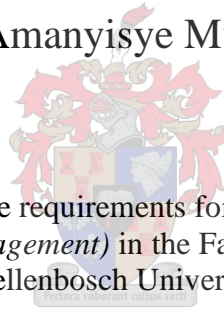# Knowledge Management in Communities of Practice: The Backyard Mechanics "Gereji Bubu" of Dar es Salaam

By

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Thesis presented in fulfilment of the requirements for the degree of *Master of Philosophy (Information and Knowledge Management)* in the Faculty of Arts and Social Sciences at Stellenbosch University

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# Declaration

By submitting this thesis electronically, I declare that the entirety of the work contained therein is my own, original work, that I am the sole author thereof (save to the extent explicitly otherwise stated), that reproduction and publication thereof by Stellenbosch University will not infringe any third party rights and that I have not previously in its entirety or in part submitted it for obtaining any qualification.

Date: March 2021

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# Opsomming

In die stad Dar es Salaam en ander dele van Tanzanië is die strate, oop ruimtes, en paaie gevul met baie informele en ongeregistreerde motorherstelwerkswinkels en agterplaas-motorwerktuigkundiges. Hierdie staan in Tanzanië bekend as "gereji bubu" en is 'n voortdurende kenmerk van die motorlandskap van die land. Een van die grootste risiko's vir die voortbestaan van sulke werkswinkels is die spoed waarteen motortegnologie verander. Alhoewel hierdie werkswinkels gewoonlik op ouer motormodelle werk, is hulle steeds blootgestel aan tegnologiese veranderinge en dit plaas druk op hul beskikbare diagnostiese tegnologie sowel as die vereiste kennis en vaardighede vir herstelwerk.

Die tesis ondersoek hoe hierdie werkswinkels (en die agterplaas-motorwerktuigkundiges wat daar werk) die veranderinge in die motortegnologie hanteer en wat hulle as die risiko's beskou wat verband hou met tegnologiese vooruitgang wat hulle werkswinkels moontlik verouderd kan maak. Die navorsing is gedoen deur onderhoude met werkswinkelseienaars en motorwerktuigkundiges toe voer, sowel as 'n inhoudsanalise van opmerkings van kliënte en eienaars op internetfora oor die dienste gelewer deur "gereji bubu".

Daar word bevind dat hierdie werkswinkels hul gesamentlike kennis onderhou en verbeter deur samewerking en kennisdeling. Inligting word nie net binne die werkswinkels gedeel nie, maar ook in breëre netwerke. Dit is moontlik omdat lede van die gemeenskap op mekaar vertrou, wedersydse voordele kry en erken word vir hul bydraes wat lei tot proses- en gehalteverbeterings in hul dienste. Alhoewel hierdie werkswinkels min ooreenkomste het met groot formele organisasies, kan hul kennisdeling beskou word as 'n voorbeeld van 'n praktykgemeenskap wat selektief saamwerk terwyl hulle ook direk met mekaar meeding.

Kennisoordrag vind hoofsaaklik deur "storievertelling" en "leer deur te doen" plaas en verteenwoordig die belangrikste kennisbestuurspraktyke wat onderskeidelik deur hierdie werkswinkels gebruik word vir kennis-eksternalisering en kennis-internalisering. Die werktuigkundiges het egter ook internetsoektogte en hul wyer sosiale netwerk gebruik om oplossings vir nuwe probleme te vind.

Laastens toon die onderhoude en forumposte dat daar onder lede van die gemeenskap groot kommer bestaan oor die toekoms van hierdie werkswinkels. Aangesien moderne motors toenemend deur rekenaars gediagnoseer word, vind hierdie werkswinkels dit moeilik om die nodige hardeware, sagteware en toerusting aan te skaf om mededingend te bly.

# Summary

In the city of Dar es Salaam and other parts of Tanzania, the streets, open spaces and roadsides are filled with many informal and un-registered automotive repair garages or backyard mechanics. These garages are popularly known as "gereji bubu" in Tanzania and they are enduring features of the automotive landscape of the country. One of the major risks to the longevity of such garages is the rapidly changing automotive technology. Whilst these garages typically operate on older car models, they are not immune to technological changes and these put pressure on their available diagnostic technology and repair knowledge and skill.

The thesis investigated how these garages (and the backyard mechanics working in them) cope with the changes in car technology and highlights what they consider to be the risks associated with the changes in technology that could potentially make their garages obsolete. The research was done by interviewing garage owners and mechanics, as well as by desktop research of posts by clients and owners on an internet forum.

It was found that these garages maintain and improve their collective knowledge through collaboration and knowledge sharing. Information is shared both within the garage and outside with their wider networks. This has is possible because community members trust each other, get mutual benefits, and get recognised for their contributions that lead to process and quality improvements in their services. Even though these garages bear little resemblance to large formal organisations, their mode of knowledge sharing can be considered an example of a Community of Practice that cooperates while they compete.

The mode of knowledge transfer was mainly "storytelling" and "learning by doing" as the main knowledge management practices used by these garages for knowledge externalisation and internalisation respectively. However, the mechanics also used internet searches and their social network to find solutions to problems.

