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ASSESSMENT AND IMPLEMENTATION OF UPGRADED ON BUTTON HOLE AND BUTTON ATTACH MACHINE IN CASE OF DEBR BRHAN CLUSTER

Bahir Dar University

Ethiopian Institute of Textile & Fashion Technology

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ETHIOPIAN INSTITUTE OF TEXTILE AND FASHION TECHNOLOGY

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ASSESSMENT AND IMPLEMENTATION OF UPGRADED ON BUTTON HOLE AND BUTTON ATTACH MACHINE IN CASE OF DEBR BRHAN CLUSTER

By

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A Thesis Submitted to the
Ethiopian Institute of Textile and Fashion Technology
In Partial Fulfillment of the Requirements for the
Degree of Master of Education
In
Garment Technology

Under the Supervision of

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ABSTRACT

Technology adaption has emerged as an important determinant of competitiveness in recent global trade. Gaining competitiveness in the mass production became a driving force for the garment firms to adapt technologies. However, the status, activities, and organizational factors that affect the level of technology adaption by garment manufacturers. The purpose of this study was the assessment and implementation of upgraded on button hole and button attach machine in case of Debre Brihan cluster. Purposive technique and a descriptive survey methodology are employed to collect data. The survey using a structured questionnaire, observation check list and oral question was prepared. The data was analyzed using the SPSS software package, version 20.0. The results revealed that firm size 6 enterprise used and 23 enterprise not used button hole and button attach machine positively influences by the technology adaption are technical skills, cost, quality and productivity have significant result on the technology adaption. The results were discussed in terms the assessment of technology adaption in buttonhole and button attaching machine in garment manufacturing. It was used mean and standard deviation to test the hypotheses using Z test result revealed a statistically significant difference between the perceptions of the four groups with, questioner mean response used of button hole and button attach machine calculated Z-values =0.54 less than the critical values =0.7123 at 0.005 percent level of significance. The null hypothesis was therefore accepted. Implementation giving training used button hole and button attach machine on dress shirt, casual pants and men jacket from the three result also the casual pants operation of sew buttonhole on top of front, sleeve placket & cuff (5 pc) of according to Singapore JUKI standards SMV is =0.58 and productivity standards =104/hrs and after training SMV=0.63/min productivity (produces quantity=96/hrs so the gap minimized to standards after training.

Key word: -Assessment, Implementation, Technology, Adaptation, Buttonhole machine, Button attach machine.

ADVISORS' APPROVAL SHEET

ETHIOPIAN INSTITUTE OF TEXTILE AND FASHION TECHNOLOGY (EITEX)

POST GRADUATE STUDIES AND PROJECT DEVELOPMENT OFFICE

This is to certify that the thesis title **"Assessment and implementation of upgraded on button hole and button attach machine in case of Debre Brihan cluster."** Submitted in partial fulfillment of the requirements for the degree of masters with specialization in master garment technology the post graduate studies program of the Ethiopian institute of textile and fashion technology, and has been carried out by ZELEKE H/GIORGIS ID. No. MGT/S/029/07, under my supervision, therefore, I recommend that the student fulfilled the requirements and hence hereby can submit the thesis to the institute.

_____	_____	_____
Name of major advisor	signature	Date
_____	_____	_____
Name of co- advisor	signature	Date

APPROVAL PAGE

I certify that I have supervised /read this study and that in my opinion it conforms to acceptable standards of scholarly presentation and is fully adequate, in quality and scope, as a thesis for the fulfillment of the requirements for the degree of masters of garment education**.**

_____	_____	_____
Supervisor co-supervisor	Academic status	Signature
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(Examination committee member)

This thesis was submitted to the Ethiopian Institute of Textile and Fashion Technology Bahir Dar University and is accepted as a fulfillment of the requirement for the degree of masters of garment technology.

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Declaration

I hereby declare that the thesis is submitted in the fulfillment of the Master's degree is my own work and that all contributions from any other persons or sources are properly and dual cited. I further declare that the material has not been submitted either in whole or in part, for a degree at this or any other university in making this declaration, I understand and acknowledge any breaches in this declaration constitute academic misconducts, which may result in my expulsion from the program me and/or exclusion from the award of degree.

Name: ZELEKE H/GIORGIS

Signature: _____

Date:_____

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LIST OF ABBREVIATIONS

CADCAM	Computer aided design and computer aided manufacturing
CAD	Computer aided design
CNC	Computer numerically controlled
A	Agree
D	Disagree
GTP	Growth and Transformation Plan
GoE's.	Governments of Ethiopia
HRD	Human resource development
M&E	Monitoring and evaluation
MFA	Multi Fiber Arrangement
MoUDH	Ministry of Urban Development and Housing
MSEs	Micro and small enterprises
NGOs	None governmental organizations
R&D	Research and development
SPSS	Statistical Package for Social Science
SMV	Standard minute value
SD	Standard deviation
SD	Strongly disagree
SA	Strongly agree
U	Undecided
UNESCO	United nation educational, scientific and cultural organization.
UNIDO	United Nations Industrial Development Organization
UK	United Kingdom
WTO	World Trade Organization

CHAPTER ONE

INTRODUCTION

1.1. Background

Ethiopia is one of the fastest developing economies in the world. Small enterprise is major players in the economic resurgence. They are instrument of change and vehicles of growth and diversification. The industrial sector is contributing its share to the expansion of employment, export and entrepreneurship (Sreepada Hegde, 2015).

Today rapid industrialization is one of the most pressing needs for many countries in the African Continent. The small enterprises/industries occupy a strategic position and play a vital role in fulfilling the socio-economic objectives of any nation. Ethiopia possesses the second largest population in Sub-Saharan Africa, 88 million, which could provide the necessary workforce for labor-intensive industries (Sreepada Hegde, 2015).

The rapid economic growth, achieved by Ethiopia during the past 12 years, has been the result of its economic and social development programs as well as the measures the country has taken to build good governance. In recognition of the vital role micro and small enterprises (MSEs) play in the country's economic and social development, much attention has been paid by government of the Federal Democratic Republic of Ethiopia to the development of MSEs. According to Ministry of Urban Development and Housing (Second Edition March 2012, edit April 2016, Addis Ababa) The Micro and Small Enterprise Development Policy and Strategy is evidence of the focus given to MSE development.

The Micro and Small Enterprise Development Policy and Strategy prepared by Ministry of Urban Development and Housing (MoUDH) takes into account the experience gained in the implementation of the MSE component of the Industry & Urban Development Package (2006) that formed part of the Ministry's contribution1 to GoE's Plan for Accelerated and Sustained Development to End Poverty (2005/06-2009/10), as well as analysis of best practices from other countries. The major aims of the Micro and Small Enterprise Development Policy

and Strategy are to build further the gains achieved in MSE development to date, fulfill the objectives of next five year's Growth and Transformation Plan (GTP) as well as attain the MSE development targets set by GoE's.

Now, not a single area of the human life and development is exempt from technological up- gradation and development. If truth be told, we are being steered by technology and that is the sign of a civilized living which is not vulnerable to natural obligations or geological limitations as we quickly notice in the wildlife. (Jerome R. Ravetz 1971) In the modern world, no sane person can ever afford to be against technological development.

Process parameters and the aspects of their interaction should be known and obvious if technological operations of garment sewing for a particular situation are to be determined. Most of the measurements performed to this end used to be done by hand, with stop watches or smoother simple measuring equipment. As individual technological operations are of extremely short duration, it is rather awkward to perform measurements and write down the results by hand, not to mention the subsequent analysis of the results obtained, which is a time-consuming and tiring job The pace of technological innovation for sewing operations in the garment industry was slow up to the beginning of the 1980s as it concentrated on manufacture of faster and more durable sewing machines and the development of attachments for specialized tasks. The major technological changes occurred in 1980s when micro-electronics penetrated all stages of garment production. These are used either to speed up production on task dedicated machines or increase flexibility of multi-purpose machines (Konzen& Locker, 2000).

Industrial sewing is one of the most common operations in the manufacturing of garments, shoes, upholstery and technical fabrics for automobiles. Every day, millions of products ranging from shirts to automotive airbags are sewn using industrial sewing machines. Heavy industrial sewing, such as that used in the manufacture of automobile seat cushions, backs and airbags, requires not only high production but also high sewing quality (i.e. better appearance and seam strength). Typically, the material being sewn includes single and multiple plies of

fabric or leather, sometimes backed with plastics, and needle heat-up is a major problem on the sewing floor. In recent years, in order to increase production, high-speed sewing has been extensively used. Currently, sewing speeds range from 1000-6000r/min. In heavy industrial sewing, typical sewing speeds range from 1000-3000r/min (Konzen & Locker, 2000).

Constant innovation and adaption of new technology becomes an essential element for competitive advantage in the global market because firms can maintain quick and flexible responses to market demand using the technologies (Özçelik & Taymaz, 2004). While developing countries have disadvantages in developing and exporting advanced technologies due to capital intensiveness, adoption of the technologies can increase their manufacturing industries' performances (Kumar & Siddharthan, 1994). A firm may adopt or borrow technology already in use within the industry (Gopalakrishnan & Damanpour, 1994).

There are two groups of technologies in the manufacturing industries (Wiarda, 1997):

1) Hardware technology and
2) Software technology.

Typically, the hardware technologies include: automated identification stations; automated inspection stations; automated material handling devices; computer aided design work stations; computerized numerical control machine tools; numerical control machine tools; programmable production controllers; robots; and shop-floor control systems (Wiarda, 1997). Example of software technologies include: computer-aided manufacturing; computer-aided engineering; statistical process control; production planning/inventory management software; engineering data management; computer aided process planning; local area networks; and group technology (Wiarda, 1997).

Traditionally, high technology and R&D activities have been less prioritized in the garment manufacturing industry. The industry runs on three basic operations: cutting, stitching, and pressing/finishing. While the typical production is a combined process of various specialized and/or general machines operated by

manual/mechanical/electronic devices by skilled and unskilled labor of diversified organizational production activities (Bhavani & Tendulkar, 2001).

However, in many instances, the production involves manual operations of machines and materials of automated assembly. Since the material need proper feed through the machines, automation is limited (Bailey, 1993). Therefore, the technology adaption in the industry has primarily been mass-production focused, and technology development and usages have been limited.

In recent days, however, the change in the market trends and fast fashion styles reduced demands for mass production models. It has been reported that apparel executives believe that industry competitiveness depends upon the ability to quickly respond to demand with a variety of practices and better engineering practices (Bailey, 1993). Desired levels of production and quality can be achieved by adoption of newer technologies and techniques. Apparel makers strive to cope with ever-changing fashion styles by reducing the time it takes to design, produce, and deliver the goods (Bailey, 1993). In this environment, technology to support such needs emerged as an important source of competitiveness..

1.2. Statement of the problem

Debre Brihan town are 52 garment enterprise in garment manufacturing from the above 6 medium level MSEs working on production of garment but there are not using button hole and button attaching machine. Most of their customers complain about the quality of the products they produce, the services they render and time. Most of them do not using good technology. Moreover, they use traditional tools and equipment's for their production and service which is time consuming and costly. Therefore, for these reason this research work is initiated and designed made have focused and explores how the technology adaptation practice looks like and find out the assessment and implementation of upgraded on button hole and button attach machine in case of Debre Brihan cluster. Where this study is conducted in Debre Brihan was founded by Emperor Zara Yaqob, in response to a miraculous light that was seen in the sky at the time. offers the

date of 1456 for the date of the founding of this church, the Town in the North Shewa Administration Zone of the Amhara Regional State, 130 km North of Addis Ababa the Capital city of Ethiopia. This research answers the following questions.

1. What is the current practice of impacts of technology adaptation in button hole and button attach machine in case of Debre Brihan cluster?
2. How effective are the garment enterprise in implementing the button hole and button attach machine in case of Debre Brihan cluster?
3. What are the challenges to implement button hole and button attach machine in case of Debre Brihan cluster garment enterprise?
4. What are the roles and the current contributions of the button hole and button attach machine in case of Debre Brihan cluster garment enterprise?

1.3. Research Purpose and Objective

1.3.1. Purpose of the thesis

The purpose of this study is to assess the status of technology adaption and examine organizational factors that facilitate technology adaption in the garment manufacturing. To test the hypotheses, primary data for this study was collected through survey using questionnaire and observation and finally To give train to operate, Show the major gap between the current practice, the standard operation and after giving the train to effectively use of machine and Give recommendations that are not use button hole and button attach machine in 23 enterprise.

