factors (SF3) in CR and SR**

Factor	The proportion of positive responses (CR/SR index)	Z-score p-value
SF31	0.170/0.252	<b>0.011</b>
SF32	0.199/0.331	<b>&lt;0.001</b>
SF33	0.276/0.337	0.091
SF34	0.208/0.392	<b>&lt;0.001</b>

(Source:own processing)

Assessing the media impact on entrepreneurship is rather negative. Only 17% of entrepreneurs in the Czech Republic and 25.2% of entrepreneurs in Slovakia have confirmed the opinion that Media (television, radio and other media) truthfully inform about entrepreneurship (SF31). Only 19.9% of Czech entrepreneurs and 33.1% of Slovak entrepreneurs (SF32) agreed that Media help shape the quality of the business environment through the presentation of good business practices (SF32).

A relatively small proportion of entrepreneurs in both countries agreed with factor SF33: The media inform about the business environment to an appropriate extent. 20.8% of Czech entrepreneurs and 39.2% of Slovak entrepreneurs agreed with the view that the media support the communication of entrepreneurs with the public (SF34).

The results of the testing criterion  $p$ -value (0.011; <0.001; <0.001) confirm that there are statistically significant differences between respondents' answers in the two countries. Slovak entrepreneurs perceive the influence of the media environment on the quality of business environment more positively compared to the Czech entrepreneurs (statistically significant differences in the respondents' positive answers were recorded for SF31, SF32 and SF34).

*H3 was confirmed.*

**Table 4 – Evaluation of social factors (SF4) in CR and SR**

Factor	The proportion of positive responses (CR/SR index)	Z-score p-value
SF41	0.660/0.650	0.795
SF42	0.827/0.821	0.834
SF43	0.631/0.669	0.322
SF44	0.808/0.827	0.535

(Source: own processing)

A relatively large proportion of entrepreneurs in this research responded positively to the various factors in the social attitudes of entrepreneurs. More than 2/3 of entrepreneurs in both countries agreed to claim that the benefits of doing business outweigh the disadvantages (SF41).

The highest level of consent was found in the SF42: Entrepreneur has more money and better social status (up to 82.7% of Czech entrepreneurs and 82.1 % of Slovak entrepreneurs agreed with this statement).

The results of the testing criterion  $p$ -value (0.795; 0.834; 0.322; 0.535 ) confirm that there are not statistically significant differences between respondents' answers in the two countries.

*H4 was not confirmed.*

Research results have yielded some interesting results. Entrepreneurs in both countries felt a relatively low level of acceptance by the society and presented the view that the media misunderstood the contribution of entrepreneurs to society.

An important problem is the perception of entrepreneurs by society. E.g. According to the GfK Czech survey (2015), only 55% of the total number of respondents positively perceived entrepreneurs. At the same time, respondents said entrepreneurs respect their customers less than in the past. In this context, the media play an important role in shaping society's attitudes towards the business environment.

Similarly, Belás et al. (2015) report that the perception of entrepreneurs in the society is not optimal. People who do not do business, consider entrepreneurs rather negatively also because the media give a priority to the negative business news. Research by these authors has shown that up to 71% of

entrepreneurs in the SME segment thought that the media was insufficiently informed about the importance of entrepreneurs for the whole of society.

On the other hand, entrepreneurs have declared great importance to the family environment for their business activities. The family environment motivates them to do business and helps them in business.

The results of the research largely confirm the views of the European Commission. In the document entitled *The Entrepreneurship 2020 Action Plan* it is stated: "*There are only a few stories about entrepreneurial success in Europe.*" This is because doing business was not the preferred career. In Europe, we rarely find an entrepreneur profession among the most sought-after professions. Although entrepreneurs create jobs and stimulate the economy, their successes are not presented as a model in the media. For young people, entrepreneur's career is a low-profile one, discouraging those who want to become entrepreneurs. An important element in the change of business culture is therefore *a change in the perception of entrepreneurs on the basis of practical and positive information* about their achievements, benefits for society and the possibility of establishing new businesses or acquisitions as a career goal. In order to achieve this, it is necessary to speed up their visibility as role models, taking into account the diversity of business profiles and ways to achieve a success. Clear and engaging information about the challenges and rewards of a business career can undermine negative impressions. Therefore, a broader public debate, especially in the media, is needed for the business revolution. Public and private institutions should be encouraged to emphasize the social and economic importance of entrepreneurs not only as a generally recognized career, but also as a matter of extraordinary national, European and international interest" (European Commission, 2013).

#### 4 CONCLUSION

The aim of the article was to quantify the important social and cultural factors creating the quality of the business environment in the SME segment and to compare their importance in the Czech Republic and Slovakia.

The research results point to a significant finding that the entrepreneurs in both countries have experienced a relatively low public and political acceptance. On the other hand, the entrepreneurs stated that the family environment motivates them to do business and helps them with their entrepreneurial activities

The assessing of the media impact on the business is quite negative in both countries. Entrepreneurs have largely thought that the media misrepresent doing business in general and do not help to shape the business environment, e.g. through the presentation of business success stories. More than the two-thirds of entrepreneurs in both countries have agreed that the doing business' advantages outweigh the disadvantages.

This research has some limitations, but it has brought interesting findings and a potential inspiration for further research to explore the issue of the quality of the business environment of SMEs.

In further research, we plan to explore the importance of political, technological and economic factors affecting the quality of the business environment.

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