Lastly, the interviews and forum posts show that there is a great concern over the future of these garages among community members. As modern cars are increasingly diagnosed by computers these garages find it difficult to purchase the necessary hardware, software and equipment in order to remain competitive.

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# Chapter 1. Introduction

## 1.1. Background

Knowledge has been variously defined as the information, facts, principles and skills acquired through education and experience—in other words the understanding of phenomena or subject matter, whether theoretical or practical. Knowledge is a valuable resource that is essential to the functioning of any organisation. Associated with knowledge, the process by which it is acquired and its effective application in organizational contexts, are cognitive skills such as interpretation, learning, reasoning, and communication (Epetimehin & Ekundayo, 2011).

Newell *et al.* (2002, 2009) refers to knowledge management as explicit strategies, tools and practices applied by management that seek to make knowledge a resource for the organisation. Knowledge management is not only a management application in organisations, it is also an academic field that theorise knowledge and the organisational practices that makes it productive.

Many large and formal organisations have enjoyed the fruits of managing knowledge in order to create business performance improvements centred around people rather than technology. About eighty per cent of large organisations practice knowledge management (KPMG, 2000). Knowledge Management (KM) is the deliberate effort to manage the organisational knowledge resource, whether found in the workers or in the technology and routines of the organisation. KM is deemed to be a necessary step in any organisation that intends to retain a competitive advantage in a world dominated by technological change which requires a frequent updating of the knowledge required to conduct work. A Knowledge Management framework aligns the strategy of an organisation with the knowledge processes, the organisational structure and roles, and available technology to deliver business value for its stakeholders.

## 1.2. Research Problem

There is extensive research on knowledge management in formal organisations, with a focus on explicit knowledge (knowledge that can be articulated) that is embedded into systems and

routines. On the other hand, there is minimal research on small, informal organisations whose knowledge is primarily tacit (a knowledge which cannot be articulated).

In the city of Dar es Salaam there are many informal and un-registered garages (backyard mechanics) popularly known as "gereji bubu". These garages exist under trees, in open spaces, or in residential properties. These garages lack the formality and structure of listed business organisations, but they also require knowledge discovery, knowledge sharing, and knowledge application. Whilst these garages do not have a formal knowledge management strategy, they do display knowledge practices which help them to stay competitive and articulates their relationship to the formal garages on whose periphery they operate and on whom they depend.

This thesis intends to study the practitioners in "gereji bubu" as a "community of practice" that exist in the wild as it were. According to Dubé *et al.* (2005) communities of practice can exist in physical settings, for example, a lunchroom at work or a factory floor. However a community of practice can also connect to each other in a virtual space, forming a "virtual community of practice" (VCoP) that collaborates online (typically in an online forum or discussion). Kietzmann et al. (2013) even found evidence for "mobile communities of practice" (MCoP) where the virtual collaboration takes place via cellphones and on the go.

These garages are preferred by many Dar es Salaam residents and Tanzanians in general, because they are generally less expensive than formal and registered garages, and they are usually located closer to their customers' place of residence or areas of work.

This research is aimed at understanding how these garages have managed to survive for all these years, despite changes and advancements in technology and the car manufacturing industry. The research further aims to highlight the risks associated with changing technologies and the resultant impact on these garages. Specifically taking the viewpoint of a community of practice, this thesis intends to uncover how knowledge made outdated by changing automotive technology is replenished by the community of backyard mechanics through processes like knowledge discovery, sharing, integration, and application.

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## 1.3. Research questions

I. How is knowledge inherited from one generation of the community of practice to another without the benefit of formal training in backyard mechanics?

II. How do backyard mechanics integrate their existing knowledge with newly discovered knowledge during problem solving?

III. What are the knowledge management practices that enable knowledge conversion processes, i.e. externalisation, internalisation, combination and socialisation among these backyard mechanics?

## 1.4. Conceptual Model

The following conceptual model is assumed to represent the knowledge management process that informs the research questions outlined in section 1.2 above.
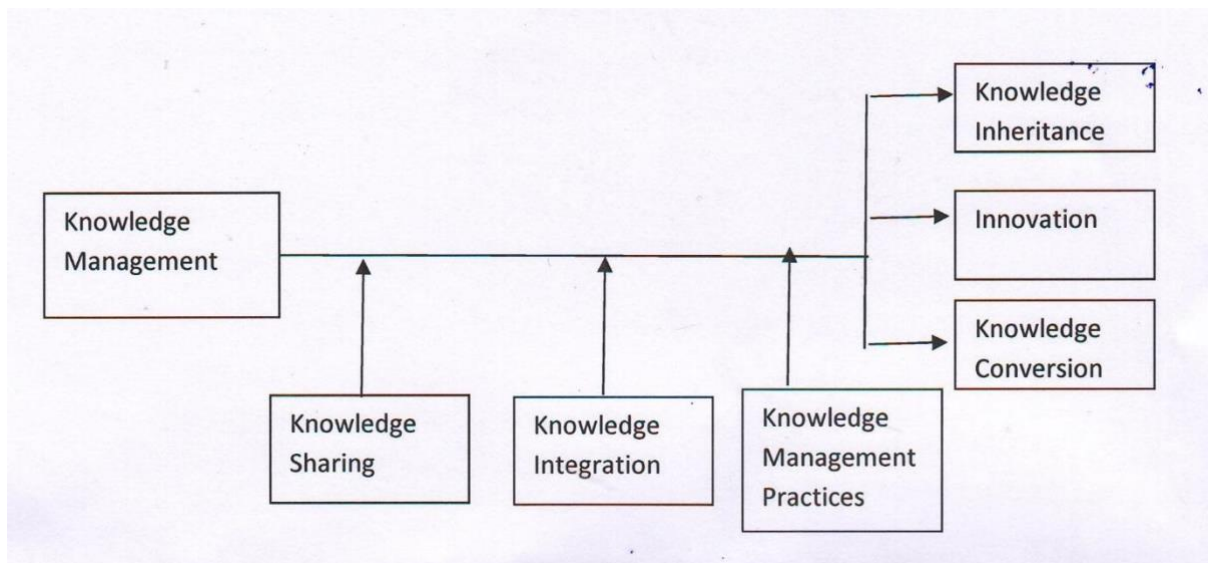