1.3.2. General objectives

This thesis is to explore the overall assessment how technology practiced and implementation of the assessed result on technology adaptation in button hole and button attach machine in case of Debre Brihan cluster**.**

1.3.3. Specific objectives

- ❖ The assessment on the current practice on technology adaptation in button hole and button attach machine in case of Debre Brihan cluster.

- ❖ Identify how a basic principle of technology adaptation in button hole and button attach machine in case of Debre Brihan cluster garment enterprise
- ❖ Investigate the role and the current practice of the in the technology adaptation in button hole and button attach machine.
- ❖ To give train to operate button hole and button attach machine in case of Debre Brihan cluster garment enterprise.
- ❖ Show the major gap between the current practices, the standard operation and after giving the train to operate button hole and button attach machine in case of Debre Brihan cluster garment enterprise.
- ❖ Give recommendations that are not use button hole and button attach machine in case of Debre Brihan cluster garment enterprise.

1.4. Justification

Debre Brihan Garment enterprise is un-competitive in case of underutilization of machine and resource in button hole and button attaching technology adaptation. This research necessary to assessment and implementation of upgraded on button hole and button attach machine in case of Debre Brihan cluster. The research is to adapt for small and medium level garment manufacturing enterprise and open opportunities for local manufacturer and retailer that button attaching and buttonhole machine, because it has a great impact on delivery of quality product with needed amount in a short time to competent in the market and reducing cost in case of Debre Brihan cluster of North Shewa zone in Amhara region

1.5. Significance of the thesis

The study helps to identify their drawbacks and which variables affecting the efficiency, Maximize capacity utilization in buttonhole and button attaching to improve the technology adaptation and implement the machine and give training to the buttonhole and button attaching machine for garment enterprises in Debre Brihan cluster.

1.6. Benefits and beneficiaries of the thesis

1.6.1. Benefits

The benefits of this thesis work are directly related to satisfying and increasing incomes agreed quality maintenance of the garments reduces production costs, increase productivity and quality of production the garment enterprises members of Debre Brihan town.

1.6.2. Beneficiaries

The major beneficiaries of this Thesis work are the following;

- Small and medium scale garment manufacturing enterprises
- Ethiopia textile and fashion technology institute
- researchers
- Government of the country
- Customer

1.7. Scope of the study

The scope of the study is to assessment button attaching and buttonhole 29 enterprise and implementation of technology adaptation in button hole and button attach machine in case of Debre Brihan cluster.

1.8. Limitation of the Study

The researcher faced shortage of reference materials in the library, there were no related studies on assessment and implementation of upgraded on button hole and button attach machine in case of Debre Brihan cluster and there is shortage of time. These and other aspects may affect the quality of the thesis.

CHAPTER TWO

LITERATUREREVIEW

2.1. Introduction

Global trend of garment industry majorly related to the intense laborious activities. A systematic synchronization of process and operational parameters are required to produce a one piece of complete set of product. By optimizing productivity industry can able to optimize the raw material and other resources like men, material, and machine, time, space, capital etc.(Suprit Borse,2016)

Garment industries in developing countries are more focused on sourcing of raw material and minimizing delivery cost than labor productivity because of the availability of cheap labor. Due to this, labor productivity is lower in developing countries than in the developed ones (Paneru, 2011).

Traditionally operated garment industries are facing problems like: - low productivity, longer production lead time, high rework and rejection, poor line balancing, low flexibility of style changeover (B. Naveen*., 2012)

The term handling is normally used to describe those elements that are not sewing and it is this handling along with that dealing with garment bundling where they exist, plus various aspects of machine attention and personal needs, that make up 80 percent of the time spent working by most sewing machinists (Raihan, 2016).

The contribution of new technology to economic growth can only be realized when and if the new technology is widely diffused and used. Diffusion itself results from a series of individual decisions to begin using the new technology, decisions which are often the result of a comparison of the uncertain benefits of the new invention with the uncertain costs of adopting it. An understanding of the factors affecting this choice is essential both for economists studying the determinants of growth and for the creators and producers of such technologies.

Unlike the invention of a new technology, which often appears to occur as a single event or jump, the diffusion of that technology usually appears as a

continuous and rather slow process. Yet it is diffusion rather than invention or innovation that ultimately determines the pace of economic growth and the rate of change of productivity. Until many users adopt a new technology, it may contribute little to our well-being. (As Nathan Rosenberg said in 1972), “in the history of diffusion of many innovations, one cannot help being struck by two characteristics of the diffusion process: its apparent overall slowness on the one hand, and the wide variations in the rates of acceptance of different inventions, on the other.”

Thus understanding the workings of the diffusion process is essential to understanding how technological change actually comes about and why it may be slow at times. Diffusion can be seen as the cumulative or aggregate result of a series of individual calculations that weigh the incremental benefits of adapting a new technology against the costs of change, often in an environment characterized by uncertainty (as to the future evolution of the technology and its benefits) and by limited information (about both the benefits and costs and even about the very existence of the technology). Although the ultimate decision is made on the demand side, the benefits and costs can be influenced by decisions made by suppliers of the new technology. The resulting diffusion rate is then determined by summing over these individual decisions (As Nathan Rosenberg said in 1972), The most important thing to observe about this kind of decision is that at any point in time the choice being made is not a choice between adapting and not adapting but a choice between adapting now and deferring the decision until later. The reason it is important to look at the decision in this way is because of the nature of the benefits and costs. By and large, the benefits from adapting a new technology, as in the wireless communications example, are flow benefits which are received throughout the life of the acquired innovation. However, the costs, especially those of the non-pecuniary “learning” type, are typically incurred at the time of adaption and cannot be recovered. There may be an ongoing fee for using some types of new technology, but typically it is much less than the full initial cost. That is, ex ante, a potential adapter weighs the fixed costs of adaption

against the benefits he expects, but ex position, these fixed costs are irrelevant because a great part of them have been sunk and cannot be recovered.

(As Nathan Rosenberg said in 1972), this argument in turn implies two stylized facts about the adaption of new technologies: first, adaption is usually an absorbing state, in the sense that we rarely observe a new technology being abandoned in favor of an old one. This is because the decision to adopt faces a large benefit minus cost hurdle; once this hurdle is passed, the costs are sunk and the decision to abandon requires giving up the benefit without regaining the cost. Second, under uncertainty about the benefits of the new technology, there is an option value to waiting before sinking the costs of adoption, which may tend to delay adoption.

2.2. The Role of Technology in Garment Manufacturing

A firm's quick response to compete in the global market depends on the extent of manufacturing technology adapted and its integration of this technology into business operations. Constant innovation and adaption of new technology becomes an essential element for competitive advantage in the global market because firms can maintain quick and flexible responses to market demand using the technologies (Özçelik &Taymaz, 2004). While developing countries have disadvantages in developing and exporting advanced technologies due to capital intensiveness, adaption of the technologies can increase their manufacturing industries' performances A firm may adapt or borrow technology already in use within the industry (Gopalakrishnan & Damanpour, 1994).

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2.3. Technology Transfer, Adoption and Diffusion

New technologies have enabled acquisition of industrial technology which has been an underlying factor in diversification of export and economic growth of countries globally. To be able to compete effectively in the global market, there is need to use technologies as they change (Lall, 2001) and this entails upgrading technologies, skills and productivity in existing activities. Advanced technology has challenged the producers in developing countries by undermining their cost advantage and presenting them with new parameters of competition.

Due to the nature and speed of technological innovations and the accompanying organizational changes, developing countries are finding it more difficult to keep up with these changes and, therefore, the technology gap between them and the developed countries is increasing. These trends affect not only the direction, composition and volume of international trade in textiles and apparel, but also the industrialization process and labor markets at country and regional level. The dynamics of globalization can propel faster industrial growth hence technological transfer is inevitable. Adjusting to increased global competition has placed

unprecedented demands on industrial capabilities; hence, institutions should be enhanced to deal with the challenge of global competition. To respond to globalization opportunities, the industrial sector will need significant upgrading of manufacturing capabilities (United Nations Industrial Development Organization, 2002). Developing countries are more involved in technology transfer and in most cases the adaption of technology (Andrej, 2005):

The ability to diffuse technologies rapidly and effectively is vital to success. To use new technologies, there is need for investment by the user in order to create new skills, information and institutional support. Mastering technology requires continuous upgrading and deepening of technologies, human capital and supporting networks (Lall, 2001). Scientific and technical manpower resources would also be needed for the transfer of technology from abroad and its adaptation, upgrading and assimilation in the economy (Gupta, 2004). Developing technological competence has long been identified as one of the most complicated issues facing developing countries today. Ethiopia has limited and fragmented technology support systems as with other Sub-Saharan countries, and this affects the technology adaption process (Wignaraja & Ikiara, 1999).

Adaption of technology is not an automatic process, but occurs gradually as some users wait to see how it has worked for the others (Moore, 1991). When adapting technology the gains are more at early stages of adaption but with high risks (Rogers, 1995). To remain competitive some industries are at the forefront seeking new technology in the market and evaluating the gains they will derive from adapting it. Educationalists have a great role to play in the adaption process, as they put the necessary structures in place to ensure appropriate knowledge is transmitted. Both universities and apparel industries should work together if training is to be relevant. For technology to be transferred, expertise is fundamental. Knowledge and technological progress have become more important to the realization of economic prosperity within an integrated world economy (UNIDO, 2002). These forces are exerting profound influence on the industry, applying manufacturing context based on knowledge and technological

progress. Learning is considered the key to the effective transfer and diffusion of technology and to achieving innovation, industrial growth and international competitiveness (Mytelka, 1998). Competitiveness is sustained by continuously improving products, processes, customer services and management Routines. Investment in education, research and development is crucial in ensuring technological competitiveness.

Innovations according to (Rogers 2003), diffusion is the process by which an innovation is communicated through certain channels over time among the members of a social system and by which alteration occurs in the structure and function of a The Journal of Technology Studies 51 social system as a kind of social change. Diffusion is an extremely critical process for the practical use of innovation and reinvention. In other words, diffusion plays a pivotal role in helping the adopters fully take advantage of an innovation and to modify that innovation. Thus, the comprehension of the major issues in the diffusion process is essential for making technology transfer successful. Diffusion consists of four key elements: innovation, communication channels, time, and a social system (Mahajan & Peterson, 1985; Rogers, 2003).

The issues of diffusion can be analyzed based on the main elements in the diffusion. According to (Rogers 2003), innovations have five common characteristics that help to explain the rates of adaption; these can be relative advantage, compatibility, complexity, trainability, and observe ability. He argued that the greater relative advantage, compatibility, trainability, and observe ability and the less complex the perceptions of an innovation are, the faster the rate of adaption. Change agents need to use this implication to speed up the rate of diffusion and to make the potential adopters recognize the need for change. In the diffusion process of innovations, the information exchange occurs through a variety of communication channels, such as mass media, interpersonal channels, or interactive communication (e.g., via the Internet). More effective communication occurs when two or more individuals are similar (i.e., homophonous). However, some degree of heterophony, the degree to which two

or more individuals who interact are different in certain attributes, is usually present in communication about innovations (Rogers, 2003).

2.4. Technology Transfer, Organizations, and Culture

The three main aspects of technology practice are cultural, organizational, and technical (Pacey, 1986). Both the concept of maintenance and these three aspects of technology should be considered when making a technology transfer successful. However, most people tend to consider only the technical aspects, such as knowledge, skills, techniques, machines, and resources, in the technology transfer process. This lack of insight could be one of the biggest obstacles to making the technology transfer successful. Without a thorough analysis of both organizational and cultural issues related to technology, successful technology transfer cannot be expected. Technological advances tend to increase complexity and uncertainty, make end users dependent on specialized experts, and build new knowledge hurdles for potential adapters. In cases of the diffusion of complex production technologies, knowledge and technical knowhow become important barriers to diffusion. Most organizations delay in-house adaption of complex technology until they obtain sufficient technical know-how to both implement and operate it successfully. Reinvention and learning-by-doing might be responses to the difficulty or incompleteness of technical knowledge transfer between donor and recipient organizations (Attewell, 1992).

