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Prospects of Introducing Modern Technology into SME Businesses in Ghana

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Abstract

The prospects of introducing modern technology into the operations of Cottage and Small industries has been the focus of most governments in emerging markets due to the enormous benefits it accrues to the economy of nations. The study is aimed at determining the strengths and opportunities linked with introducing modern technology into these local industries. The findings and recommendations of the study will go a long way in identifying the vast prospects of economic benefit to the government and also to the other stakeholders involved. The problem of youth unemployment can be reduced by the introduction of modern technology in the cottage industry as discovered during the study. It is also envisaged that the study will also have some impact when it comes to enriching the body of knowledge on the subject of technology management introduction into cottage and small-scale enterprise businesses in Ghana. The study found out that, prospects for introducing modern technology in the cottage industries are very bright considering that a lot more output could be achieved to bring in more income to cottage groups like weavers, palm oil producers, Shea butter producers, soap and other beauty products producers etc. than the existing traditional methods. It also came out during the study that it is unlikely that the existing small cottage owners/workers would be able to fund the equipments needed for a smooth integration of technology into their businesses. The study concluded that the introduction of modern technology into the cottage industry business is likely to enhance the fortune of the industry as well as create more jobs and therefore stakeholders should liaise with the appropriate authorities including the Trade & Industry ministry and Employment & Social welfare ministry to ensure that the necessary structures have been put in place to enhance the smooth integration of modern technology into SME industry in Ghana.

Keywords: Cottage industry, Technology management, Prospects, Small industries, innovation.

Introduction

Cottage and small-scale industries have attracted the attention of many governments especially in emerging markets seeing it holds huge potential in raising the living standards of the poor in society. Improving the livelihoods of families is not the only reason for giving attention to this segment of people but also the benefit that the country stands to gain from the exports of the products which converts into the badly needed foreign exchange for economies. The important roles that cottage and small-scale business play in economies cannot be overlooked with glaring evidence from countries like India, China, Malaysia, Zambia, South Korea etc. just to name a few. These seemingly negligible industries have the potential to propel economies by their significant contribution to a country's Gross Domestic production (GDP), earnings from exports and reducing youth employment which has become the bane of most governments in emerging markets.

In their submission, Kombo, Justus, Murumba & Makworo (2011), advanced the conception that small scale businesses including agriculture and rural family businesses have contributed greatly to the growth of Kenyan economy for example. They continued to argue that the sector contributes to the national objective of creating employment opportunities, training entrepreneurs, generating income and providing a source of livelihoods for the majority of low-income households in the country accounting for 12-14% of GDP (Republic of Kenya, 1982, 1989, 1992, 1994).

Findings will help to uncover the opportunities available for expanding these cottage and small businesses like the Shea butter, Jewelry and Kente Business through modern technology introduction

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thereby helping to convince stakeholders to adopt the envisaged new technology to render the cottage and small business more lucrative for the unemployed youth and profitable as well.

Conceptual definition

Technology management according to Rothaermel & Hill (2005) involves the application of management skills to the discovery, development, operation, and proper use of technology. Technology managers help create value for their organization by using technology and other resources to solve problems and improve efficiency and effectiveness. Technology is informed by values at every point. Value decisions may be called for not only in relation to the specific design criteria (i.e. aesthetic, ergonomic and economic judgments, suitability for purpose and ease of manufacture) but also in relation to the rightness or wrongness of a particular solution in ethical terms. Chanaron, Jolly & Soderquist. (2002). submits that, although there is certainly a relationship between science and technology, there is, except in certain high technology industries, very little technology that could be classified as applied science. Technology is marked by different purposes; different processes a different relationship to established knowledge and a particular relationship to specific contexts of activity. Change in the material environment is the explicit purpose of technology, and not, as is the case with science, the understanding of nature; accordingly, its solutions are not right or wrong, verifiable or falsifiable, but more or less effective from different points of view. According to Pavitt (1990), technological enterprises are determined not by advances in knowledge nor simply by the identification of needs, but by social interests. Of the potential new technologies available at any one time only a few are developed and become widely implemented. In this way technology is shaped by society, by consumer choice. yet it could also be argued that technology shapes society - the technology of the motor car, for example, has shaped our environment and our whole way of life. The motivating factor behind all technological activity is the desire to fulfill a need. For this reason, all designs should be made or realized - whether that be through prototype, batch- or mass- production or some form of three-dimensional or computer model - if the need is to be truly fulfilled, the design is to be legitimately evaluated, and the design activity is to have been purposeful and worthwhile.

Review of literature

According to Rush, Bessant, Hobday, (2007). technology development seems to have benefited mankind in every sphere of endeavour. Scott (2000) also explains that, our social life, workplace, manufacturing systems, road traffic administration, transportation, just to mention of a few, have all seen immense improvement as technology advances. Cost of doing business is getting increasingly reduced as a result of important break-through in technology. The use of computers and sophisticated machines is really reducing the number of physical human hands that ought to be engaged and this obviously means cut in labour cost and its attendant reduction in production cost. Customer satisfaction is also benefiting from the impact of technology. The management of human resource at work places has witnessed tremendous improvement under the advent of modern technology. In the opinion of Garcia & Calantone (2002), staffs pay system, employee attendance management have all been revolutionized under the aura of technology. Management function is perhaps where technology is seen to have greatly enhanced business administration. Modern Technology enables more efficient management of inventory, enhances communication and goes a very long way to integrate and streamline every facet of management function. This research assignment will discuss the impact of technology on the above areas in addition to analyzing ways through which technology enhances quality, effective management and minimizing lead time in modern under-takings. Prior to doing all that, there is the need to review literature concerning the concepts and definitions of technology management.