*Figure 1.1: Conceptual Model.*

## 1.5.  Relevance

This research paper contributes empirical evidence regarding the communities of practice, in the context of informal garages (gereji bubu) which are located in the mainland of Tanzania, to the research community and/or body of knowledge. There is little evidence that such studies have been performed in other countries and less so in developed countries, as most of these activities are organised and executed by large, formal organisations. This study empirically determines how knowledge management practices, technological changes and socio-cultural activities play a role in the continuity of these garages despite their lack of formalised knowledge management, training, or computers and central databases.

From a practical point of view, this study provides insight regarding the knowledge management practices that are conducive for knowledge transfer, i.e. externalisation, internalisation, combination and socialisation. According to Foray and Gaul (2003), the management of knowledge is a key factor in promoting innovation and competitiveness in organisations. Whilst knowledge management case studies usually are situated in organisations with a formal knowledge management system or in large organisations that are deemed able to benefit from it, little attention is paid to how knowledge practices exist in small informal settings where there are no attempts to directly manage knowledge and where any actual "knowledge management" is the responsibility of individual workers. The community of practice perspective is useful for this kind of study, because community members share a common knowledge interest and learn from each other through their participation in the community. Attempts to establish communities of practice in formal organisations in a top-down fashion resulted in many failures. Formal organisations can learn a lot from how such natural communities of practice exist in contexts where they are not conscripted but borne from necessity.

## 1.6.  Chapter Outline

In chapter one, the research problem was introduced, followed by background information for context. Thereafter, the research questions to be answered by this study and the conceptual model was presented, as well as the relevance of the study in terms of why this study is important and how it can add value to society.

In chapter two, the most applicable theoretical concepts will be identified and analysed. In this part, attention will be focused on existing literature around knowledge management in general, communities of practice, knowledge management and innovation. Furthermore, other essential concepts will be discussed such as; knowledge transfer, knowledge sharing and tacit and explicit knowledge. An additional concept is added to this theoretical framework, which is the use of internet and intranets as knowledge resources. Finally, the relationships between the theoretical concepts will be discussed resulting in the formulation of several hypotheses.

In chapter three, the methodology used in this study will be discussed, both qualitative and quantitative methods will be addressed in detail, together with their limitations. This part includes the explanation of the research design, sample size selection, research area and documents to be reviewed. Furthermore, we will explain and clarify how the theoretical concepts are put into operation and measurable indicators, the procedure of data collection and analysis, and in the end, how the reliability and validity of this research is secured.

In chapter four, the basics of car maintenance as well as the skills and experience needed in order to be a good motor vehicle mechanic are explored. Furthermore, the evolution of the motor vehicle industry, the changes that have been occurring in the industry over time and how the changes affected or will affect future mechanical jobs will be addressed. Also, knowledge management in the automotive industry is explored in a general context.

In chapter five, the analysis of both quantitative and qualitative data gathered, together with documentations related to this study will be performed and the results will be presented and discussed. In this part, the descriptive statistics of each variable will be discussed. Followed by a reliability analysis and the extent to which the items are measuring the same underlying constructs. In the end, an additional analysis of the use, extent and nature of knowledge transfer processes and the cultures that stimulate knowledge inheritance and innovation will be performed.

The last chapter includes the most important conclusions and discussions of this research. Furthermore, possible recommendations for future research will be discussed. In the last part of this chapter the limitations of this research will be identified. In this study there will be references to various figures and tables.

# Chapter 2. Literature review

## 2.1. Introduction

Backyard Mechanics "gereji bubu" are usually small businesses in terms of the number of workers and the surface area that they require to operate. They can be compared to a section or a department in a middle to large-sized organisation.

In backyard mechanics there are no formal procedures, policies, documentations or routines that act as a guideline for their daily operations, they do not have missions and visions in place to direct them. These garages use remarkably primitive tools for their day-to-day activities, for example to change an engine they would throw a chain over the branch of a tree, tie the engine on one side, and apply a load to the other side of the chain so that the engine can be lifted upwards.