Technical know-how is relatively immobile, and it must be recreated by user organizations. As a result, the burden of developing technical know-how through organizational learning becomes a hurdle to adapting new technology. Given such hurdles, the relationships between donor and recipient organizations in a network go beyond selling and buying equipment. Service is an alternative to adopting or not adopting a technology. In such a case, consumers obtain the benefits of a new technology by having someone else provide it as a service, rather than by taking on the formidable task of organizing the technology in-house for themselves (Attewell, 1992). In such scenarios, knowledge barriers are

lowered and the process of technology diffusion is accelerated. Organizations that have already experienced the benefits of a technology via a service provider constitute a pool of already-primed potential adopters that are likely to adopt technologies in house once knowledge issues or other barriers are removed (Attewell, 1992). Consequently, a transition will occur from service to self-service. In other words, shifts from market services to in-house deployment result from a progressive lowering of know-how barriers. Lowering knowledge and technical knowhow barriers could be achieved by the efforts of both donors and recipients of technology. Donor or generations must innovate, not just in their design of products, but especially in the development of novel organizational mechanisms for reducing the knowledge or learning burden upon recipient organizations. Recipient organizations should try to create and accumulate technical know-how regarding complex, uncertain, and changing technologies. This implies that HRD professionals should capitalize on a learning organization strategy as a framework for the successful transfer of technology. A learning organization focuses on the values of continuous learning, knowledge creation and sharing, systematic thinking, a culture of learning, flexibility and experimentation, and a people-centered view (Watkins & Marsick, 1993). This strategy is regarded as one of the most effective organizational strategies to use for adapting changing technologies. If the learning organization expands the concept of learning from the individual level to the team and organization level, this can help organizations effectively and efficiently create and accumulate technical knowhow. Such a strategy for learning will contribute to enhancing the implementation of technology transfer as well as organizational performance In addition; HRD professionals should try to create an environment that can induce the motives of both organizations and individuals to adapt new technologies for successful technology transfer. To do so, HRD professionals should strive to provide their potential users with opportunities to observe the benefits of new technologies.

2.5. Factors affecting technology

Transfer Technology transfer implies the movement of physical structure, knowledge, skills, organization, values and capital from the site of generation to the receiving site (Mittelman & Pasha, 1997). The invisible aspects of technology, such as knowledge, skills, and organization, might be much more critical than the physical aspects for the successful transfer of technology. The case of the "Green Revolution" in India shows that technology is a form of knowledge created by humans, and knowledge transfer occurs as the outcome of a set of learning experiences (Parayil, 1992). This illustration implies that education and training play an important role in facilitating the movement of invisible aspects of technology. In other words, the capacity to assimilate, adapt, modify, and generate technology could be obtained through education and training. The significance of education and training is also found in the cases of Japanese industrialization and Indonesian farm mechanization. In the early stage of Japanese industrialization, science and engineering universities and company schools contributed to facilitating the transfer of a marine steam turbine generator by providing capabilities for learning the new technology (Matsumoto, 1999). The capability of Japanese companies, acquired through education, made it possible to actively seek out new technology for the purpose of gaining competitive advantages, despite the economic risks. On the contrary, Indonesian farmers failed to transfer agricultural machines for farm mechanization because of the lack of education, training, and other political and compatibility issues (Moon, 1998). Technology transfer should almost always involve modifications to suit new conditions. This implies that the unsuccessful transfer of agricultural machines in Indonesia resulted from the recipients' lack of absorptive capacity to assimilate and modify it rather than the donors' lack of sensitivity to local context for fit - ting the needs of end users. Technology is a passive resource whose effectiveness depends on humans. Consequently, one of the most critical components for effective technology transfer is a person's ability to learn new technology, which can be gained through extended education. Although

education is regarded as a critical and necessary factor for facilitating the transfer of technology, it is not sole factor for successful The Journal of Technology Studies 54 technology transfer. Another important factor could be effective planning for facilitating that transfer of technology. The plan should include concrete ways that recipients and donors can collaborate during the technology transfer process. Collaboration might be based on willingness for technology transfer from both the recipient and the donor. Without a strong willingness for technology transfer on both sides, it is impossible to assimilate, adopt, and generate new technology. In the international technology transfer context, most technology transfers are primarily guided by the profit motive. A donor country seems reluctant to transfer knowledge or capacity to a recipient country without the hope for profit. The article entitled “Technology Transfer: A Third World Perspective” provides a great implication about the issue. Third World countries embarked on a massive but passive importation of technology (Akubue, 2002). Many recipient countries in the Third World adopted these innovations without

2.6. The Adaptation Process and the Role of Assessing

The costs and benefits of adaptation options before elaborating on the different assessment approaches, this section provides an overview on the overall adaptation process and the role of assessing the costs and benefits of adaptation options. The adaptation process can be divided into four stages:

i. Assessment of impacts, vulnerability and risks;
ii. Planning for adaptation;
iii. Implementation of adaptation measures and
iv. Monitoring and evaluation of adaptation interventions. The findings from this stage

- ❖ feed back into stage
- ❖ Ensuring that adaptation action is iterative and dynamic over time.

At the outset of any adaptation initiative it is important for adaptation planners to assess the implications of climate change for natural systems (e.g. agricultural productivity, water supply) and human society (e.g. human health, economic

activity) to determine whether, and the extent to which, climate change will have an impact, pose a risk or even offer beneficial opportunities. Building upon the assessment of risks, impacts and vulnerability during stage

I, adaptation planners can effectively identify adaptation options in areas and sectors that are the most socio-economically important and/or most vulnerable to climate change during stage

ii. Questions to be addressed during the planning stage.

The adaptation process and its four key components, Which suite of options constitutes a comprehensive adaptation strategy that addresses cross-pectoral linkages and establishes priorities within and across sectors, Is the adaptation strategy consistent with national, local or sectored development objectives?, What aspects of decision making processes pose barriers or present opportunities for integrating climate change risks and adaptation into national, local or sectored policies and measures? Assessing the economic, environmental and social costs and benefits of adaptation plays a critical role in informing the second (planning) stage of the adaptation process. Assessment of costs and benefits informs planners about when and where to act and how to prioritize and allocate scarce financial and technological resources. In practice, objectives vary between regions, countries and communities, and trade-offs will need to be made between adopting all possible measures, and living with the risks. In addition, adaptation planners need to identify and agree upon a set of criteria that will be used to assess the identified adaptation options against the agreed objectives. Possible criteria include:

- Efficiency – are the outputs achieved optimal relative to the resources allocated?
- Effectiveness – will the option meet the objectives?
- (3. Equity – will the option benefit vulnerable groups and communities?
- Urgency – how soon does the option need to be implemented?
- Flexibility – is the option flexible, and will it allow for adjustments
- Robustness – is the option robust under a range of future climate projections?
- Practicality – can the option be implemented on relevant timescales?

- Legitimacy – is the option politically, culturally and socially acceptable?
- Synergy/Coherence with other strategic objectives – does the option offer co-benefits (for example, improving agricultural land management practices could lead to reduced erosion/siltation and carbon sequestration).

When current and projected impacts, vulnerability, risks and planned adaptation options have been assessed, targeted adaptation actions can be implemented (stage (iii). The monitoring and evaluation of adaptation actions can be undertaken throughout the adaptation process, in addition to after adaptation actions have been implemented (stage (IV). Knowledge and information gained from monitoring and evaluation of adaptation actions is fed back into the adaptation process to ensure that future adaptation efforts are successful (DeVore, 1987 and Frey, 1987).

2.7. Education and Technology in the Era of Globalization

Although dynamic changes in design and manufacturing have taken place, shortage of technologically trained people in all aspects of computer aided design and manufacturing (CADCAM) is being experienced since technology changes faster than the societal system including education (Emptage, 1991). To be successful in the field of designing and manufacturing, one must continuously learn new concepts and skills. The economic structure of a country has an obvious relationship to education as it is the framework for development (Eshiwani, 1993; DeGregori, 1989). As countries face the era of globalization, technological innovation and emergence of new economies, a well-educated population is a requirement for the competitive world market (World Bank, 1999; UNESCO, 1998). Assessment for apparel sector identified a gap exists in core technical skills and knowledge amongst designers and garment technologists due to changes in technology and lack of investment in staff training. Shortage of sector specific technical topics was a significant barrier to development within the industry (Skill Fast UK, 2006). Developed countries like the United States and the United Kingdom are also faced with slow uptake of apparel CAD technology, citing lack of information, experts and training coupled with systems cost as the

main reasons This is attributed to training structures that are deficient, hence unable to adequately prepare learners for a dynamic or changing labor market. The missions of the universities, being institutions of higher education and research, are to undertake training and research activities to empower citizens with necessary skills and information for development of the society (Achola, Gray & Wanjala, 1990). The structure and conception of school that evolved in the last century is quite incompatible with effective use of new technologies. The view of teaching as transmission of information from teachers to their students has little place for students using new technologies to accomplish meaningful tasks (Collins, 1996). Apparel industries are themselves changing, with computer based technology playing a greater part in design and manufacturing processes. Educators therefore have a duty to prepare students so that they are familiar with the technologies they will encounter in a working environment (World Bank, 2000). Educators often find themselves in a dilemma. Some educators return to the academia after several years in industry. Others have predominantly been involved in training and are therefore often hesitant to enter and overlap into other fields of design or even technology. (Wilson, Sherry, Dobrovolny, Batty & Ryder, 2000)

2.8. Determinants adaption of a new technology

2.8.1. Demand determinants

2.8.1.1 Skill level of workers and state of capital goods sector

As Nathan Rosenberg argued in his (1972 article, the skill level of workers and the state of the capital goods sector are two of the important determinants of diffusion of a technology to individual firms, because both workers and capital goods are crucial for successful implementation and operation of a new invention. If a successful implementation of a technology requires complex new skills, and if it is time-consuming or costly to acquire the required level of competence, then adoption might be slow. As a consequence, the overall levels of skills available to the enterprise as well as the manner in which the necessary

skills are acquired are important determinants of diffusion. Rosenberg also stresses the importance of the technical capacity of an industry for adaption.

2.8.1.2. Customer commitment and relationships

A stable and secure customer base is an important factor for technology adoption in some industries. In order to recoup costly investments in new production technologies, firms want to be assured that there will be income in the future to pay for the investment, as a way of reducing the risk inherent in the adoption decision. (Susan Helper in 1995) on this factor in her study of adoption of computer numerically controlled (CNC) machine tools in the auto component supply industry in the United States.

A technology has a network effect when the value of the technology to a user increases with the number of total users in the network. Network effects in adoption can arise from two different but related reasons, often characterized as direct and indirect. Direct network effects are present when a user's utility from using a technology directly increases with the total size of the network. For example, the utility that a user gets from using electronic mail directly depends on how many other people are accessible by electronic mail. Similarly, the benefit from having a telephone also directly depends on the number of telephone sets in the network since the benefit will increase as more people can be reached by the phone (Susan Helper in 1995).

2.8.2. Environmental and institutional factors

2.8.2.1. Market structure and firm size

(As Nancy Dorfman suggested in 1997), four major arguments support the positive role of firm size and market share in determining the level of innovative activity New Economy Handbook: Hall and Khan November 2002 and these same arguments apply also to the choice to use new innovations, because many of the factors and underlying issues are quite similar at both stages. The first two arguments are due to Schumpeter: firms that are large or have large market shares are more likely to undertake innovation, both because appropriate ability

(the benefits of new technology adaption) is higher for larger firms and because the availability of funds (the costs of new technology adoption) to these firms is greater. Firms with larger market share are more likely to adapt a new technology because they have a greater ability to appropriate the profits from the adaption. Use or innovation of a new technology often involves huge upfront costs, for example, investment in production, training of workers, marketing, and research and development. A firm will have an incentive to invest in a new technology only if it can later obtain profits that justify the initial investment. Since profits erode in the presence of competition, only firms with sufficient market power would find it profitable to adapt. The second Schumpeterian argument involves the availability of resources needed for investment in a new technology. In the presence of imperfect capital markets, due in part to asymmetric information problems between investors and firms, larger and more profitable firms are more likely to have the financial resources required for purchasing and installing a new technology. In addition, they may be better able to attract the necessary human capital and other resources that are necessary. The third argument is related to the potential risks associated with the use, development, and marketing of a new technology. Clearly, uncertainty about the benefits (Hall and Khan November 2002) of a new technology is one of the factors slowing down the speed of diffusion. Firms with large market share are sometimes better able to spread the potential risks associated with new projects because they are able to be more diversified in their technology choice and are in a position to try out a new technology while keeping the old one operating at the same time in case of unexpected problems. Finally, the fourth argument is that many new technologies are scale-enhancing, and therefore larger firms adopt them sooner because they capture economies of scale from production via the learning curve more quickly and can spread the other fixed costs associated with adoption across a larger number of units. However, large size and market power may also slow down the rate of diffusion. First, larger firms may have multiple levels of bureaucracy and this can impede decision making processes about new ideas and projects, and the hiring of new workers. Second, it may be relatively more expensive for older

and larger firms to adopt a new technology because they have many resources and human capital sunk in the old technology and its architecture, as was argued by (Rebecca Henderson and Kim Clark in 1990). In the presence of networks, this problem may be worse since it may be a very expensive undertaking to convert the entire network to the new technology (Hall and Khan November 2002)

2.8.2.2. Government and regulation

The fashion industry began to take form with the birth of the sewing machine, the development of the paper pattern industry, synthetic dyes, the first apparel factories, and the rising middle class during the mid-1800s (Abernathy et al., 1999; Ross, 2008; Welters, 2008). The emerging middle class aspired to move up the social ladder and one method was to consume the fashions of those at the top of the social strata. This encouraged the expanding spending habits of the middle class. Simmel's (2003) Trickledown Theory attributes the increased pace and assumed power of fashion to the rise of the middle class. Social advancement became directly linked with fashion – the ability of the lower strata to imitate the upper strata led to the immediate discard of a particular fashion by the upper strata the moment the lower strata had adopted it (Simmel, 2003). links consumption and social equalization with its cycle of adaptation and discard as an expression of status, unlike Veblen who links consumption as the source of status (Veblen, 1899/2009). The common implication between Simmel and Veblen is that a major motivator for the consumption of fashion is status. Moving from the 19th century into the 20th, two extremely important developments had now been firmly established: capitalism, and conspicuous consumption. Capitalism, coupled with newly formed apparel factories, the introduction of the department store, and the standardization of sizing, allowed for the development of ready-made garments. Democratization of fashion, the notion that everyone can afford to be fashionable gained momentum and apparel consumption increased. This was a direct result of capitalist industrialization and its ability to produce mass goods for a lower cost (Agins, 2000; Welters, 2008).