Importance of technology on business

Almost all businesses and industries around the world are using computers ranging from the most basic to the most complex of operations. Technology played a key role in the growth of commerce and trade around the world. It is true that we have been doing business since time immemorial, long before there were computers; starting from the simple concept of barter trade when the concept of a currency

was not yet introduced but trade and commerce was still slow up until the point when the computer revolution changed everything. Technology according to Anjum Z. and Hadia B. (2017) has had a large impact on the business environment in terms of telecommuting. With broadband access and computers today, as well as smart phones, employees can work out of their homes, saving the company money by not needing as physically large a space to operate. With video conferencing, business meetings no longer need to be face-to-face, saving on air fare and hotel reservations. Social networking according to Kropsu-Vehkaperä, Haapasalo, and Rusanen, (2009) affects the business environment. Employees are connected to social networks. This can be a double-edged sword, however. An employee might post something about the business publicly which should not be shared. In addition, employees need to understand what gets posted for the public to see can have an impact on the work environment, especially if the employee is posting negative comments about the work environment or other employees.

On the flip side, businesses can use social networks to monitor customer satisfaction. For example, if a customer is not happy with a product and he posts his feelings online, the company can contact the customer and try to resolve any problems. Since social networks have links to friends and family, seeing the company work hard to make things right with the customer might turn the potential loss of a customer into the chance to gain new customers. The impact of technology on a business isn't restricted to business use. A business is also affected when consumers use technology. At one time, the only way some people had to file their tax returns was through going to either a certified public accountant or a professional tax preparer, or doing taxes themselves. The tax code is complex and some people might not have felt secure in preparing their taxes on their own. However, accounting software evolved to the point where many people simply had to answer a series of questions and the computer would do the rest, including filing the information electronically. Pilkington & Teichert (2006) suggest that, the advancement of technology in the workplace has assisted management in creating a more functional work environment. Technology such as video-teleconferencing equipment, data tracking software, and personalized business software has made communication and data sharing between remote offices a breeze. At Bankers Life and Casualty providing potential clients with the most up-to-date benefit and pricing information is very important. Information Tech has revolutionized the phase of business around the world. Local businesses have become international due to a simple website. I.T. has helped businesses in advertising. I.T. has helped in customer service, huge corporations like Microsoft attend to customer needs through email and chat services. Networking internal and external in organizations has improved the working of businesses. Staff and clients likewise can get in touch with the managers for feedback, progress reports and extensions.

Advantages of technology to business

According to Levin & Bernard (2008), technology affects the way companies communicate and establish relations with their clients. In a fast moving and business environment, it is vital for them to interact with clients regularly and quickly to gain their trust and to obtain customer loyalty. With the use of Internet and online social networks, firms interact with consumers and answer all their queries about the product. Establishing effective communication with customers not only creates rapport with them, but it also creates strong public image. It allows business enterprises to reduce and to cut carbon dioxide emissions. With the use of technological innovations, business owners and entrepreneur understand their cash flow better, how to manage their storage costs well and enables you to save time and money. Technology allows employees communicate and interact with other employees in other countries. It establishes clique and prevents social tensions from arising.

Analysis of how technology reduces lead time in organization

In the view of Kropsu-Vehkaperä, Haapasalo, and Rusanen, (2009) lead time can be described as the duration between the point in time at which a customer places order and the point in time at which the final product or services is delivered. Swift delivery of order hinge upon the efficiency of inventory management with the use of technology especially the enterprise resource planning (ERP) software an organization is able to integrate its services so that order received from the sales department is automatically or spontaneously picked up by the production department for the necessary action.

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Through technology supply chain stakeholders especially suppliers of raw materials are able to monitor the inventory position of a company so as to act swiftly as soon as the re-order level is attained. What this means is that product goes on smoothly.

Rationale and Need for the study

The findings as envisaged would help produce more affordable locally produced goods like the Kente cloth, neatly packaged Shea butter wares, other agricultural products on the market and this should positively influence the livelihoods of the society. With the envisaged cost reduction in production, a lot of more local production related businesses would be established to absorb more hands so as to reduce the huge stock of unemployed youth in Ghana and other emerging markets. Those in the export business are likely to raise more foreign currency as a result of selling more at competitive prices. Ghana's foreign exchange reserve position is therefore likely to improve when the research findings are adopted for implementation.

Objective of the study

The main objective of the study is to ascertain the strengths and opportunities associated with introducing modern technology in the traditional way of running the cottage and small industries for example Shea processing and Kente weaving in Ghana. Specific objectives include:

i. To ascertain the strengths associated with introducing modern automated production technology in the cottage and small business of Ghana.

ii. To identify the opportunities emanating from introducing modern technology into the traditional way of production in Ghana.

Identification/defining research problem

According to a World Bank report in June 2017, micro, small, and medium enterprises (MSMEs) drive employment, economic growth, and entrepreneurship across the globe. The report continued to support the fact these MSMEs form a large part of the global economy and in emerging markets, there are between 365-445 million MSMEs, which contribute over 50% of total employment and up to 40% of national income. But unfortunately, many of the owners of these segment of the economy has either been ignored or forgotten. Most of them receive little to no support in any form from the central government. Due to this deficiency, the cottage and small businesses are not able to expand their businesses by introducing modern ways of scaling up their production. It is in the light of the above that the study seeks to explore the prospects and make available for decision makers to understand how to address the issue which has the potential of turning around the economy.

Thesis statement/hypothesis

H^{1}The introduction of modern technology into the cottage and small business industry will greatly improve upon the profit curve of the entrepreneurs.

$H^{1.0}$ The introduction of modern technology will have very little effect on the business prospects of local cottage producers in Ghana.

H^{2} The strengths of introducing modern technology into small businesses operating in Ghana are enormous and will lead to higher turnover for the producer.

$H^{2.0}$ The strengths of introducing modern Technology in small businesses trail behind the associated weaknesses thereby making the move, a non-starter.

H^{3}The opportunities available for introducing modern technology into small and cottage businesses are very enormous and therefore the project is worthwhile.

$H^{3.0}$ The opportunities in the cottage business are not promising and for that matter investing in modern technologies for the local industry will be a non-viable venture.