Large, formal organisations are accustomed to structures like Knowledge Management, organizational structures, organizational strategies, and guidelines; however, this is not the case with backyard mechanics. They do not have access to advanced technologies, and they do not use computers to keep their records or process information. In fact, they have very few features that one would expect to find in organisations that have established Knowledge Management systems.

However, when considering the communities of practice literature, the formation and existence of backyard mechanics resemble the way that communities of practice are formed and exist, even in large business organisations. As we'll see in the literature on communities of practice, it is hard to kick-start such a community where none exists, and management-led efforts are often counter-productive. However, where communities of practice naturally form, they can be supported and then have a beneficial impact on the knowledge aspects of the organisation. The backyard mechanics form a community, even though they compete with each other for business, however they are forced to collaborate when it comes to knowledge and skills and therefore share a common knowledge interest regarding automotive technology. This resemblance with communities of practice found in more formal business settings is the reason why I decided to

use a communities of practice perspective to understand the knowledge processes in these informal organisations facing the threat of knowledge obsolescence.

Knowledge management is formally practiced in large organisations where the knowledge problem is one of sharing knowledge across departments and sections. In such organisations the issue is how to best pool knowledge or transfer what was learnt by a particular cross-functional team to the functional departments where the members were selected from. When it comes to sharing tacit and explicit knowledge and learn from each other, the workers in these departments and sections in large organisations behave similarly to the workers in small informal organisations. So although the aim of a formal knowledge management program in a large organisation might be loftier, on the micro-level the knowledge processes between workers are similar and it is worthwhile to consider knowledge management theory in our quest to understand processes of knowledge transfer, integration, and application in backyard mechanics too.

## 2.2. Knowledge Concept

Knowledge can be defined as the cognisance or comprehension of something or someone that. is acquired through education experience (www.wikipedia.org). Weiner and Simpson (1991) define knowledge as "the fact of recognising as something known about". There is no clear definition as to what knowledge is and how it should be managed, although all descriptions about knowledge emphasize the "know" part and underscores the last part "ledge" as a mere analytical pronunciation.

According to Laurence Bonjour (2017) and other philosophers, knowledge is categorised into three conditions,

1. Belief when the statement is perceived to be true.

2. The statement is truthful.

3. The individual is justified in thinking the statement is true.

**Belief**

Belief is a person's view of something that is the case or true, usually in situations where there is little or no proof. A person's belief system (collection of beliefs and principles) shapes the way they view the world and will drive how they act and behave.

**Truth**

Truth is the quality or state of being true, something that is in accordance with fact or reality. A person views their beliefs as true, however since beliefs are not always based on fact, they may not be aligned with actual truths and the manner in which the world truly is.

**Justification**

In the event that the "seed of knowledge is belief", what transforms belief into knowledge? Justification is the activity of demonstrating that something is correct or sensible. An individual knows something on the off chance that they are justified in believing it to be valid.

## 2.3. Knowledge and organisation types

It is an important step for knowledge management (KM) to consider the various ways in which knowledge can occur and thus be able to differentiate between different types of knowledge. It should be very obvious, for example, that the information captured in a paper will have to be handled (i.e., stored, retrieved, exchanged, updated, etc.) in a completely different way than that acquired over the years by a knowledgeable artisan.

Knowledge Management and organizational learning theory are often rooted in the interaction and partnership between these two forms of expertise. This definition was introduced and developed by Nonaka in the 1990s (e.g., Nonaka 1994) and remains a theoretical pillar of this discipline. Botha et al. (2008) point out that implicit and explicit information can be seen as a continuum rather than a conclusive point. Therefore, in practice, all knowledge is a mixture of tacit and explicit elements, rather than being either or. However, it is important to identify these theoretical opposites in order to understand knowledge.

S Some researchers further distinguish and explore embedded knowledge. As a result of this, they are able to classify the differences between the types of knowledge that is embodied in people, processes, organisational culture and routines (Horvath, Gamble and Blackwell, 2001) use a scale consisting of represented-embodied-embedded knowledge, where the first two closely match the explicit-tacit.

Without question, the foremost distinction within Knowledge Management is between explicit and implied information. However, it can be contended that the embedded dimension is an important addition, since the administrative necessities of this sort of information are distinctive. For this reason, this reference, when significant, will use all three categorisations of knowledge, but at the centre there will be on the explicit-tacit dimension.

From knowledge work literature, Blackler (1995) identified four knowledge and organisation types. These types are identified as expert dependant (embodied), knowledge in routines (embedded), symbolic – analyst dependant (embedded) and communication intensive (encultured). The literature further recognizes the trend which indicates that there is a move from embodied and embedded knowledge organisation types to embedded and encultured knowledge organization types as summarised below.

## 2.3.1. Expert Dependent organisations

In expert-dependent organizations, the focus is on the expertise of key stakeholders whose knowledge is focused on common issues, such as specialist physicians. Hospitals employing doctors or a law firm employing lawyers will be an example of this in other industries. These workers are vital to the organisation's primary goals.

Aarrevaara (2005) states that organisations may be either autonomous or heteronomous but continues to clarify that expert-dependent organisations are usually autonomous, primarily because experts have more control over their own work. This implies that the degree of autonomy can be calculated by the degree of autonomy given to experts in the organisations.