CHAPTER THREE

MATERIALSANDMETHODS

3.1. Materials

The proposed solution is Giving training to the operator using JUKI buttonhole machine and JUKI button attaching machine we argued that the trainer cost incurred by the researcher but the other all training row material used from given enterprise.

Table: 3.1list of material used for the thesis.

BUTTON ATTACKING MACHINE			BUTTONHOLE MACHINE	
1	Model name	MB-1373	Model name	LBH-780
2	Max. sewing speed	1,500sti/min	Max. sewing speed	3,600sti/min
3	Number of stitches	8, 16, and 32 stitches	Number of stitches	54～345 (by gear-change method)
4	Feed length (crosswise feed)	2.5-6.5mm	Lift of the work clamp	Max. 12mm
5	Feed length (lengthwise feed)	0-6.5mm 0-4.5mm	Buttonhole length	6.4～38.1mm
6	Applicable button	Label, Metal button, Stay button Shank button, Wrapped-around button, Snap,	-	-
7	Button size	φ10-28mm (thickness of button: 1.8-3.5mm)	-	-
	Needle	TQ×1 (#16) #14-20	Needle	DP×5 #11J, 134 Nm75

3.1.1. Tools and equipment

- SPSS (Statistical Package for Social Science) software used to sample calculation.
- Stop watch helps to record time taken.
- Computer used for documentation and Paper

3.2. Methods

This research is first conduct observations in production buttonhole and button attaching sewing section assess and improve adaption. This study use qualitative and quantitative research methods to determine and understand the nature of the study. Primary and secondary data collection systems are used. Collected data are analysis in SPSS and Z test etc. Below the operational structure shows the process of identification of the assessment and implementation of upgraded on button hole and button attach machine in case of Debre Brihan cluster.

3.2.1. Data collection instruments

First to increase the validity of the instrument pretest the data collection procedure, they are asked to answer the observation, questionnaire and provide their comments regarding the content and readability of the survey. After the pilot study, further refinement is made according to the comments received to prepare the final questionnaire for the survey. This procedure is performed to achieve content validity and to reduce confusion and misunderstanding by the respondents answering the survey. Appendix A.B.E.F shows the items included in the questionnaire and observation.

3.2.1.1. Documents

Documents concerning from daily record book, Monthly reports and other different relevant published and unpublished documents in north shewa zone micro and small enterprise office were reviewed.

3.2.1.2. Observation

During the data collection in the town, the researcher tried to systematically observe realities on the ground. Accordingly, there were more informal discussions with key information sacking in all enterprise.

3.2.1.3. Questioners

Formal questioners wear prepared for data collection to get concrete information made according to the comments received to prepare the final questionnaire for the survey. This procedure was performed to achieve content validity and to reduce confusion and misunderstanding by the respondents answering the survey.

3.2.2. Measurements

Each variable was measured by multi-item indicators. All the items, except firm size, used a 5-point, from strongly disagree (1) to strongly agree (5).The Size of the firm was measured by the number of 6 all enterprise used button hole and button attaching machine and from 23 enterprise assessed the half number of not used those machines.

3.2.3. Sample description

Among 29 firms that responses were received, resulting in a response rate of 100%. After careful review of the returned responses, no responses were determined unusable because of a significant number of missing values. Therefore, a total of 29 responses were deemed usable and were included in the analysis.

3.2.4. Analysis

The data were analyzed by using the SPSS (Statistical Package for Social Science) software package version 20.0. SPSS is widely used for various statistics and data management. SPSS is a software package used for conducting statistical analyses, manipulating data, and generating tables and

graphs that summarize data. In this thesis hypothesis was used to test at 0.05 level of significance of Z-Test value. Mean values of 2.50 and above accepted while mean vale below 2.50 were rejected also it 'was decided that where the Z-calculated value was equal or greater than the table Z-value it indicates significant difference, the null hypothesis is rejected but if otherwise the null hypothesis is accepted, Regression analysis as well as descriptive statistics such as means and standard deviation are used in this study. Below the operational structure shows the process of identification of the problem and development appropriate technology adaptation to in button attaching and buttonhole in Small and micro Enterprises.

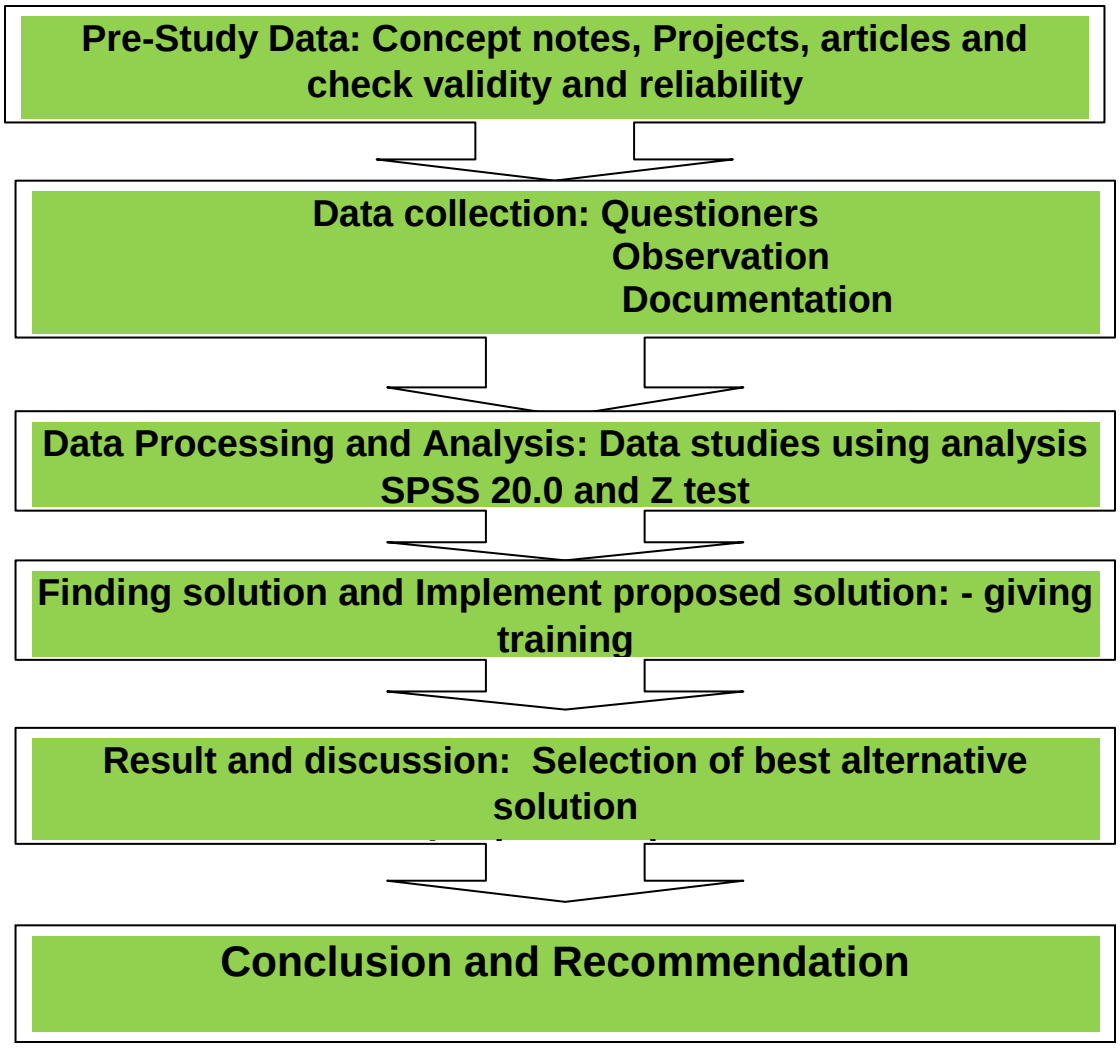


Figure: 3.1: Research work process

3.2.5. Calculation formula

$$Z = \frac{Y - \text{Mean}(Y)}{\text{StDev}(Y)} = \frac{Y - \mu_Y}{\sigma_Y}. \qquad \text{..... (3.1)}$$

$$z = \frac{\bar{X} - \mu_{\bar{X}}}{\sigma_{\bar{X}}} \qquad \text{..... (3.2)}$$

Standard Minute Value (SMV) = Basic time+ allowances……..……...…... **(3.3)**

Basic time = (average time*rate)……..……..…..……. **(3.4)**

Allowance= Relaxation on allowance + Contingency allowance + Machine Delay Allowance……..…….…….. **(3.5)**

Total Productivity = $\frac{\text{Goods /Services Produced (Their worth)}}{\text{All inputs used to produce them}}$ ……..……... (3.6)

CHAPTER FOUR

RESULTS AND DISCUSSION

This thesis are focuses only assessment and implementation of technology adaptation in button hole and button attach machine in case of Debre Brihan cluster is examining to 6 use of button hole and button attaching machine, 23 not used button hole and button attaching machine total of 29 small and micro enterprises.

In the first stage to assess how technology adaptations in 29 enterprises that button attaching and buttonhole machine by direct observation and structured questioner that the result is as follow.

4.1. Reliability

The reliabilities of the constructs used in this study were assessed using Cronbach's alpha coefficients. The results indicated (see Table 4.1) that four of the four variables achieved an alpha value greater than the suggested cutoff value of 0.7 (Premkumar, 2003).Reliability is a measure of the degree to which a research instrument yields consistent results after repeated trials. To determine content reliability, the researcher administered questionnaires six use of button hole and button attaching machine respondents. The researcher also collected data from 23 not used button hole and button attaching machine. Cronbach's Alpha was used to measure internal consistency among a set of survey items which the researcher believed would all measure the same construct, and therefore correlated with each other, and thus could be formed into some type of scale. Cronbach Alpha can be written as a function of the number of test items and the average inter correlation among these items.

Table 4.1 Reliability Statistics result of SPSS

NO	Variable on questioner and observation	Cronbach's Alpha	No of Items	No of sample
1	Observation result enterprise on use buttonhole and button attaching machine	0.830	16	23
2	Observation result of enterprise not use buttonhole and button attaching machine	0.816	8	23
3	questioner result of enterprise not use buttonhole and button attaching machine	0.794	11	6
4	questioner result of enterprise use buttonhole and button attaching machine	0.841	11	6
TOTAL		0.821		

4.2. The Result of the Research questioners' enterprise used of button hole and button attach machine

What are the assessment of technology adaptation in button attaching and buttonhole machine practice and implementation by giving training that technology adaptation used of button hole and button attach machine in case of Debre Brihan cluster result of all questioner enterprise used of button hole and button attach machine from total of 6 male =5 female=1enterprise?

Table 4.2: Mean and standard deviation quaternary response that the enterprise used button hole and button attach machine.