Literature review

Technology and technology management

Technology Management (TM) is a multi-disciplinary field that is bridging the sciences and engineering disciplines to the business disciplines (Barnes, 2005). Even though TM is closely related

to innovation, they are actually two different disciplines (e.g. technological innovation is different from marketing innovation) that are explained by scholars such as Phaal and Probert (2006). It is argued that technology affects wealth and rent creations of the firms and nations. Therefore, managing technologies especially for technology-intensive industries such as semiconductor and pharmaceutical is crucial in determining the success of the firms. There are many definitions of TM in literature, but the one that is well accepted in literature and TM publications referring TM as: a process, which includes planning, directing, controlling and coordination of the development and implementation of technological capabilities to shape and accomplish the strategic and operational objectives of an organization. Technology management is the set of policies and practices that leverage technologies to build, maintain, and enhance the competitive advantage of the firm on the basis of proprietary knowledge and know-how (Buchanan, 2012).

This is similar to Rush et al (2007) in which they treat technology as one type of knowledge resources that can be divided into tacit and codified technological knowledge. In addition, claims 'the efficient utilization of technological resources is a critical aspect of the management of techno-economic enterprises. The early concept of technology as information holds that the technology is generally applicable and easy to reproduce and reuse (Keller, 2002). However, Brady et al (1997) contend that the early concept of technology contradicts with a strand of literatures on international technology transfer which holds that "technology is conceived as firm-specific information concerning the characteristics and performance properties of the production process and product design". They further argue that the production process or operation technology is embodied in the equipment or the means to produce a defined product. On the other hand, the product design or product technology is that which is manifested in the finished product.

Lee, Kozar, & Larsen, (2003) suggests that technology is mainly differentiated knowledge about specific application, tacit, often uncodified and largely cumulative within firms. Thus, based on this argument, technology is regarded as the firm's 'intangible assets' or 'firm-specific' which forms the basis of a firm's competitiveness and will generally release under special condition. Arthur & Rowe (2011) propose that technology can include information that is not easily reproducible and transferable. Based on this argument technology is seen as "tacit knowledge or firm-specific, secrets or knowledge known by one organization". Technology as the intangible assets of the firm is rooted in the firm's routines and is not easy to transfer due to the gradual learning process and higher cost associated with transferring tacit knowledge (Burgelman, Christensen, & Wheelwright, (2004). Valuable technological knowledge which is the intangible assets of the firm is never easily transferred from one firm to another because the technological learning process is needed to assimilate and internalized the transferred technology (Anderson 1997). Barnes (2005) also considers technology as firm-specific information concerning the characteristics and performance properties of production processes and product designs; therefore, technology is tacit and cumulative in nature. Burgelman et al. (1996) referred to technology as the theoretical and practical knowledge, skills, and artifacts that can be used to develop products and services as well as their production and delivery systems. Technology is also embodied in people, materials, cognitive and physical processes, facilities, machines and tools. Dodgson, Gann, and Salter (2008). argues that technology and knowledge are inseparable simply because when a technological product is transferred or diffused, the knowledge upon which its composition is based is also diffused. The physical entity cannot be put to use without the existence of knowledge base which is inherent and not ancillary. Benamati, Lederer, & Singh, (1998) define technology as the integration of the physical objects or artifacts, the process of making the objects and the meaning associated with the physical objects. These elements are not distinctive and separable factors but form a 'seamless web' that constitutes technology.

Technology transfer

The definitions and concepts of technology transfer have been discussed in many different ways based on the disciplines of research and according to the purposes of the research. Marler, Liang & Dulebohn, (2006). view technology transfer is often a chaotic, disorderly process involving groups and individuals who may hold different views about the value and potential use of the technology. According to them technology often has no definitive meaning or value. Researchers, developers, and

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users are likely to have different perceptions about the technology. A review of literature on technology transfer reveals that technology transfer is a complex, difficult process even when it occurs across different functions within a single product division of a single company. Technology transfer is commonly acknowledged to be a complex process that needs time to evolve (Edler, Meyer-Krahmer & Reger (2002).

Nevertheless, the economic theories for example Solow's (1957) growth model, have often treated technology as given that is embodied in products or processes; where technologies that resemble blueprint, machines, or materials are easily replicated and transferred. The literatures on technology transfer and international technology transfer are extensive and varied in perspective from various disciplines which include political science, economics, sociology, public policy, marketing and management of technology (Scott, 2000). The issues that have been investigated, among other, are technology transfer process, appropriateness of technology, cooperation and conflict between transfer countries, the success of technology transfer, and the social and economic benefits of technology transfer for both suppliers and recipient countries (Liao 2005).

Past literatures have referred to technology transfer as the transmission of know-how to suit local conditions, with effective absorption and diffusion both within and across countries. Other early researchers for example Low, Chen, & Wu, (2011) defines technology transfer as transmission of know-how (knowledge) which enable the recipient enterprise to manufacture a particular product or provide a specific service. As compared to the sale of machinery and equipment, the transfer of technology requires a sustained relationship between two enterprises over a period of time to enable the receiving enterprise to produce the product with the desired level of quality standards and cost efficiency. This is consistent with the earlier argument by Stam & Stanton (2010) who argues that technology transfer does not only transfer the technical know-how (knowledge) required to produce the product to the recipient but also the capacity to master, develop and later produce autonomously the technology underlying the products. In the context of developing countries, Hoffman and Girvan (1990) argue that technology transfer needs to be perceived in terms of achieving three core objectives: 1) the introduction of new techniques by means of investment of new plants; (2) the improvement of existing techniques and (3) the generation of new knowledge.

Since the term "technology transfer" provides many dimensions, it has often been used to describe the process by which ideas and concepts are moved from the laboratory to marketplace the transfer and knowledge and concept from developed to less technologically developed countries and the transfer of inventive activities to secondary users. Phaal, Farrukh, & Probert, (2006) suggest a broader definition by proposing that technology transfer involves an intentional, goal-oriented interaction between two or more social entities, during which the pool of technological knowledge remains stable or increases through the transfer of one or more components of technology.