There is a shift from expert-dependent to encultured and which is presented to back group works between people who are separated in time and space. Implied information is personal knowledge an employee has, and this may be challenging to convey to others. Since a populace

of employees possess a theoretically boundless number of mental models or ways of seeing data, tacit knowledge is often personalised and highly specific in scope (Lubit, 2001). Lubit further observes that unequivocal information is codified and put in the "organisational memory" and is accessible to workers all through the structure.

In knowledge routinised organisations, knowledge is embedded in technologies, rules and procedures. These organisations try to achieve their goals by collectively focussing on familiar problems.

## 2.3.2.    Knowledge routinised organisation

According to the Open Journal of Management (Issue III/2011), there are several challenges of Knowledge Management, because working with people is not like a control loop that entails simply scrutinising problem areas and re-adjusting these for change. There are several challenges that one should expect, such as barriers in technology, which has several limits especially in terms of communication and workflow management. Another barrier is linked to individual skills, in that delivered content may simply not be understood. Further, barriers in organisations occur when the knowledge-sharing culture is badly role-modelled by those highest in the organisation's hierarchy, in turn hindering Knowledge Management. Lastly, are the barriers in personnel, where the human factor is key and many of the above-mentioned issues are connected to individual behaviour.

## 2.3.3.    Symbolic analyst dependant

For symbolic analyst dependent organisations, emphasis is placed on embedded knowledge, where the skills of main members focus on novel problems such as software consultancies.

According to Reich (2003), symbolic-analytic services jobs include problem-solving, identifying and brokering of many people and these include research scientists, design engineers, public relations executives, investment bankers, lawyers, real estate developers and even a few creative accountants.

Further to this category, there are many works by management consultants, management information specialists, organisation development specialists, strategic planners, corporate head-hunters, and systems analysts.

Reich further asserts that, like routine production services, symbolic-analytical services can be exchanged worldwide and thus compete with international suppliers, as well as in the American industry. They do not, however, enter world trade as standard goods. The manipulations of symbols, data, words, oral and visual representations are exchanged instead.

## 2.3.4. Communication Intensive

Stephen R. Axley (1996) argues that communication encompasses virtually everything that managers do. What most people incorrectly believe about communication can and does restrict their effectiveness, both professionally and personally. Communication is hard "work" and more difficult than people know. Concrete advice and thought-provoking questions illustrate how to be a more successful communicator.

For communication-intensive organisations, emphasis is placed on encultured knowledge and collective understanding where novel problems such as innovation mediated production are in focus. Ideally, a firm can improve the management of its intellectual capital base by discovering the tacit knowledge of its employees and turning it into explicit knowledge that will then be available to others (Erickson & Rothberg, 2000).

## 2.3.5. Encoded Knowledge

Encoded knowledge is a vital first step in developing a new memory. It is a mechanism that enables the perceived object of interest to be transformed into a construct that can be processed within the brain and then remembered from short-term or long-term memory.

Literature has suggested that electronically encoded and distributed information has also been applied to conventional encoded knowledge forms, in order to produce a coherent and consistent pattern of action and output in organisations. It discusses the importance of this argument for organisations: information encoded by de-contextualized abstract symbols is

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invariably highly selective in the representations / meanings it can express (Blackler, 1995), Zuboffs (1988)

Blackler further criticizes the fifth form of knowledge (encoded knowledge) by suggesting that this form of knowledge is not different from others, but that it is used to transform other forms of knowledge by using information and communication technologies.

## 2.4.  Knowledge Management

Operationally, Knowledge Management is the systematic administration of an organisation's knowledge assets. The main objective has consistently been to create value in order to meet the Organisation's intended goals and objectives. Knowledge Management includes initiatives, procedures, methods and systems that will allow the organisation to preserve and improve the storage, evaluation, sharing, production and development of knowledge. It further leads to a strong tie to organisational goals and plan. It is a process that involves managing the information that is crucial and has a linear purpose to create and add value to the organisation. In order for the above to succeed Knowledge Management should create and provide the right tools, people, knowledge, structures and culture. It further needs to enhance learning, that will enable the understanding of the value and applications of the new knowledge. Management of knowledge has the role of ensuring that the information is readily available for the right people at the right time. Ensure a continuous access, application, refinement and removal if not required.

Evidence has now shown Knowledge Management as a popular research topic in recent years because it has been recognised as key to efforts to boost competitiveness and innovation (Newell *et al.* 2002, 2009). Many people have researched this area and others are still researching in order to learn different ways of managing knowledge and knowledge work.

 Newell et al (2002) refers to knowledge management as explicit techniques, tools and procedures implemented by management to make knowledge a resource for the company. As a field of research, Knowledge Management is involved with the development of principles that illuminate or improve the implementation of such activities.

Alavi & Leidener (2001) on the other hand proceed from the assumption that knowledge is something that we do. Their discussion is based on the development of Knowledge

Management and Knowledge Management Systems that will assist in the management of the knowledge creation, storage/retrieval, transfer and application processes.