NO	Questioner Item	Respondents		
		mean	SD	remark
1	Do you perform miner maintenance during operation?	2.67	1.03	Agree
2	Do you agree to minimize the cost of product using buttonhole and button attaching machine?	2.67	1.03	Agree
3	Does you believe the machine have high electrical consumption?	2.83	0.753	Agree
4	Do you believe the buttonhole machine have faller during operation?	2.83	1.17	Agree
5	Does your customer is local market?	2.83	0.753	Agree
6	Does he/she have proper threading of operation?	3.00	0.632	Agree
7	Have you come to the garment industry by your own?	3.17	0.753	Agree
8	Do you believe don't get operator to maintain the buttonhole and button attaching machine filer during operation?	3.17	0.753	Agree
9	Does you creating a Buttonhole Using a Sewing Machine have time saving?	3.17	0.753	Agree
10	Does your product delivered on deliver time?	3.17	0.753	Agree
11	Do you agree to improve product quality using buttonhole and button attaching machine?	3.17	0.753	Agree

The result shown in table 4.2 the enterprise not used of button hole and button attach machine accepted all 11 items of questioner and there is no rejected item not used of button hole and button attach machine that acts as assessment of technology adaptation in button attaching and buttonhole machine in case of Debre Brihan cluster all respondent mean values of do you perform miner maintenance during operation? In case of implementation =2.67 is above the mean value 2.50 and 1.03 standard deviation value so the other all mean and standard deviation value above and accepted.

4.3. The Result of the Research questioners' percentage and numeric value enterprise used of button hole and button attach machine

What are the questioners percentage and numeric value that assessment of technology adaptation in button attaching and buttonhole machine practice and implementation by giving training that technology adaptation used of button hole

and button attach machine result of all questioners enterprise used of button hole and button attach machine from total of =6 male =5 female=1 enterprise?

Table 4.3: Questioners' percentage value on the enterprise used of button hole and button attach machine.

NO	Questioner Item	responses in number					responses in percent				
		1	2	3	4	5	1	2	3	4	5
1	Do you perform miner maintenance during operation?		2	2	2		0.0	33.3	33.3	33.3	0.0
2	Do you agree to minimize the cost of product using buttonhole and button attaching machine?	1	1	1	1	2	16.7	16.7	16.7	16.7	33.3
3	Does you believe the machine have high electrical consumption?		1	3	2		0.0	16.7	50.0	33.3	0.0
4	Do you believe the buttonhole machine have Faller during operation?	1	4		1		16.7	66.7	0.0	16.7	0.0
5	Does your customer is local market?		2	2	2		0.0	33.3	33.3	33.3	0.0
6	Does he/she have proper threading of operation?	2	2	1	1		33.3	33.3	16.7	16.7	0.0
7	Have you come to the garment industry by your own?		4	1	1		0.0	66.7	16.7	16.7	0.0
8	Do you believe don't get operator to maintain the buttonhole and button attaching machine filer during operation?	1	1	1	3		16.7	16.7	16.7	50.0	0.0
9	Does you creating a Buttonhole Using a Sewing Machine have time saving?	2	2	2			33.3	33.3	33.3	0.0	0.0
10	Does your product delivered on deliver time?	2	1	1	2		33.3	16.7	16.7	33.3	0.0
11	Do you agree to improve product quality using buttonhole and button attaching machine?		1	3	2		0.0	16.7	50.0	33.3	0.0

The result shown in table 4.3 It was the percentage value of enterprise not use of button hole and button attach machine all items of questioner item that indicate the five alternative value distribution of respondents answer above the

percentage average value Does your product delivered on deliver time? Responses there are above the average value item by the received values in case of Debre Brihan cluster.

4.4. The Result of the Research questioners' enterprise not used of button hole and button attach machine

What are the assessment of technology adaptation in button attaching and buttonhole machine practice and implementation by giving training that technology adaptation used of button hole and button attach machine in case of Debre Brihan cluster result of all questioner enterprise not used of button hole and button attach machine from total of 23 male =22 female=1enterprise?

Table 4.4: Mean and standard deviation of questioner response that the enterprise not used button hole and button attach machine.

NO	**Questioner Item**	Male respondents		
		Mean	SD	remark
1	Have you come to the garment industry by your own?	3.04	1.637	Agree
2	Does you believe the machine have high electrical consumption?	2.91	1.276	Agree
3	Do you buttonhole and button attaching machine that can make the work is easier?	4.00	0.853	Agree
4	Does Creating a Buttonhole Using a Sewing Machine have time saving?	2.61	0.839	Agree
5	Do you believe the buttonhole machine have faller during operation?	3.00	1.128	Agree
6	Does your customer is local market?	3.70	0.876	Agree
7	Does your delivered product on deliver time?	2.70	0.926	Agree
8	Do you have financial problem to buy buttonhole and button attaching machine?	3.52	1.442	Agree
9	Do you agree to increase the productivity using buttonhole and button attaching machine?	3.83	1.029	Agree
10	Do you agree to minimize the cost of product using buttonhole and button attaching machine?	3.52	1.275	Agree
11	Do you agree to improve product quality using buttonhole and button attaching machine?	3.48	1.238	Agree

The result shown in table 4.4 the enterprise not used of button hole and button attach machine accepted all 11 items of questioner and there is no rejected item not used of button hole and button attach machine that acts as assessment of technology adaptation in button attaching and buttonhole machine in case of Debre Brihan cluster all respondent mean values of Do you have financial problem to buy buttonhole and button attaching machine? In case of implementation =3.52 was above the mean value 2.50 and 1.442 standard deviation value so the other all mean and standard deviation value above and accepted.

4.5. The Result of the Research questioners' percentage and numeric value enterprise not used of button hole and button attach machine

What are the questioners percentage and numeric value that assessment of technology adaptation in button attaching and buttonhole machine practice and implementation by giving training that technology adaptation used of button hole and button attach machine in case of Debre Brihan cluster result of all questioners enterprise not used of button hole and button attach machine from total of =23 male =22 female=1 enterprise?

Table 4.5: Questioners' percentage value that the enterprises not used button hole and button attach machine.

NO	Questioner Item	responses in number					responses in percent				
		1	2	3	4	5	1	2	3	4	5
1	Have you come to the garment industry by your own?	6	2	3	8	4	26.1	8.7	13.0	34.8	17.4
2	Does you believe the machine have high electrical consumption?	4	6	2	10	1	17.4	26.1	8.7	43.5	4.3
3	Do you buttonhole and button attaching machine that can make the work is easier?	1		2	16	4	4.3	0.0	8.7	69.6	17.4
4	Does Creating a Buttonhole Using a Sewing Machine have time saving?		13	7	2	1	0.0	56.5	30.4	8.7	4.3
5	Do you believe the buttonhole machine have faller during operation?	1	10	1	10	1	4.3	43.5	4.3	43.5	4.3
6	Does your customer is local market?	1	1	4	16	1	4.3	4.3	17.4	69.6	4.3
7	Does your delivered product on deliver time?	1	10	8	4		4.3	43.5	34.8	17.4	0.0
8	Do you have financial problem to buy buttonhole and button attaching machine?	3	4	1	14	1	13.0	17.4	4.3	60.9	4.3
9	Do you agree to increase the productivity using buttonhole and button attaching machine?	1	2	2	18		4.3	8.7	8.7	78.3	0.0
10	Do you agree to minimize the cost of product using buttonhole and button attaching machine?	2	3	5	12	1	8.7	13.0	21.7	52.2	4.3
11	Do you agree to improve product quality using buttonhole and button attaching machine?	2	4	2	15		8.7	17.4	8.7	65.2	0.0

The result shown in table 4.5 It was the percentage questioner value of enterprise not used of button hole and button attach machine all items of questioner responses there is above the average value item by the received values in case of Debre Brihan cluster.

4.6. The Result of the Research observations enterprise not used of button hole and button attach machine

What are the assessment of technology adaptation in button attaching and buttonhole machine practice and implementation by giving training that technology adaptation used of button hole and button attach machine in case of Debre Brihan cluster result of all observations enterprise not used of button hole and button attach machine from total of 23 male =22 female=1enterprise?

Table 4.6: Mean and standard deviation of observation response that the enterprise not used button hole and button attach machine.

NO	List of activities observed.	Male respondents		
		Mean	SD	Remark
1	the product quality	2.57	0.992	Agree
2	the productivity	2.83	1.03	Agree
3	the cost of product	2.96	1.07	Agree
4	Number of operator	2.65	1.03	Agree
5	Time of operation performed for one product	3.00	1.04	Agree
6	Financial problem to buy button attaching machine?	2.78	1.15	Agree
7	the product deliver time	2.70	1.02	Agree
8	customer is local market	3.78	0.736	Agree

The result shown in table 4.6 the enterprise not used of button hole and button attach machine accepted all 11 items of questioner and there is no rejected item not used of button hole and button attach machine that acts as assessment of technology adaptation in button attaching and buttonhole machine in case of Debre Brihan cluster all respondent mean values of the Time of operation performed for one product In case of implementation =3.00 was above the mean value 2.50 and 1.04 standard deviation value so the other all mean and standard deviation value above and accepted.

4.7. The Result of the Research observations percentage and numeric value enterprise not used of button hole and button attach machine

What are the observation percentage and numeric value that assessment of technology adaptation in button attaching and buttonhole machine practice and implementation by giving training that technology adaptation used of button hole and button attach machine in case of Debre Brihan cluster result of all observations enterprise not used of button hole and button attach machine from total of =23 male =22 female=1 enterprise?

Table 4.7: Percentage observations percentage value on the enterprise not used of button hole and button attach machine.

NO	List of activities observed.	responses in number				responses in percent			
		1	2	3	4	1	2	3	4
1	the product quality	3	9	6	5	13.0	39.1	26.1	21.7
2	the productivity	2	8	5	8	8.7	34.8	21.7	34.8
3	the cost of product	2	7	4	10	8.7	30.4	17.4	43.5
4	Number of operator	4	5	9	5	17.4	21.7	39.1	21.7
5	Time of operation performed for one product	2	6	5	10	8.7	26.1	21.7	43.5
6	Financial problem to buy button attaching machine?	4	5	6	8	17.4	21.7	26.1	34.8
7	the product deliver time	2	10	4	7	8.7	43.5	17.4	30.4
8	customer is local market	1	1		21	4.3	4.3	0.0	91.3

The result shown in table 4.7It was the percentage value of enterprise not used of button hole and button attach machine all items of questioner responses there is above the average value item by the received values in case of Debre Brihan cluster.

4.8. The Result of the Research observations enterprise used of button hole and button attach machine

What are the assessment of technology adaptation in button attaching and buttonhole machine practice and implementation by giving training that

technology adaptation used of button hole and button attach machine in case of Debre Brihan cluster result of all observations enterprise used of button hole and button attach machine from total of 6 male =5 female=1 enterprise?

Table 4.8: Mean and standard deviation of observation response that the enterprise used button hole and button attach machine.

NO	List of activities observed.	Male respondents		
		mean	SD	Remark
1	**safety rule during performance of task**	-	-	-
1.1	check the setting of the machine	2.50	1.05	Agree
1.2	Power on before tilting the buttonhole machine	2.17	0.408	Agree
1.3	cleaning up machine before and after their task	2.50	0.548	Agree
1.4	skills to be observed &measured	2.67	0.816	Agree
1.5	Oiling of machine	2.67	0.516	Agree
1.6	machine running after the ground wire is removed	3.17	0.753	Agree
2	**Perform minor maintenance**	-	-	-
2.1	Needle breakage	3.00	0.894	Agree
2.2	Thread breakage	3.17	0.753	Agree
3	select, check &prepare the required tool, equipment and facilities available	3.00	0.894	Agree
4	Operator to maintain the button attaching machine filer during operation?	2.83	0.983	Agree
5	Correctly positioned button attaching?	3.33	0.816	Agree
6	mark the placement with pins or tailor's chalk	3.00	0.894	Agree
7	proper threading of machine	2.67	0.816	Agree
8	down time of machine during electric power off	3.00	0.894	Agree
9	Machine speed	2.83	1.17	Agree
10	time of operation performing button attaching and buttonhole	2.67	0.516	Agree

The result shown in table 4.8 the enterprise not used of button hole and button attach machine accepted all 11 items of questioner and there is no rejected item not used of button hole and button attach machine that acts as assessment of technology adaptation in button attaching and buttonhole machine in case of Debre Brihan cluster all respondent mean values of select, check &prepare the required tool, equipment and facilities available? In case of implementation =3.00 was above the mean value 2.50 and 1.04 standard deviation value so the other all mean and standard deviation value above and accepted.

4.9. The Result of the Research observations percentage and numeric value enterprise used of button hole and button attach machine

What are the observation percentage and numeric value that assessment of technology adaptation in button attaching and buttonhole machine practice and implementation by giving training that technology adaptation used of button hole and button attach machine in case of Debre Brihan cluster result of all observations enterprise used of button hole and button attach machine from total of 6 male =5 female=1 enterprise?