Technology adoption and diffusion theories

Technology adoption is one of the mature areas of research in information systems. Carr (1999) has defined technology adoption as the 'stage of selecting a technology for use by an individual or an organization while the term diffusion refers to "the stage in which the technology spreads to general use and application" (Rogers, 2003). Therefore, while the term adoption is used at individual level, diffusion can be thought of as adoption by the masses. With rapid strides being made in technology innovations in every conceivable domain, the issues related to technology adoption have gained increasing prominence in recent times. Huge investments are made by organizations and governments for introducing new technologies that have the potential of bringing a paradigm shift in the life-style of the users. However, these investments may not yield results if the innovations are not adopted by the intended users. Initial failure of diffusion of Electronic Health Record (EHR) systems in US and Enterprise Resource Planning (ERP) Systems are some of the examples of the technologies that failed to take off in spite of promising start (Addo & Helo 2011). More recent examples are that of cloud computing and e-Government that were promising in respect of the advantages they offered to the users but still have not been adopted by the users to the extent expected (Low et al. 2011). Several studies have revealed that technology adoption is not related to the aspects of technology alone but has evolved as a much more complex process involving dimensions of user attitude and personality social influence

trust and numerous facilitating conditions. It is necessary to understand the evolution of this research area in Information Systems and look at future research opportunities (Lichtenthaler, 2008).

Adoption and diffusion models

Adoption theory examines the individual and the choices an individual makes to accept or reject a particular innovation (Liao 2005). In some models, adoption is not only the choice to accept an innovation but also the extent to which that innovation is integrated into the appropriate context. Adoption theory, then, is a micro perspective on change, focusing not on the whole but rather the pieces that make up the whole (Roger, 2003). In contrast, diffusion theory describes how an innovation spreads through a population. It may consider factors like time and social pressures to explain the process of how a population adopts, adapts to, or rejects a particular innovation. Diffusion theory takes a macro perspective on the spread of an innovation across time (Kropsu-Vehkapera et al, 2009). There is no one model for understanding the processes in which an individual engages before adopting a new innovation. Historically, adoption is understood in terms of some kind of behavior change (Scott, 2000). Adoption and diffusion of new health behaviors, like smoking cessation or weight loss programs, have been studied in the medical and healthcare fields. Additional models have come out of sociology education and computer science. Whereas the results of adoption theory are measured in terms of behavioral change, the predictors of that behavioral change can be understood through contextual, cognitive, and affective factors. Existing theories deal independently with these factors but no one theory accounts for all three (Roger, 2003). Rogers's theory of innovation diffusion provides a foundational understanding of adoption theories. Rogers's theory has been used broadly across disciplines to comprehend and predict change. Although Rogers's theory is a critical foundation, it is not always easily applied to understanding adoption. Although several research studies seek to understand adoption process, only a few theories are widely used in the current literature. A review of the research in education revealed two primary theories of adoption applied in the current education literature. First, the Concerns-Based Adoption Model (CBAM) has been used to understand change in terms of technology (Luggen & Tschirky, 2003).

The CBAM has been used to understand teacher change in curriculum change and adoption of a consulting teacher model as well as specifically technology change and adoption. In contrast, the Technology Acceptance Model (TAM) and the Universal Technology Adoption and Use Theory (UTAUT) are originally based out of computer science specifically to answer questions about technology adoption (Sahlman & Haapasalo, 2009). They have also been applied to many educational settings including understanding adoption by student teachers, implementation of laptop-based testing, and adoption of online learning. Finally, both adoption and diffusion theories are referred to collectively as adoption-diffusion theory because the individual differentiation of the two is beyond the scope.

Advantages of introducing technology into small businesses

Technology change has been beneficial to both organizations and its employees. The adoption of technology innovations by organizations has exploded over the last few decades with global spending on technology across all industries reaching an estimated $2.6 trillion (Schilling 2008). This growth had been in large part to the use of the internet which has increased by over 200% between the years of 2000 and 2007 based on statistics from Internet World Stats. In general, technology change can bring increased efficiency, improved quality, assist in bringing products to market quicker and expand the skill set of employees'. Technology can also bring benefits such as improved communication, reduced costs and help foster new innovations. Additional benefits may be seen depending on the specific type of technology that is being implemented Luo, Hilty, Worley, & Yager, (2006). With organizations moving to things such as telecommuting, technology can increase participation and involvement with remote employees. Technology can expand the potential pool of participants that are working and collaborating together on projects through shared databases, on internal intranets and the internet. Technology solutions now allow the ability to overcome the limitations of remote employees providing the ability for individual participation and input from all over the world regardless of location. This benefit allows for employees to work at times that are more convenient for them but still provides for collaboration and communication across a team (Rothaermel & Hill 2005).

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According to Agboola & Salawu (2010), new technology can also help organizations stay more in touch with their market. Rapid changes in the economic landscape of today's business environment require action to meet customer expectations. Failure to stay current on customer needs and market changes could result in the loss of any competitive advantage an organization may possess. Additionally, keeping current on the latest technology could allow an organization to seize any possible opportunities that are not being filled by a competitor. Information Technology should help organizations understand their position in relation to their competitors, learn about customers, monitor relationships with suppliers, and control strategic objectives (Affeldt, & Silva 2013). The use of new technology can help make a business more agile and adaptable to the changes going on in their particular market. The addition of new technology can also benefit an organization by helping to shape its strategic vision as well as helping it to gain a competitive edge on their competition (Carr, 1999). Having a strategic vision will help to focus an entire organization on what they are trying to achieve and what their goal is. Doing so will create a competitive advantage that will lead to increased sales, profits and an increased market share. This benefit (strategic vision) also extends to the staff of an organization by communicating where it is going and how that technology is going to help them achieve the vision (Khalil & Bayraktar 1990).