Puja Shrivastav (2016) views knowledge management as an attempt to offer a more realistic overview of it. Like Gamble & Blackwell, he underlined the focus on managerial initiatives.
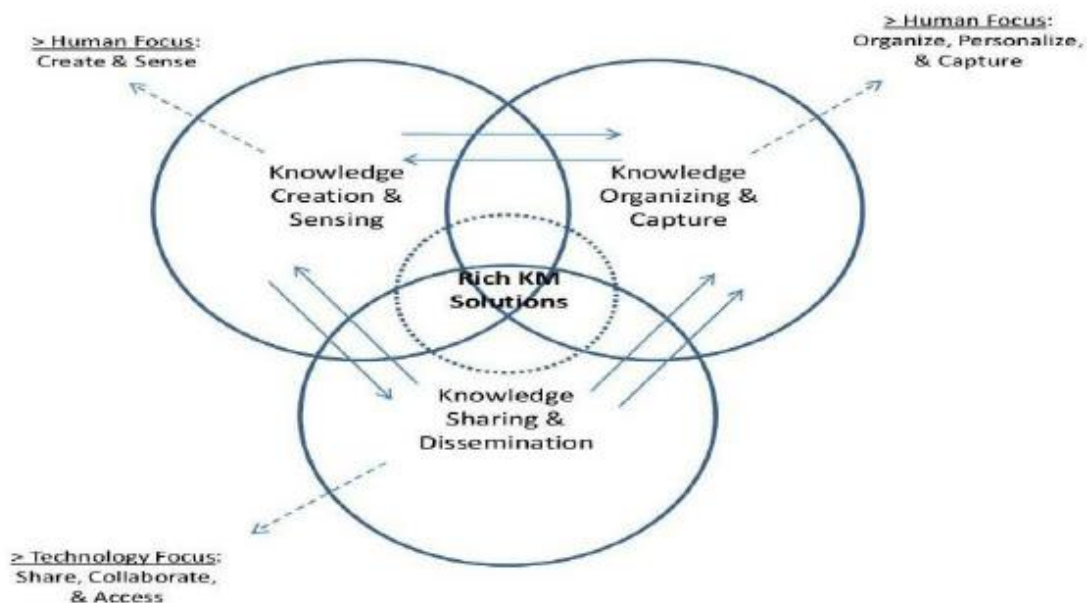


*Figure 2.1: The Knowledge management Process (Botha et al, 2008).*

## 2.4.1.  Theoretical Models of Knowledge Management

In order for any knowledge Management initiative to succeed, a strong theoretical foundation is required.   Due to the the recent work that has been conducted on the various conceptual and theoretical models of Knowledge Management, the field of study has increased its credbility as an academic area of study as well as a professional field of practice (Dalkir, 2011).

In the book entitled "Theoretical Models of Information and Knowledge Management," Sirie (2014) thoroughly explored the seven models of Knowledge Management, the first widely accepted model was the SECI (Spiral Knowledge Model) model, which explains how tacit knowledge and explicit knowledge can be transformed in an organisation. This model takes into account the nuanced and dynamic existence of knowledge and cultural and contextual influences.  In addition to the Knowledge Spiral Model as it has been described by Sirie, a

further seven models will be discussed hereafter to show the extent of the success of the Knowledge Management initiatives. These models include The Nonaka and Takeuchi Knowledge Spiral Model (1995), The von Krogh and Roos Model of Organisational Epistemology (1995), The Choo Sense-Making KM Model (1998), The Wiig Model for Building and Using Knowledge (1993), The Boisot I-Space KM Model (1998), Complex Adaptive System Models of KM, and The European Foundation for Quality Management (EFQM) KM Model.

The Nonaka and Takeuchi Knowledge Spiral Model (1995) is rooted in two leading Japanese industry experts, Hirotaka Takeuchi and Ikujiro Nonaka, whose skill led to Japan's first success by producing creative and realistic information that led to new technologies and products.

It is perceived that the Nonaka and Takeuchi Knowledge Spiral Model is a holistic model of knowledge formation and 'serendipity' management (Darkir, 2011). Both the tacit and explicit continuum of knowledge forms (epistemological dimension) and the individual, group, organisational or three-tier model of knowledge sharing, and diffusion (ontological dimension) are required to build knowledge and to generate innovation.

Sirie (2014) and Darkir (2011) further clarify that there are essentially two forms of knowledge. The first is explicit knowledge which is recorded and second is tacit knowledge, which is learned through experience, correspondences and verbal communications. They claim that there are various focal areas of knowledge and while American leaders concentrate on explicit knowledge, the Japanese concentrate on tacit knowledge. Authors acknowledge the disparity between the two types has led the latter to turn the tacit into explicit knowledge.

As per Sirie and Dalkir, Western culture regards the knower and the known as two separate entities. This varies from the structural properties of Japanese language and influences such as Zen Buddhism have led the Japanese to recognise that there is unity between humanity and nature, body and mind, and self and others.

In their book, The Knowledge-Creating Company, Nonaka & Takeuchi (1995) comprehensively discuss the way in which Japanese companies develop this new knowledge in their organisations. For example, Matsushita 's invention of the Home Bakery is a representation of how tacit knowledge can be translated to explicit knowledge. Designers with little

knowledge and experience struggled to master the dough kneading mechanism. With the help of a software programmer and a mater baker from the Osaka International Hotel, they were able to gain a tacit understanding of kneading.