Table 4.9: Observations percentage value on the enterprise not used of button hole and button attach machine.

NO	List of activities observed.	responses in number				responses in percent			
		1	2	3	4	1	2	3	4
1	check the setting of the machine	2	1	3	0	33.3	16.7	50.0	0.0
2	Power on before tilting the buttonhole machine	0	2	4	0	0.0	33.3	66.7	0.0
3	cleaning up machine before and after their task	1	1	4	0	16.7	16.7	66.7	0.0
4	skills to be observed &measured	0	0	1	5	0.0	0.0	16.7	83.3
5	Oiling of machine		6			0.0	100.0	0.0	0.0
6	machine running after the ground wire is removed	1			5	16.7	0.0	0.0	83.3
7	Needle breakage		2	4		0.0	33.3	66.7	0.0
8	Thread breakage	2	4			33.3	66.7	0.0	0.0
9	select, check &prepare the required tool, equipment and facilities available	2	4			33.3	66.7	0.0	0.0
10	Operator to maintain the button attaching machine filer during operation?		3	3		0.0	50.0	50.0	0.0
11	Correctly positioned button attaching?		2	4		0.0	33.3	66.7	0.0
12	mark the placement with pins or tailor's chalk		2	2	2	0.0	33.3	33.3	33.3
13	proper threading of machine	1	2	3		16.7	33.3	50.0	0.0
14	down time of machine during electric power off	1			5	16.7	0.0	0.0	83.3
15	Machine speed	4	2			66.7	33.3	0.0	0.0
16	time of operation performing button attaching and buttonhole	3	2	1		50.0	33.3	16.7	0.0

The result shown in table 4.9 is the observed percentage value of enterprise not used of button hole and button attach machine all items of questioner responses there is above the average value item by the received values in case of Debre Brihan cluster

4.10. Hypothesis test

4.10.1. Hypothesis one

There were no significant difference on in the mean response on Assessment and implementation of technology adaptation in button hole and button attach machine in case of Debre Brihan cluster**.**

Table4.10: Analyses of questioner Z critical value used of button hole and button attach machine.

Group	N	mean	SD	Z calculation	Z critical	Decision	Remark
Average mean	6	2.97	0.83	0.54	0.7123	ACCEPTED	

N=6 P<0.05% =ACCEPTED

The result in table 4.10 show that the calculated Z-values =0.54 less than the critical values =0.7123 at 0.005 percent level of significance. The null hypothesis was therefore accepted. This implies that there were no significance difference questioner mean response used of button hole and button attach machine on assessment and implementation of upgraded on button hole and button attach machine in case of Debre Brihan cluster.

4.10.2. Hypothesis' two

There were no significant difference in the mean response of male and female on assessment and implementation of technology adaptation in button hole and button attach machine in case of Debre Brihan cluster.

Table4.11: Analyses of questioner Z critical value not used of button hole and button attach machine.

Group	N	mean	SD	Z calculation	Z critical	Decision	Remark
Average mean	23	3.30	1.138	0.702	0.7734	ACCEPTED	

N=23 P<0.05% =ACCEPTED

The result in table 4.11 show that the calculated Z-values =0.702 less than the critical values =0.7734 at 0.005 percent level of significance. The null hypothesis was therefore accepted. This implies that there were no significance difference questioner mean response not used of button hole and button attach machine on assessment and implementation of technology adaptation in button hole and button attach machine in case of Debre Brihan cluster.

4.10.3. Hypothesis three

There were no significant difference on in the mean response on assessment and implementation of upgraded on button hole and button attach machine in case of Debre Brihan cluster.

Table4.12: Analyses of observation Z critical value used of button hole and button attach machine.

Group	N	mean	SD	Z calculation	Z critical	Decision	Remark
Average mean	6	2.82	0.795	0.402	0.6736	ACCEPTED	

N=6 P<0.05% =ACCEPTED

The result in table 4.12 show that the calculated Z-values =0.402 less than the critical values =0.6736 at 0.005 percent level of significance. The null hypothesis was therefore accepted. This implies that there was no significance difference observation mean response used of button hole and button attach machine on assessment and implementation of upgraded on button hole and button attach machine in case of Debre Brihan cluster.

4.10.4. Hypothesis' four

There were no significant difference in the mean response of male and female on assessment and implementation of upgraded on button hole and button attach machine in case of Debre Brihan cluster.

Table4.13: Analyses of observation Z critical value not used of button hole and button attach machine.

Group	N	mean	SD	Z calculation	Z critical	Decision	Remark
Average mean	23	2.91	1.010	0.405	0.6736	ACCEPTED	

N=23 P<0.05% =ACCEPTED

The result in table 4.14 show that the calculated Z-values =0.405 less than the critical values =0.6736 at 0.005 percent level of significance. The null hypothesis was therefore accepted. This implies that there was no significance difference observation mean response not used of button hole and button attach machine on assessment and implementation of upgraded on button hole and button attach machine in case of Debre Brihan cluster.

4.11. Implementation phase

Before implementation the finding details analysis the existing from the above quaternary and observation assessment result of the firm then verifies the current situation specially the solution. Finally implement solution to improve performance of the firm and evaluate the solutions by giving train.

4.11.1. Time study of button attaching and buttonhole machine before and after training result

Table4.14: In the training five cycle time observation result of time value.

NO	Description of Operation	training	Cycle time					
			1	2	3	4	5	Average/min
1	Mark eyelet buttonhole position (2points)	**CASUAL PANTS TRAINING**						
		After	0.237	0.237	0.246	0.244	0.248	0.242
2	Sew eyelet buttonhole (2pc)	After	0.52	0.32	0.42	0.42	0.42	0.42
3	Mark button position (2 points)	After	0.31	0.27	0.31	0.41	0.25	0.31
4	Sew button to waistband corner & hip pocket (2pc)	After	0.31	0.28	0.29	0.36	0.26	0.3
5	Sew buttonhole on front (6 pc)	**DRESS SHIRT TRAINING**						
		After	0.88	0.88	0.88	0.88	0.88	0.88
6	Sew button on front (7 pc)	After	0.81	0.63	0.75	0.69	0.77	0.73
7	Sew buttonhole on top of front, sleeve placket & cuff (5 pc)	After	0.58	0.64	0.55	0.65	0.58	0.6
8	Sew button on top of front(1) & sleeve placket(2) & cuff(4) (7 pc)	After	0.62	0.64	0.68	0.58	0.58	0.62
9	Mark buttonhole position(3 point s)	**MEN JACKET TRAINING**						
		After	0.49	0.49	0.51	0.52	0.47	0.5
1	Sew eyelet buttonhole (2							

0	pc)	After	0.59	0.51	0.59	0.61	0.59	0.58
11	Sew flower hole(1 pc)	After	0.39	0.41	0.46	0.47	0.43	0.43
12	Bar tack buttonhole & flower hole end(3pc)	After	0.76	0.57	0.63	0.7	0.65	0.66
13	Mark button position(3 point)	After	0.38	0.41	0.46	0.47	0.44	0.43
14	Sew button to inside pocket (1 pc)	After	0.31	0.36	0.4	0.39	0.37	0.37
15	Sew button to front(2pc)	After	0.61	0.77	0.73	0.66	0.57	0.67
16	Sew sham buttonhole (6 pc)	After	0.66	0.57	0.63	0.67	0.65	0.64
17	Sew button to sleeve(6 pc)	After	0.84	0.85	0.91	0.95	0.94	0.9
18	Sew eyelet buttonhole on inside f lap (1pc)	After	0.54	0.48	0.52	0.48	0.53	0.51
19	Bar tack eyelet buttonhole end (1 pc)	After	0.19	0.2	0.16	0.15	0.17	0.17

From the above table 4.14 I understand: data are taken from the 6 enterprise for 5 cycle time observation some time it excides up to 10 cycle time. Recording data are correctly collected and the accuracy of the taking the data of five times during train and after training and the average value of casual pants, men jacket and dress shirt, so from this average date to calculate SMV and productivity cycle time from my observation it recorded.

4.11.2. Operational time and productivity casual pants

Table4.15: Standard minute value and productivity of casual pants observation result.

NO	Description of operation	SMV (min.)	SMV(min) After training	SEAM TYPE	Standard quantity(pc./h)	Standard quantity(pc./h After training
1	Mark eyelet buttonhole position (2points)	0.22	0.27		273	245
2	Sew eyelet buttonhole (2pcs.)	0.38	0.44		158	132
3	Mark button position (2 points)	0.30	0.33		200	156
4	Sew button to waistband corner & hip pocket (2pcs.)	0.29	0.32		207	158

The above data the calculated result from table 4.15 average value was collected by the researcher using stop watch methods for one week during production process. From the table we understand the data the operation Sew button to waistband corner and hip pocket (2pcs.) of according to Singapore JUKI standards SMV was =0.29min standards productivity =207/hrs, after training SMV=0.32min productivity =158/hrs so the gap minimized to standards after training operation of casual pants on button attaching and buttonhole machine of the enterprise.

According (Sharmin Akter, KaziRezwan Hossain 2017)

Average time=$\sum_{i=1}^{n} ti/n$

Where Ti=observing time

N=numbers of observing time

Basic Time= *(Observed time X Observed rating)/ Standard rating*

Standard Minute Value (SMV) = *Basic time+ allowances*

So that in order to find out average value

Average time =0.343+0.313+0.273+0.313+0.317/5=0.32 min

According to (Noor Ahmed Raaz, 2015,)

Allowance= Relaxation on allowance + Contingency allowance + Machine Delay Allowance.

Rating= the pace/speed of operation at which the operator is performing the job.

Standard Minute Value Observed time can be found by the time necessary to complete an operation. This observed time calculated by stop watch. Ratting is an evaluation of Efficiency. This ratting is done by the operator who is performing the job. It can be measured by an observer to special job which is being observed. Therefore based on operator performance, machine allowance and relaxation allowance the given data are found

Total allowance =28% and Average rating=80%

Standard Minute Value (SMV) = Basic time+ allowances

Basic time = (average time*rate) casual pants on Mark eyelet buttonhole position (2points) of one operation the Average time =<u>0.32 min</u>

= (0.32*80%) casual pants on Mark eyelet buttonhole position (2points)

=<u>0.256 min</u>

SAM value= (basic time) + (basic time*allowance)

= (0.256) + (0.256* 28%)

=<u>0.33 min</u>

4.11.3. Operational time and productivity dress shirt

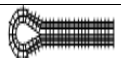
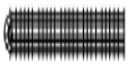
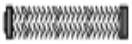
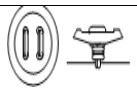
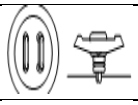
Table4.16: Standard minute value and productivity of dress shirt observation result.

no	description of operation	SMV (min)	SMV (min.) After training	SEAM TYPE	Standard quantity(pc./h)	standard quantity(pcs./h) After training
1	Sew buttonhole on front (6 pc)	0.83	0.92		72	61
2	Sew button on front (7 pc)	0.71	0.77		85	78
3	Sew buttonhole on top of front, sleeve placket &cuff (5 pc)	0.58	0.63		104	96
4	sew button on top of front(1) & sleeve placket(2) & cuff(4)(7 pc)	0.58	0.66		104	96

The above data the calculated result from table 4.16 average value was collected by the researcher using stop watch methods for one week during production process. From the table we understand the data the operation Sew buttonhole on top of front, sleeve placket and cuff (5 pc) of according to Singapore JUKI standards SMV were =0.58 min and productivity standards =104/hrs but after training SMV=0.63min productivity =96/hrs so the gap minimized to standards after training operation of dress shirt on button attaching and buttonhole machine of the enterprise

4.11.4. Operational time and productivity men jacket

Table4.17: Standard minute value and productivity of men jacket observation result on the button hole and button attach machine.

No	description of operation	SMV (min.)	SMV (min.) after	SEAM TYPE	Standard quantity(pc/h)	standard quantity(pc/h) after
1	mark buttonhole posit ion (3 point s)	0. 46	0.52		130	115
2	Sew eyelet buttonhole (2 pc)	0. 54	0.62		111	98
3	sew flower hole (1 pc)	0. 38	0.46		158	142
4	Bar tack buttonhole & f lower hole end (3pcs)	0. 52	0.69		115	98
5	mark button position(3 point)	0.39	0.46		153	142
6	Sew button to inside pocket (1 pc)	0.31	0.4		193	178
7	Sew button to front (2 pc)	0.63	0.71		95	87
8	Sew sham buttonhole (6 pc)	0.58	0.68		95	88
9	Sew button to sleeve (6 pcs.)	0.83	0.93		72	65
10	Sew eyelet buttonhole on inside f lap (1 pcs)	0.46	0.54		130	121

The above data the calculated result from table 4.17 average value was collected by the researcher using stop watch methods for one week during production process. From the table we understand the data the operation Sew button to front (2pc) of according to Singapore JUKI standards SMV was =0.63minand productivity standards =95/hrs but after training SMV=0.71min and productivity =87/hrs so the gap minimized to the standards after training operation of men jacket on button attaching and buttonhole machine of the enterprise.