Technology management and implementation strategies

Once an organization has selected and approved a new technology tool, it must be implemented and introduced to employees. Organizations failing to introduce their planned changes successfully can pay a high price that could lead to lost market position, credibility with stakeholders, decreased staff morale, and loss of key employees (Chanaron et al, 2002). When embarking on a technology change that will impact an organization, a great deal of thought must be put into the implementation of that change. Successful implementation of technology change, requires visionary leadership that has considered the benefit, consulted with influential leaders at all levels to identify unintended consequences, identified sources of resistance, and developed a detailed plan to foster the implementation over time (Luo et al 2006). Spending the time to carefully create a well thought out plan for implementation is the key to success. Thought should be put into demonstrating how the new technology will serve all staff and not just management. Failure to communicate this to users may cause the implementation effort to fail despite considerable time and effort spent on the roll out.

Staff impact – communication

The implementation of any new technology should be communicated to staff. Items such as status, benefits, training and expectations should be clearly provided (Carr, 1999). Along with the "what" of the change, the "why" should be emphasized to provide staff with an understanding of the changes that are going to occur and what will be expected of them. To do this effectively the nature of change should be defined and why it is important to the users and is helpful if this definition explains how the change will affect the individuals both personally and professionally (Cetindamar et al, 2006). This message can be provided in various ways depending on the organization and methods they have for communication. Information about the change can be provided through things such as email, newsletters, the company website, staff briefings or town hall meetings.

The communication about the changes should also be tailored to the different levels and roles within an organization as each will react different to the changes that are being made. Open communication between managers and employees is an important part of making a technology change and should be encouraged. Research has shown that employees want to hear about changes directly from their manager so it is vital that open communication take place between management and their employees Dodgson, Gann and Salter (2008). Having an open dialog like this can help to get employee "buy in" and reduce the amount of resistance to the change being made. Getting people talking about the reasons for the change and allowing them to express their views will more than likely get the required backing from employees' for the change that is going to be made. Additional benefits of this communication will allow staff to see how the change and new technology can improve their jobs.

Small and cottage industry and innovation

The textile industry for instance, according to Kadolph (2007) comprises a diverse and fragmented group of establishments that produce and/or process textile-related products like fibres, yarns, and fabrics that are further converted into apparel, home furnishings, industrial goods, and for technical application. Textile establishments receive and process fibers; transform fibres into yarn, or webbing in case of non wovens; convert the yarn into fabric or related products; and dye and finish these materials at various stages of production (Sykas, 2005). The process of converting raw fibers into finished apparel and non-apparel textile products is complex. Conventionally, textile manufacturing is characterized by the use of technologies not only limited to advanced machinery for making textile products but also includes improvements on the production process itself. Application of techniques of industrial engineering, maintenance management and computer aided processes have improved the process further (Low, et al 2011). The continual improvement programmes like Gemba Kaizen has enhanced productivity and quality of products. An independent case study indicated that implementation of Gemba Kaizen management philosophy improved productivity of the company considerably, reduce material wastage and enhance overall profitability (Schraeder, Swamidass, & Morrison, (2006Application of Enterprise Resource Planning in the manufacturing sector has led to improved levels of efficiency in operation, with basic manufacturing modules such as inventory, production planning, procurement, sales, and human resource being linked through an Information Communication Technology (ICT) backbone. The overall effect of the linkages is seamless flow of information and activities right from raw material procurement through to the finished products, and their delivery to the customer (Rogers, 2003).

By use of these technological concepts, the enterprises are able to achieve optimal production of high-quality goods at reduced production costs, thus ensuring customer satisfaction. However, the use of technological concepts finds limited applications in the textile cottage industries. Most cottage industries in the developing countries employ relatively old and or outdated technology in their production, with most production being done manually (Quartey & Abor 2011). There is little or no application of principles of product or process standardization, whereas in developed countries the basics techniques of production have advanced to automation and use of robotics. For the small scale industries to compete effectively within the market and have vertical linkages with big industries they have to improve on their level of productivity, standardize their products and monitor their quality. Textile cottage industries stand to gain immensely through establishment of outsourcing opportunities. For the textile cottage industries to outsource, they are required to put in place production strategies that allows for product quality and standardization in line with respective standard bodies existing within a country. The cottage industries can achieve these by adapting modern technology (Kadolph, 2007).

Technology and small scale (grass root) business

New technologies, according to Liao, (2005) had a great impact on all aspects of life and the global society and economy is undergoing a fundamental transformation. Society is changing and is becoming “knowledge society” more dependent on new technologies, with a new economy or “knowledge economy”, where knowledge and information are essential and the key factor of production and where ideas, processes, knowledge and information are growing share of trade in the knowledge economy (Low et al 2011).

Information and communications technology (ICT) represent an enormous opportunity to introduce significant and lasting positive change across the developing world (Affeldt, & Silva 2013). The rapid penetration of mobile access in particular has resulted in considerable improvements in the lives of the poor in both rural and urban contexts. All evidence suggests that this trend is going to continue, as the availability expands and the cost of access continues to decline. The breathtaking pace of penetration and uptake of mobile telephony and broadband Internet is supporting many new possibilities, products, and services; providing breakthrough ideas in agriculture, health, education, and access to finance; and helping local and international trade. According to Rothaermel & Hill (2005), it also provides new ways of communicating and lobbying, which transcends international borders, as shown by the role of mobile phones and the Internet in the waves of revolution that spread across Northern Africa in 2011.

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In the information society environment successful enterprises produce high technology goods and services and transform human effort materials and other economic resources into product and services that meet customers need (Lai, 2007). In such society, in order to be successful, SME would need high quality information and must always provide superior value, better than competitors, when it comes to quality, price and services. SME are often seen as vital for the growth and innovation of economies and the long term of economic development of the countries depends on the promotion of SME sector. Behind this lies a common recognition that SME play an important and a key role in revitalization and development of national economy in many countries by providing various goods and services, forming a structure of division of labour and developing regional economies and communities (Arthur & Rowe, 2001). Furthermore, SME are considered key agents of social and economic growth and are increasingly becoming the most vital part of the economy since they play a key role in fostering growth, creating jobs and reducing poverty.