Sirie and Dalkir concluded that the ideal management style to aid in the creation of knowledge is the middle-up-down approach. Neither top-down nor bottom-up approaches may lead to success. In their understanding, middle managers are said to be the link between the principles of top management and the volatile conditions of the frontline.

Nonaka and Takeuchi suggest that creating knowledge will become essential to retaining a competitive advantage in the future. Since the business landscape and consumer trends are constantly evolving, knowledge perishes easily. With the Knowledge-Creating Company, managers have years' worth of experience and are able to demonstrate how to continuously develop knowledge and how to utilise it to make effective new goods, services and systems.

He asserts that the SECI model is a well-known conceptual model that was initially suggested by Nonaka (1991) and extended upon by Nonaka and Takeuchi (1995). It explains how explicit and tacit information is created, shared and replicated in organisations. Although it was first developed in the context of business organisations, the model can easily be extended to education, as discussed by Lin, Lin and Huang (2008) and Yeh, Huang and Yeh (2011).

Ensuring personal knowledge is accessible to anyone in the organisation is at the centre of this Knowledge Management model. This type of knowledge development process takes place on an ongoing basis and exists in all levels of a company. Knowledge generation is an unpredictable process in many cases (Dalkir, 2011).
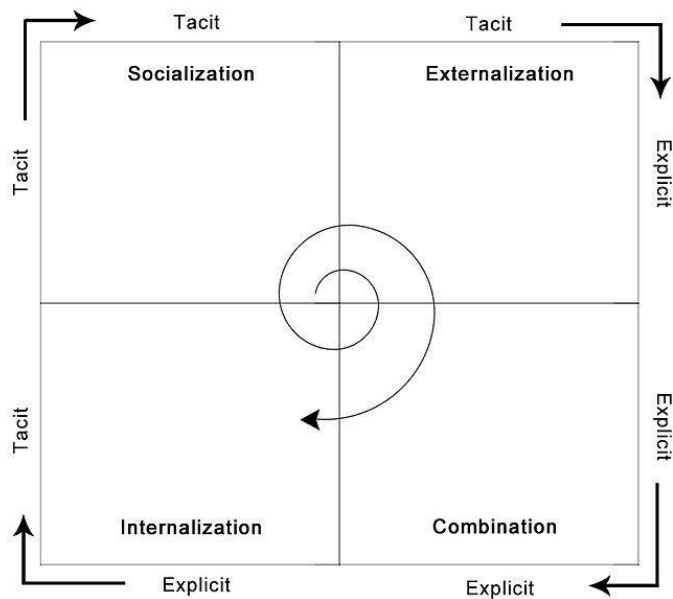
*Figure 2.2: SECI model of knowledge dimensions.*

Socialisation (tacit to tacit) "is the process of converting new tacit knowledge through shared experiences in day-to-day social interaction."

Externalisation (tacit to explicit) is a process whereby "tacit knowledge is articulated into explicit knowledge…so that it can be shared by others to become the basis of new knowledge".

Combination (explicit to explicit) is a process whereby the collection of explicit knowledge occurs on either the inside or outside of the organisation and then undergoes combination, editing or a process to form explicit knowledge that is more complex and systematic. This leads to the dissemination of the new explicit knowledge among the organisation's members.

Internalisation (explicit to tacit) is a process whereby the creation and sharing of explicit knowledge occurs throughout an organisation and the individuals then convert it into tacit knowledge. This stage where knowledge is used and applied in practical situations, as well as becomes the base for new routines, is understood as praxis.

Source:( http://www.dubberly.com/articles/design-as-learning.html, retrieved August 2018)

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Sirje concludes that the Nonaka and Takeuchi model has shown to be one of the most reliable in the field of Knowledge Management and continues to be implemented in a number of settings.

**The von Krogh and Roos Model of Organisational Epistemology (1995)**: On the other hand, Sirje ranks "The von Krogh and Roos Model of Organisational Epistemology" (1995) as the first model that explicitly differentiates between individual knowledge and collective knowledge from an epistemological perspective on Knowledge Management.

According to this model of Knowledge Management, the following aspects of knowledge were analysed:

- Why and how the knowledge reaches employees
- why and how the knowledge reaches the organisation
- what does it imply if knowledge is for the employee/organisation?
- what are the barriers for organisational Knowledge m Management (Cristea and Căpaţînă, 2009)?

Cristea and Căpaţînă, (2009) provide two theories of knowledge which are critical for developing knowledge management models known as "the cognitive perspective" and cognitive epistemology. The former model states that a cognitive system creates representations of reality and the process of learning appears when these representations are used in different inferences. This normally does not consider whether the system is human or artificial.

Cognitive epistemology views organisational knowledge as a framework with characteristics of self-organisation. People believe in the transparency of external knowledge. In this context, the brain is regarded as a computer focused on logic and detection, which does not allow conflicting statements. It is recognised that the brain does not process sequential symbols, but instead interprets the entire perspective, universal properties, models and synergies. As a result, the organisation collects the knowledge that it has by means of inquiries and various cognitive skills, potential actions will be produced – all dependent on the mobilisation of personal cognitive resources. Training rules control the way in which the various components relate to one another. Prior knowledge and practise contribute to understanding.