CHAPTER FIVE

CONCLUSION AND RECOMMENDATION

5.1. Conclusion

Adaptation has been described by some as a process of “social learning” (Collins and Ison, 2009). .

The paper confirms the importance of adaptation technologies that scaling up the thickness of the firm. It is possible the structured approach to identify technologies and barriers under the technology assessment process leaves out important structural measures to enable adaptation technology especially within a buttonhole and button attaching machine is an important and essential. These technology adaptations maintaining the processing parameters at desired level used to reduce the cost, SMV and used to improve the productivity and quality of the garments.

Technology adaptation transform traditional materials-reliant production systems and accelerate a new form of sustainable production Education and skills A diverse skill set is essential, as the new production paradigm requires workers to show creativity, adaptability and inventiveness just for customers and suppliers, but also within the technological infrastructure, institutional and organizational framework, and knowledge-creating and diffusing institutions that include extension services, industrial clusters, productivity standards, technical information services and quality control institutions require educational and training programs.

The Small Scale Enterprises successful in the market if they adapting technology and give training about button attaching and buttonhole machine used of their potential areas for future work include strengthening collaborative joint R&D on adaptation.

The calculated Z-values =0.54 less than the critical values =0.7123 at 0.005 percent level of significance. The null hypothesis was therefore accepted. This

implies that there is no significance difference questioner mean response used of button hole and button attach machine.

The calculated Z-values =0.702 less than the critical values =0.7734at 0.005 percent level of significance. The null hypothesis was therefore accepted. This implies that there is no significance difference questioner mean response not used of button hole and button attach machine.

The operation Sew button to waist band corner and hip pocket (2pcs.) of according to Singapore JUKI standards after training SMV=0.32/min productivity (produces quantity=158/hrs so the gap minimized to standards after training operation of casual pants.

The operation Sew buttonhole on top of front, sleeve placket and cuff (5 pc) of according to Singapore JUKI standards after training SMV=0.63/min productivity (produces quantity=96/hrs but the gap minimized to standards after training operation of dress shirt, the data.

The operation Sew button to front (2pc) of according to Singapore JUKI standards after training SMV=0.71 productivity (produces quantity=87 but the gap minimized to the standards after training operation of men jacket

5.2. Recommendation

- Enterprise that was not used buttonhole and button attaching machine especially in Debre Brihan cluster shall use those machine instead of traditional/hand to products to reduce the cost, SMV and used to improve the productivity and quality of the garment.
- Governments and companies need to address apprenticeships, internships, and workforce re-skilling and up-skilling programs of enterprise and Institutions, including local institutions, are a vital part of the enabling for scaling-up technologies for adaptation.
- Stakeholder engagement is important right from the planning stage, socio-political relations between different groups.
- Government shall monitor and evaluation (M&E) is crucial to ensure continuous adaptation of the technology in a changing environment.
- Give recognizes that adaptation technologies, like buttonhole and button attaching machine market barriers at various stages of the value chain.
- Lack of market access and inadequate financial services are all barriers to access of adaptation technologies at the local scale which may need to be overcome through the development of market infrastructure or expanding financial services.
- Main streaming and integration of adaptation in to development processes and increase governmental extension services.
- In terms of enablers and barriers to the successful implementation of technologies, in the adaptation process almost all Parties identified economic and financial; policy, legal and regulatory barriers; institutional and organizational capacity relate and technical barriers to technologies for adaptation.

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APPENDICES

Appendix A (English version)

Bahir Dar University

Ethiopian Institute Of Textile and Fashion Technology

Garment Technology Department

Main objective: -

A Questionnaire to be filled by **use buttonhole and button attach machine**

General Direction: - The main purpose of this questionnaire is to collect necessary data for the assessment of technology adaptation in button hole and button attach machine and that to get final out put implementation of technology thereby to come up with some workable solutions to overcome the existing problems. To this end, the outcome of this study will highly depend upon your responsible, sincere and timely response. Therefore, you are kindly requested to fill the questionnaire honestly.

Note:

1. No need of writing your name.

2. All questions raised are of equal importance to attain the objectives of the study. Failure to complete any of them will negatively affect the overall study.

Part one: Background Information

1. Sex: a) Male b) Female
2. Age : a) 18-29 b) 30-39 c) above 40
3. Woreda/Town _____
4. Educational level_____

Part two: issues related to the **use buttonhole and button attach machine.**

Instruction: Below there are series of statements which represent issues related to used buttonhole and button attaching machine. Read each statement carefully and indicate your opinion about the buttonhole and button attaching machine by putting ‘X’ mark in one of the five alternatives.

Put(X) symbol for the questions rated with 5-1, Where; 5= Strongly Agree, 4= Agree, 3=Undecided, 2= Disagree and 1= Strongly Disagree

Notice: Please return this questionnaire within two days!

Thank you.

No	Questions on used buttonhole and button attach machine.	Scale of option				
		5	4	3	2	1
1	Have you come to the garment industry by your own?					
2	Do you perform miner maintenance during operation?					
3	Do you believe don’t get operator to maintain the buttonhole and button attaching machine filer during operation?					
4	Does you believe the machine have high electrical consumption?					
5	Does you creating a Buttonhole Using a Sewing Machine have time saving?					
6	Do you believe the buttonhole machine have faller during operation?					
7	Does your customer is local market?					
8	Does your product delivered on deliver time					
9	Do you agree to minimize the cost of product using buttonhole and button attaching machine?					
10	Do you agree to improve product quality using buttonhole and button attaching machine?					
11	Does he/she have proper threading of operation?					

Appendix B (English version)

Bahir Dar University

Ethiopian Institute Of Textile and Fashion Technology

Garment Technology Department

Main objective: -

A Questionnaire to be filled by **use buttonhole and button attach machine**

General Direction: - The main purpose of this questionnaire is to collect necessary data for the assessment of technology adaptation in button hole and button attach machine and that to get final out put implementation of technology thereby to come up with some workable solutions to overcome the existing problems. To this end, the outcome of this study will highly depend upon your responsible, sincere and timely response. Therefore, you are kindly requested to fill the questionnaire honestly.

Note:

1. No need of writing your name.

2. All questions raised are of equal importance to attain the objectives of the study. Failure to complete any of them will negatively affect the overall study.

Part one: Background Information

1. Sex: a) Male b) Female
2. Age : a) 18-29 b) 30-39 c) above 40
3. Woreda/Town _____
4. Educational level_____

Part two: issues related to the **use buttonhole and button attach machine.**

Instruction: Below there are series of statements which represent issues related to buttonhole and button attaching machine. Read each statement carefully and indicate your opinion about the buttonhole and button attaching machine by putting 'X' mark in one of the five alternatives.

Put(X) symbol for the questions rated with 5-1, Where; 5= Strongly Agree, 4= Agree, 3=Undecided, 2= Disagree and 1= Strongly Disagree

Notice: Please return this questionnaire within two days!

No	**Questions on** Market demand	Scale of option				
		5	4	3	2	1
1	Have you come to the garment industry by your own?					
2	Does you believe the machine have high electrical consumption?					
3	Do you buttonhole and button attaching machine that can make the work is easier?					
4	Does Creating a Buttonhole Using a Sewing Machine have time saving?					
5	Do you believe the buttonhole machine have faller during operation?					
6	Does your customer is local market?					
7	Does your delivered product on deliver time?					
8	Do you have financial problem to buy buttonhole and button attaching machine?					
9	Do you agree to increase the productivity using buttonhole and button attaching machine?					
10	Do you agree to minimize the cost of product using buttonhole and button attaching machine?					
11	Do you agree to improve product quality using buttonhole and button attaching machine?					

Appendix C /Amharic version /

ባህር ዳር ዩኒቨርሲቲ

የኢቲዮጵያ ቴክስታይልና ፋሽን ኢንስቲቲዩት

ጋርመንት ቴክኖሎጅ ድፓርትመንት

የጥናቱ ዋና አላማ፡-

የዚህ ጥናት ዋና አላማ በቁልፍ መትከያ እና የቁልፍ ቤት መስሪያ ማሽን ላይ ያሉ የለመጠቀም ችግርን በመለየት እና ሁሉም የስፌት ባለሙያዎች ቴክኖሎጂውን እንዲጠቀሙት በመለየት እና በማሰልጠን የመፍትሔ ሃሳቦችን በማስቀመጥ የትምህርት ጥናታዊ ጽሁፍ ለማቅረብ ነው።

በመሆኑም ለጥናቱ መሳካት እርስዎ የሚኖርዎት አስተዋጽኦ ከፍተኛ እንደሆነ በመረዳት በቁል ፍመትከያ እና የቁልፍ ቤት መስሪያ ማሽን በገበያ ላይ ተዎዳዳሪ እንዳይሆኖ ነገሮችን በመለየት ለችግሮች መፍትሄ ለመስጠት ስለሆነ ትክክለኛውን መረጃ በመስጠት ትብብር እንዲያደርጉልን በአክብሮት እንጠይቃለን። የሚሰጡት መልስም በአጥኚው ላይ ሚስጥርነቱ የተጠበቀ ነው።

ስም መፃፍ አያስፈልግም።

መመሪያ: ከታች የተዘረዘሩ መጠይቆች የዚህጥናት ዋና አላማ በቁልፍ መትከያ እና የቁልፍ ቤት መስሪያ ማሽን ላይ ያተኮሩ ሲሆን መልስዎትን የ 'X' ምልክት ካሉት 5 አማራጮች መጠቀም።

የ (X) ምልክት ለጥያቄዎች ተገቢ የሆነ መልስ 5-1, በጣም እስማማለሁ =5: እስማማለሁ =4: እርግጠኛ አይደለሁም =3: አልስማማም =2: በጣም አልስማማም =1 በመምረጥ ያስገቡ።

በቅድሚያ ስለትብብረዎ አመሰግናለሁ!!!

<u>መመሪያ፡</u>

በምርጫ ለቀረቡ ጥያቄዎች አማራጩን የክብ ምልክት በማድረግ መልስ ይስጡ። በባዶ ቦታ ለቀረቡ ጥያቄዎች በባዶ ቦታው ላይ መልስዎን በአጭሩ ያስፍሩ።

ክፍል አንድ. ዳህራዊ መረጃ

1. ፆታ፡ ሀ) ሴት ለ) ወንድ
2. እድሜ : ሀ) ከ18-29 ለ) 30-39 ሐ) ከ40በላይ
3. የደንበኛውየትም/ትደረጃ_____
4. ወረዳ/ከተማ_____

ክፍልአንድ. መጠይቅ

ተ.ቁ	የተዘጋጁ መጠይቆች	ለጥያቄው የተሰጠ ክብደት				
		5	4	3	2	1
1	አንተ/አንቺ ወደ ልብስ ስፌት ሙያ በራስዎ ፍላጎት ነው ስራውን የጀመሩት?					
2	አንተ/አንቺ ማሽኑ በሚበላሽበት ሰአት ቀላል ጥገናዎችን ታከናውናለህ/ሽ?					
3	.አንተ/አንቺ የቁልፍ መትከያ እና የቀልፍ ቤት መስሪያ ማሽን በሚበላሽበት ጊዜ የጥገና ባለሙያ አላገኝም ብለው ያምናሉ?					
4	አንተ/አንቺ የቁልፍ መትከያ እና የቀልፍ ቤት መስሪያ ማሽን ከፍተኛ የኤሌክትሪክ ፍጆታ አለው ብለው ያምናሉ?					
5	አንተ/አንቺ የቁልፍ መትከያ እና የቀልፍ ቤት መስሪያ ማሽን በመጠቀም መስራት ጊዜን ይቆጥባል ብለው ያምናሉ?					
6	አንተ/አንቺ የቁልፍ መትከያ እና የቀልፍ ቤት መስሪያ ማሽን በሚጠቀሙበት ጊዜ ይበላሽብኛ ልብለው ያስባሉ					
7	አንተ/አንቺ የሚያመርቱት ምርት ተጠቃሚዎች የሀገር ውስጥ ተጠዋሚዎች ብቻ ናቸው					
8	አንተ/አንቺ ምርትዎትን ለደምበኛ ባስቀመጡት የጊዜ ቀጠሮ ቀን ያስረክባሉ					
9	አንተ/አንቺ የቁልፍ መትከያ እና የቀልፍ ቤት መስሪያ ማሽን በመጠቀም የአንድን ምርት ዋጋ ያሻሽላል ብለው ያምናሉ					
10	አንተ/አንቺ የቁልፍ መትከያ እና የቀልፍ ቤት መስሪያ ማሽን በመጠቀም የአንድን ምርት ጥራት ያሻሽላል ብለው ያምናሉ					
11	አንተ/አንቺ የቁል ፍመትከያ እና የቀልፍ ቤት መስሪያ ማሽን ሲጠቀሙ ትክክለኛውን የክር አገባብ ይጠቀማሉ					