Globalization of world economy and technological developments in the two decades of twentieth century have transformed the majority of wealth creating work from physically based to knowledge based and has greatly enhanced the values of information to business organization by offering new business opportunities (Phaal, et al 2006). While, for the last two hundred years, economics has recognised only two factors of production: labour and capital, this is now changing. Information and knowledge are replacing capital and energy as the primary wealth creating assets. Information has become a critical resource, a priceless product and basic input to progress and development. Information has become synonymous with power. Therefore, accurate, rapid and relevant information are considered to be essential for SME (Pilkington, & Teichert, 2006).

SME would need as well as effective information systems to support and to deliver information to the different users. According to Carr (1999) such information systems would include technology that support decision making, provide effective interface between users and computer technology and provide information for the managers on the day-to-day operations of the enterprises. Information is needed for various purposes and serves as an invaluable commodity or product. Information is very important aspect of decision making in all levels of management in enterprises especially in competitive business environment and managers utilize information as a resource to plan, organize, staff administer and control activities in ways that achieve the enterprises objectives. The ability of SME's to realize their goals depends on how well the organization acquires, interprets, synthesizes, evaluate and understands information and how well its information channels supports organizational processes (Chun, 2007).

Research methods

This chapter explains the method used to address the research problem identified in this study. It presents the research design, population and unit of analysis, nature of sample and sampling procedures, type of data and methods of data collection. Also, sources of data, reliability and validity of the research instrument, data collection procedure and data analysis procedure have been discussed in the chapter.
Research design

Creswell (2013) has affirmed experiments, surveys, grounded theory, ethnography and case study as some research designs to help a researcher approach a study. A research design captures the philosophy of the research process including assumptions and values that serve as a rationale for the research and standards that the researcher uses for collecting, unionizing, and integrating the solicited data for unearthing research findings required at drawing research conclusion (Kumar, 2005; Kothari 2004). The quantitative descriptive method linked with the positivist paradigm was used in this study. Again, this research was an ex-post facto study in terms of the researcher's direct control on the independent variables and quantitative as regard to its methods of analysis in achieving the study objectives (Yin, 2009). Following Creswell & Plano (2011) this research design was suitable for the fact that the researcher sought to explore the possibility of introducing modern technology in the cottage & small business industry in Ghana. This design ensured that variables were measured numerically via instruments that allow for data analysis through statistical procedures (Creswell, 2013).

Population of the study

A population is the totality of the objects under the investigation and from whom data was obtained (Zikmund & Babin, 2010). It is a set of all cases of interest that are within the reach of the researcher (Hennink, Hutter, & Bailey, (2011). With respect to this study, all identified cottage and small businesses in selected urban and semi-urban centers as well as officials of stake holder institutions like National Board for Small Scale Industries, (NBSSI), Vegetable producers & exporters, Ghana (VEGPEG) and Ghana Export Promotion Council.

Sample technique, sampling size and sampling procedures

Purposive sampling technique was employed to pick up 80 cottages and small businesses respondents and 60 staff of stake holder organizations

The sample size percentage was obtained by using Spiegel's (1988) formula:

$n = \frac{f}{Ef} N$ where n is the sample size percentage of each study area, N is the total of the sample percentage and f is the number of officials in each study area.

A sample is defined as a smaller unit or representation of an entire population. Booth, Colomb, Joseph & Williams (2008) have confirmed that the size of a sample and the way in which it is selected has implication for the confidence in the data and the extent to which generalization can be made in a research. Normally generalization about population in quantitative studies requires researchers to select large sample size to minimize the likely error in generalizing to population and vice versa. However, it is worth declaring that a sample usually depends on the population size, available resources, and degree of homogeneity or heterogeneity among the population and method of sampling (Kumar, 2005).

In a study like this, a sample depicts any well calculated representative group from which data was solicited for analysis, presentation, and interpretation (Zikmund & Babin, 2010). Reliance on a sample allows researchers to save time and money, gets more accurate information, and also obtains information that may not be otherwise available (Hennink et al, 2011). This study adopted purposive sampling to select its final respondents. The suitability of purposive sampling was justified on the grounds that the researcher wanted to identify specific weavers and officials with in-depth knowledge that should help meet the objectives of the study (Kothari, 2004).

Research instrument

Both interview guide and the questionnaire technique were employed as research instruments to pick-up the relevant information for the study. The use of the questionnaire afforded the respondents the flexibility of using their private leisure time to honor the dictates of the questionnaire. The use of interview guide to solicit information from some owners and workers was borne out of the fact that most of them could hardly read or write and for that matter could not do justice to the questionnaire.

Data sources

Data comprised both primary and secondary sources. In the case of primary sources, the data were accessed through respondents from the questions on the questionnaires and the answers recorded from the interview guide obtained from the operators of small businesses. Secondary source of data came from contemporary scholarly academic papers, relevant articles on technology integration, technology management grass root technology as well as cottage and small businesses in Ghana.

Data analysis

The study adopted the quantitative statistical data analysis technique under which general descriptive statistics through percentage tabulation and figures were used to present analysed data which were interpreted to achieve the objectives of the study. Data analysis primarily dealt with respondents' demographics and issues relating to research questions to meet the objectives of the study. Specifically, elicited quantitative data was analyzed via SPSS (version 21). Data were first edited to ensure completeness, accuracy clarity and uniformity. Edited data were then entered in statistical technique (SPSS) to improve the quality of data for coding and thus actual analysis that categories responses into percentages that were presented with the help of well labeled tables and charts.

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Validity and reliability of measurements

Following Creswell & Plano, (2011) the researcher established the quality of his research against the four criteria of reliability, construct validity, internal validity and external validity. A test of construct validity was carried out to ascertain if the researcher had succeeded in conceptualizing correct operational measures for the study (Yin, 2009). Internal validity aims to find cause for related events in causal explanatory research like this study. Again, external validity details the domain within which findings of this study can be generalized via replication logic. Validity in research implies accuracy of a research instrument, validity of research technique and validity of the research report. The reliability criteria ensured that future researches yield similar consistent results using the same tools and procedures that were used in this study (Winsome & Johnson, 2000). To ensure validity and reliability, the research questionnaire was drafted only after careful review of relevant literature on the research problem to account for all variables in the objectives of the study. The questionnaire was drafted under the guidance of the supervisor for this thesis. The supervisor made sure only relevant items were included. Besides, the questionnaire was pretested on 15 respondents to ensure its validity. The pre-test enabled the researcher to identify irrelevant and ambiguous as well as relatively difficult items and had them deleted, clarified and simplified respectively to suit the study needs. Likewise, simple language was used in the study's instruments to facilitate easy understanding. Further, for consistency, views of respondents were weighed against that of available records in all instances. Moreover, only relevant data were collected to have consistent data as un-attended questions were deleted during data analysis. Finally, Cronbach alpha values were calculated where applicable to ensure reliability in the study's instrument.

Ethical consideration

Creswell (2009) discussed how ethical issues may arise during a study and what researchers envisage during the writing process of a thesis. Creswell described measures that can be taken to reduce the likelihood for ethical issues to develop. Researchers need to assess potential for risk, such as physical, psychological, social, and economic and any legal harm (Creswell, 2009, p. 89). In order to ensure protection of participants, the researcher ensured these ethics. Ethical considerations dealt with moral standards that this researcher considered at all stages of the research. The researcher aware of the ethics associated with studies such as the current one took suitable steps to enlighten respondents on the relevance of the study and the need to sustain confidentiality by not presenting any form of identity on the questionnaire (Kumar, 2005). Silverman, (2013) stressed the importance of ethics in research. Ethical issues in data collection basically relate to respect, beneficence and justice as stated by the Belmont Report. Precise and easy-to-understand language were used to help draw subjects' attention to the risks and benefits associated with their participation, as well as total assurance of respondents' confidentiality (Kothari, 2004). Respondents were also informed of their right to opt out of the study at any point.

Data analysis and discussion

Demographic features of respondents

This segment presents the personal information of and stakeholders institution officials.

Gender and age of respondents

Findings on the gender and age distribution of respondents have been presented in table 4.1.

Table 4.1. Frequency table on gender and age distribution of respondents

Age Range	Male		Female		Total	
Below 30 years	10	7.1%	15	10.7%	25	17.8%
31- 40 years	25	17.9%	30	21.5%	55	39.4%
41 -50 years	20	14.3%	16	11.4%	36	25.7%

51 – 60 years	8	5.7%	12	8.6%	20	14.3%
Above 60 years	1	0.7%	3	2.1%	4	2.8%
Total	**64**	**45.7%**	**76**	**54.3%**	**140**	**100%**

Source: Field Data, (2018)

Table 4.1 – shows that there are more women in the cottage & small business than men. In fact, out of 140 respondents 76 (i.e.54.3%) are women while the remaining 64 (i.e.45.7%) are men. Table 4.1 also indicates that 55 (i.e.39.4%) respondents happened to be younger than 40 years suggesting that the younger persons holds that segment of the economy. It is difficult to explain why unemployment stock levels are high yet the youth especially the are the most engaged in the small businesses. Perhaps when modern technology is introduced a lot more youth will be attracted to this segment of the economy to bring the levels down. This presupposes that if these young professionals were properly motivated through career development activities and sound compensations packages, a lot more professional will learn more risk mitigation skills to help manage the small business sector of Ghana the short lives associated small businesses.

Analysis of Issues Associated with Strengths of Introducing Modern Technology in the cottage and small Businesses.

Presented and discussed here under are analyzed data and discussions in respect of respondents and officials from stakeholder's institutions.

Table 4.6. Frequency table on importance of mobile technology to small businesses

Response Type	**Frequency (Out of 140)**	**Percentage %**
It makes contacts with customers much easier for business growth.	134	95.7
Other potential customer comes on board to do more business.	134	95.7
It's is much easier to contact supplier, of raw material.	129	92.1
Financial institutions could easily pick up information for business growths.	120	85.7
Business and family matters turn to flow properly through use of phone.	121	86.4
Phone facilitate relationship with trade association,	134	95.7
Statutory payments are enhanced through phone application.	133	95.0

Source: Field Data (2018)

It is visible from table 4.6, - that out of 140 respondents interviewed 134 (i.e. 95.7%) respondents noted that the telephone technology really made it such easier for customers to contact them thereby enhancing their business prospects. One hundred and twenty-nine (i.e.92.1%) respondents also pointed out the telephone has made it a lot more-easier to contact suppliers leading to reduction in lead time and helping to produce more for more revenue and by extension more money. This finding is in consonance with views put forward by Selliling (2018) who researched into the impact of technology of grass root business. The source noted that appropriate technology has the propensity of enhancing relationship of producers on one side and customers and raw material supplier on the other side.

Sykas (2005) also adds that technology often change positively the face of doing business. It was the conviction of 121 (8641%) respondents that through the use of telephone other new customers were able to come on board leading business as the fact that family and business matters flow much easily. In the opinion of 120 (i.e. 85.7%) respondent telephone enables their financial institutions to pick up information much more rapidly to aid lending purposes. According to 133 (i.e. 95.0) respondents, one other benefit of telephone to small business has to do with the ease with which statutory payment are conducted. 134 (i.e.95.7%) respondents saw telephone technology as having their business members in

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relating more positively with the trade association. Generally, the respondents saw technology as a good thing to aid manufacturing and business operations. This fact was confined by Cetindammar (2006) who studied the effect of technology on cottage industry operations and upheld the idea that technology really refines products and therefore adds value to the quality of products and services.