Appendix D /Amharic version /

ባህር ዳር ዩኒቨርሲቲ

የኢቲዮጵያ ቴክስታይልና ፋሽን ኢንስቲቲዩት

ጋርመንት ቴክኖሎጅ ዲፓርትመንት

የጥናቱ ዋና አላማ፡-

የዚህ ጥናት ዋና አላማ በቁልፍ መትከያ እና የቁልፍ ቤት መስሪያ ማሽን ላይ ያሉ የለመጠቀም ችግርን በመለየት እና ሁሉም የስፌት ባለሙያዎች ቴክኖሎጂውን እንዲጠቀሙት በመለየት እና በማሰልጠን የመፍትሔ ሃሳቦችን በማስቀመጥ የትምህርት ጥናታዊ ጽሁፍ ለማቅረብ ነው።

በመሆኑም ለጥናቱ መሳካት እርስዎ የሚኖርዎት አስተዋጽኦ ከፍተኛ እንደሆነ በመረዳት በቁልፍ መትከያ እና የቁልፍ ቤት መስሪያ ማሽን በገበያ ላይ ተዎዳዳሪ እንዳይሆንና ነገሮችን በመለየት ለችግሮች መፍትሄ ለመስጠት ስለሆነ ትክክለኛውን መረጃ በመስጠት ትብብር እንዲያደርጉልን በአክብሮት እንጠይቃለን። የሚሰጡት መልስም በአጥኚው ላይ ሚስጥርነቱ የተጠበቀ ነው።

ስም መፃፍ አያስፈልግም።

መመሪያ: ከታች የተዘረዘሩ መጠይቆች የዚህ ጥናት ዋና አላማ በቁልፍ መትከያ እና የቁልፍ ቤት መስሪያ ማሽን ላይ ያተኮሩ ሲሆን መልስዎትን የ 'X' ምልክት ካሉት 5 አማራጮች መጠቀም።

የ (X) ምልክት ለጥያቄዎች ተገቢ የሆነ መልስ 5-1, በጣም እስማማለሁ =5:እስማማለሁ =4:እርግጠኛአይደለሁም =3:አልስማማም =2:በጣምአልስማማም =1 በመምረጥ ያስገቡ።

በቅድሚያ ስለትብብረዎ አመሰግናለሁ!!!

<u>መመሪያ፡</u>

በምርጫ ለቀቡ ጥያቄዎች አማራጩን የክብምልክት በማድረግ መልስ ይስጡ። በባዶ ቦታ ለቀረቡ ጥያቄዎች በባዶቦታው ላይ መልስዎን በአጭሩ ያስፍሩ።

ክፍል አንድ. ዳህራዊ መረጃ

1. **ፆታ፡ሀ) ሴትለ) ወንድ**
2. **እድሜ : ሀ) ከ18-29 ለ) 30-39 ሐ) ከ40በላይ**
3. **የደንበኛውየትም/ትደረጃ_____**
4. **ወረዳ/ከተማ_____**

ክፍልአንድ. መጠይቅ

ተ.ቁ	የተዘጋጁ መጠይቆች	ለጥያቄው የተሰጠ ክብደት				
		5	4	3	2	1
1	አንተ/አንቺ ወደ ልብስ ስፌት ሙያ በራስዎ ፍላጎት ነው ስራውን የጀመሩት?					
2	አንተ/አንቺ የቁልፍ መትከያ እና የቀልፍ ቤት መስሪያ ማሽን ስራዎትን ቀላል ያደርጋል ብለው ያምናሉ?					
3	አንተ/አንቺ የቁልፍ መትከያ እና የቀልፍ ቤት መስሪያ ማሽን በሚጠቀሙበት ጊዜ የመብራት መቆራረጥ ስራዬ ይረዝል ብለው ያስባሉ?					
4	አንተ/አንቺ የቁልፍ መትከያ እና የቀልፍ ቤት መስሪያ ማሽን በመጠቀም መስራት ጊዜን ይቆጥባል ብለው ያምናሉ?					
5	አንተ/አንቺ የቁልፍ መትከያ እና የቀልፍ ቤት መስሪያ ማሽን በሚጠቀሙበት ጊዜ ይበላሽብኛል ብለው ያስባሉ					
6	አንተ/አንቺ የሚያመርቱት ምርት ተጠቃሚዎች የሀገር ውስጥ ተጠዋሚዎች ብቻ ናቸው					
7	አንተ/አንቺምርትዎትንለደምበኛባስወመጡትየጊዜቀጠሮቀንያስረክባሉ					
8	አንተ/አንቺ የቁልፍ መትከያ እና የቀልፍ ቤት መስሪያ ማሽን የመግዛት አቅም አለብዎት					
9	አንተ/አንቺ የቁልፍ መትከያ እና የቀልፍ ቤት መስሪያ ማሽን በመጠቀም ምርታመነትን ያሻሽላል ብለው ያምናሉ					
10	አንተ/አንቺ የቁልፍ መትከያ እና የቀልፍ ቤት መስሪያ ማሽን በመጠቀም የአንድን ምርት ዋጋ ያሻሽላል ብለው ያምናሉ					
11	አንተ/አንቺ የቁልፍ መትከያ እና የቀልፍ ቤት መስሪያ ማሽን በመጠቀም የአንድን ምርት ጥራት ያሻሽላል ብለው ያምናሉ					

Appendix E (English version)

Bahir Dar University

Ethiopian Institute Of Textile and Fashion Technology

Garment Technology Department

Main objective: -

A Questionnaire to be filled by **use buttonhole and button attach machine**

General Direction: - The main purpose of this questionnaire is to collect necessary data for the assessment of technology adaptation in button hole and button attach machine and that to get final out put implementation of technology thereby to come up with some workable solutions to overcome the existing problems. To this end, the outcome of this study will highly depend upon your responsible, sincere and timely response. Therefore, you are kindly requested to fill the questionnaire honestly.

Issues related to the **use buttonhole and button attach machine.**

Instruction: Below there are series of statements which represent issues related to buttonhole and button attaching machine. Indicate your opinion about the buttonhole and button attaching machine by putting 'X' mark in one of the five alternatives.

Put(X) symbol for the questions rated with 5-1, Where; 4= **Very low**, 3=**low**, 2= medium and 1= high

Notice: Please return this questionnaire within two days!

Observation check list that not used buttonhole and button attaching machine

Observed /Enterprise name					
Observed task	**Buttonhole and button attaching machine**				
Date of observation					
NO	List of activities observed	**Very low**	**low**	**medium**	**high**
1	Number of operator				
2	Time of operation performed for one product				
3	the productivity				
4	the cost of product				
5	the product quality				
6	Financial problem to buy button attaching machine?				
7	the product deliver time				
8	customer is local market				

Appendix F (English version)

Bahir Dar University

Ethiopian Institute Of Textile and Fashion Technology

Garment Technology Department

Main objective:

A Questionnaire to be filled by **use buttonhole and button attach machine**

General Direction: - The main purpose of this questionnaire is to collect necessary data for the assessment of technology adaptation in button hole and button attach machine and that to get final out put implementation of technology thereby to come up with some workable solutions to overcome the existing problems. To this end, the outcome of this study will highly depend upon your responsible, sincere and timely response. Therefore, you are kindly requested to fill the questionnaire honestly.

Instruction: Below there are series of statements which represent issues related to buttonhole and button attaching machine. Indicate your opinion about the buttonhole and button attaching machine by putting 'X' mark in one of the five alternatives. Put(X) symbol for the questions rated with 5-1, where; 4= **Very low**, 3=**low**, 2= medium and 1= high Notice: Please return this questionnaire within two days!

Observation check list that used button attaching and buttonhole machine

Observed /Enterprise name						
Observed task	**Buttonhole and button attaching machine**					
Date of observation						
NO	List of activities observed.	Very low	low	medium	high	
1	**safety rule during performance of task**					
1.1	check the setting of the machine					
1.2	Power on before tilting the buttonhole machine					
1.3	cleaning up machine before and after their task					
1.4	skills to be observed &measured					
1.5	Oiling of machine					
1.6	machine running after the ground wire is removed					
2	**Perform minor maintenance**					
2.1	Needle breakage					
2.2	Thread breakage					
3	select, check &prepare the required tool, equipment and facilities available					
4	Does not Operator to maintain the button attaching machine filer during operation?					
5	Correctly positioned button attaching?					
6	mark the placement with pins or tailor's chalk					
7	proper threading of machine					
8	down time of machine during electric power off					
9	Machine speed					
10	time of operation performing button attaching and buttonhole					

Appendix G

Standard Normal Probabilities of Z critical table

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.0	.5000	.5040	.5080	.5120	.5160	.5199	.5239	.5279	.5319	.5359
0.1	.5398	.5438	.5478	.5517	.5557	.5596	.5636	.5675	.5714	.5753
0.2	.5793	.5832	.5871	.5910	.5948	.5987	.6026	.6064	.6103	.6141
0.3	.6179	.6217	.6255	.6293	.6331	.6368	.6406	.6443	.6480	.6517
0.4	.6554	.6591	.6628	.6664	.6700	.6736	.6772	.6808	.6844	.6879
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389
1.0	.8413	.8438	.8461	.8485	.8508	.8531	.8554	.8577	.8599	.8621
1.1	.8643	.8665	.8686	.8708	.8729	.8749	.8770	.8790	.8810	.8830
1.2	.8849	.8869	.8888	.8907	.8925	.8944	.8962	.8980	.8997	.9015
1.3	.9032	.9049	.9066	.9082	.9099	.9115	.9131	.9147	.9162	.9177
1.4	.9192	.9207	.9222	.9236	.9251	.9265	.9279	.9292	.9306	.9319
1.5	.9332	.9345	.9357	.9370	.9382	.9394	.9406	.9418	.9429	.9441
1.6	.9452	.9463	.9474	.9484	.9495	.9505	.9515	.9525	.9535	.9545
1.7	.9554	.9564	.9573	.9582	.9591	.9599	.9608	.9616	.9625	.9633
1.8	.9641	.9649	.9656	.9664	.9671	.9678	.9686	.9693	.9699	.9706
1.9	.9713	.9719	.9726	.9732	.9738	.9744	.9750	.9756	.9761	.9767
2.0	.9772	.9778	.9783	.9788	.9793	.9798	.9803	.9808	.9812	.9817
2.1	.9821	.9826	.9830	.9834	.9838	.9842	.9846	.9850	.9854	.9857
2.2	.9861	.9864	.9868	.9871	.9875	.9878	.9881	.9884	.9887	.9890
2.3	.9893	.9896	.9898	.9901	.9904	.9906	.9909	.9911	.9913	.9916
2.4	.9918	.9920	.9922	.9925	.9927	.9929	.9931	.9932	.9934	.9936
2.5	.9938	.9940	.9941	.9943	.9945	.9946	.9948	.9949	.9951	.9952
2.6	.9953	.9955	.9956	.9957	.9959	.9960	.9961	.9962	.9963	.9964
2.7	.9965	.9966	.9967	.9968	.9969	.9970	.9971	.9972	.9973	.9974
2.8	.9974	.9975	.9976	.9977	.9977	.9978	.9979	.9979	.9980	.9981
2.9	.9981	.9982	.9982	.9983	.9984	.9984	.9985	.9985	.9986	.9986
3.0	.9987	.9987	.9987	.9988	.9988	.9989	.9989	.9989	.9990	.9990
3.1	.9990	.9991	.9991	.9991	.9992	.9992	.9992	.9992	.9993	.9993
3.2	.9993	.9993	.9994	.9994	.9994	.9994	.9994	.9995	.9995	.9995
3.3	.9995	.9995	.9995	.9996	.9996	.9996	.9996	.9996	.9996	.9997
3.4	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9997	.9998