Table 4.7. Frequency table on respondents' views on introducing technology

Response Type	Frequency (Out of 140)	Percentage %
Just as the telephone technology promoted my business relationship so will a new weaving technology enhance my operation.	136	97.1
A new weaving technology will make our wares neater and more attractive.	129	92.1
The new technology will help us to produce more in a short time.	134	95.7
New technology will enable us expand our operations and take on more people.	134	95.7
The envisaged new technology will help come up with new designs that should help expand our product profile.	130	92.8
Introducing technology will help conduct series of research that will help stabilize the industry.	134	95.7
By introducing technology, the industry will become very attractive for the youth to join the industry.	129	92.1

Source: Field Data (2018)

Findings of the study

Based on information gathered from the field, the following findings can be registered:

Usefulness of telephone technology to small businesses

The study revealed that some of the importance of phone technology to small and cottage business includes the fact that:

- It makes contacts with customers much easier for business growth.
- Other potential customer comes on board to do more business.
- It is much easier to contact supplier, of raw material.
- Financial institutions could easily pick up information for business growths.
- Business and family matters turn to flow properly through use of phone.
- Phone facilitate relationship with trade association,
- Statutory payments are enhanced through phone application

Benefit to government from introduction of technology into small businesses

It came out from the study that; government could benefit from technology introduction in cottage business which includes the fact that more jobs will be created to reduce the unemployment stock in the country. These businesses are likely to make higher profits leading to improvements in their purchasing power and invariably increase their contribution to the national GDP and with the small businesses becoming less stressful a lot more investors will come on board leading to paying more tax revenue to the state. Furthermore, improvement in foreign exchange reserve position of the country will lead to comfortable exchange rate with positive effect on macro-economic indicators like interest rate, inflation, etc. With more innovative machines coming through the ports as well as weaving materials, government agencies are likely to collect more import duty revenue to the state.

Strengths of technology introduction in small businesses

It came to light that, strengths of technology introduction in cottage business include:

- Businesses can save time and do more to raise more revenue.

- There will be proper management of inventory.
- Product will be neater with technology introduce.
- Efficiency will be embraced to rake in more profit.
- Generally, output will be increase to improve business fortune.
- Technology will shorten lead time for receiving raw materials and delivery finished products to increase profit.

Opportunities in introducing modern technology in small & cottages business

The study gathered that, opportunities in introducing modern technology in small business includes the fact that;

- Price of products is likely to come down thereby making them affordable to a lot more people.
- Government of Ghana is likely to raise more foreign exchange to strengthen its spending.
- Production increasing revenue and profit accruing to weavers will increase.
- Cottage and small business will appear lucrative and therefore attract the youth into the industry.
- With supply chain activities increasing more jobs will be created to reduce the huge stock of jobless youth.

Summary, conclusion and recommendation

The objective of this study was to analyse the prospects of introducing modern technology into the operations of small businesses and cottage industries. Specific objectives include ascertaining the strengths associated with introducing modern technology into the small business segment of the economy of Ghana and also to identify the opportunities emanating from prudent management of the technologies. The importance of the study lies in fact that the findings and recommendations will go a very long way to enrich the body of knowledge on the subject of improving the operations of small production businesses in Ghana. Once the introduced technology is managed well, these businesses can explore the possibility of further enhancing prospects in the business through joint venture-ship and other business collaborative deals. The findings if implemented well will empower cottage and small businesses to raise more foreign currency as a result of selling more at competitive prices.

The study also featured the research design, population of the study, sampling technique, research, instrument, questionnaire distribution and data collection and data analysis. Purposive sampling technique was employed in selecting the respondents for the study while statistical Package for Social Science (SPSS) facilitated the analysis of field data. Findings of the study were presented and analysed and these were arranged in consonance with the order in which the research objectives of the study were indicated.

Conclusions

The study sought to explore the prospects of introducing new and modern technology in the cottage and small businesses in Ghana building upon the traditional way of production. The study concludes that it is highly feasible to introduce modern technology in the industry because the strengths of increasing industry revenue thereby raising the standard of living of the traditional cottage or small business is very high. A lot of opportunities also exist to increase the foreign exchange reserves of the country as well as creating more jobs to reduce to high unemployment levels amongst the youth. With prudent advice and management of the technology to be introduced, the prospects are very high and feasible.

Test of hypothesis

The first hypothesis that the introduction of modern technology in the cottage and small businesses business in Ghana will help increase the profit curve of the entrepreneurs is accepted and its null hypothesis H1.0 rejected. This is because it came out from the study that such technological innovation will not only result in more products and more revenue within much shorter times but also attract the youth to take up traditional vocations thereby strengthening the sustenance of the industries. The second hypothesis that the strengths of introducing modern technology are enormous and that these will lead

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to higher turnover to existing traditional local businesses is also upheld and its null hypothesis i.e. $H_{2.0}$ rejected. This emanates from the fact that the introduction will attract lot investors whose activities could help raise income levels in the cottage and small trade. The third hypothesis that the opportunities in the cottage business are enormous and that introducing modern technology into the industry is accepted and its null hypothesis $H_{3.0}$ rejected because the study found out that the new technology will help create jobs to reduce unemployment stock as well as assist in augmenting the foreign exchange reserve levels of the country.

Recommendation

Considering the opportunities and strengths uncovered in the study, the following recommendations can be made: First and foremost, the government must make it a policy plan through the 1D1F agenda to deliberately propel the economy through empowering the entrepreneurs of these small and cottage businesses by helping them to secure soft loans for expansion. This should be done by engaging both local and foreign partners to secure modern equipments which will be used in achieving this goal. For this to be achieved, Hoffman and Girvan (1990) argue that technology transfer needs to be perceived in terms of achieving three core objectives: 1) the introduction of new techniques by means of investment of new plants; (2) the improvement of existing techniques and (3) the generation of new knowledge. Finally, the government must actively engage private partners who will be willing to support this agenda knowing the enormous benefit this will bring to the economy.

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