The Von Krogh and Roos models not only conform to the concepts of the connectionist method, but also explore the essence of Knowledge Management from the context of staff, communication, organisational structure, linkages between stakeholders and human resources management. In this organisational model, knowledge exists both in the minds of people and in the relations between them.

In his book, Sirie (2014) notes that if personnel do not view knowledge as an integral part of the business, this standpoint is often reflected in their quality of work.And on that notion, keeping the new knowledge will be difficult if common language is lacking. Furthermore, it will be challenging if members of the organisation are less willing to share experiences that may lead to collective/new knowledge. It is for this reason companies should use tools to stimulate employees to activate knowledge creation.

Dalkir (2011) concludes that organisations need to generate ideas that will stimulate individual knowledge development, group sharing of knowledge and hence retain the treasured knowledge-based content of the organisation.
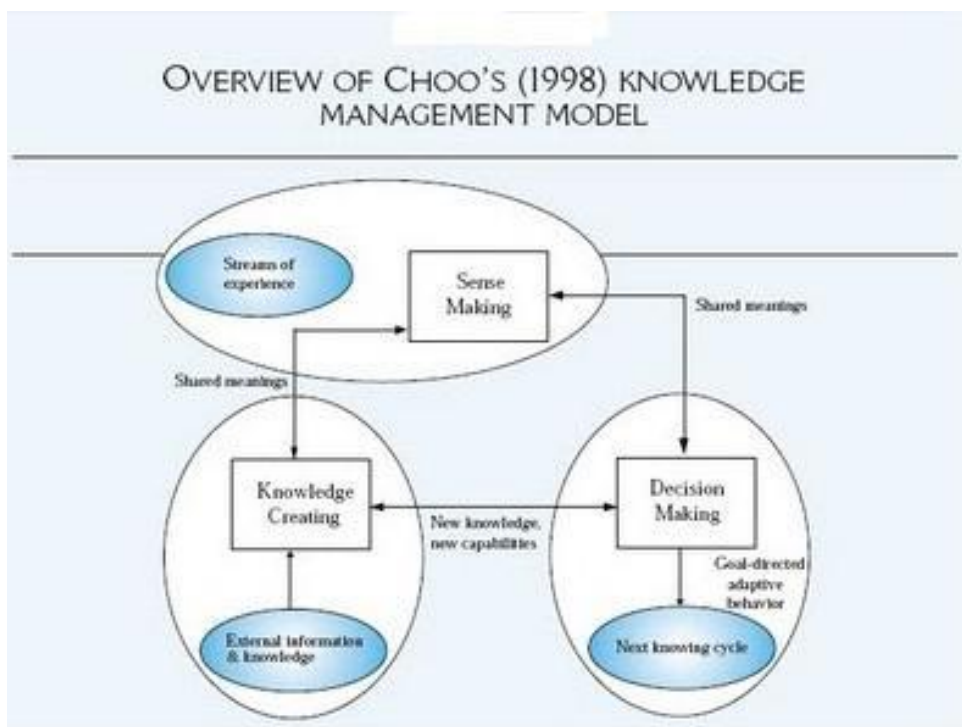


*Figure 2.3: The Choo Sense-Making KM Model (1998).*

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In its Knowledge Management Model, Choo (1998) insists that "knowledge organisations" are those that use information strategically in three areas namely, sense-making, knowledge-creation and decision-making. All three are strongly interlinked processes and serve a critical part in forming the knowledge vision of the company, its capacity for knowledge development and its dedication to developing knowledge to the greatest possible extent (Neto et al., 2009).

Neto et al. recognise the long-term objective of sense making as a guarantee that companies can evolve and continue to succeed in a competitive and complex environment through the prospecting and analysis of relevant information, allowing them to consider the developments, patterns and scenarios of customers, suppliers, competitors and other external environmental actors. Organisations are confronted with problems such as the mitigation of uncertainty and the control of ambiguity.

Knowledge development is described as a process that enables an organisation to develop or acquire, organise and process information in order to develop new knowledge through organisational learning. Neto et al. further emphasises that the new knowledge created in turn enables the company to acquire new abilities and capabilities, make new products and services, improve current ones as well as remodel organisational systems. This shows the companies "potential to act".

 The third aspect of the Choo (1998) model addresses decision-making. The organisation must select the best choice between those appropriate to pursue and adopt on the basis of the organisation's strategic goals. The decision-making system in organisations is limited by the concept of bounded rationality, as proposed by March & Simon (1975).

Following the Wiig Model for Building and Using Knowledge (1993), Sirie places significant emphasis on the effectiveness and importance of the knowledge organisation. Knowledge can be arranged differently based on what knowledge will be utilised for and should have five dimensions, including completeness, connectivity, congruence, perspective and intent.

Dalkir (2011) speaks to completeness with regards to the extent of relevant knowledge that is available at a given source and whether the knowledge is fully established if all the information available on the subject exists at the source. This is contrary to the above, where no one can make use of the knowledge.

Connectedness is referred to as well-understood and well-defined relationships between various objects of knowledge. The more knowledge objects are connected to each other, the more the knowledge base is connected. This results in increased coherent content and higher value.

All evidence, ideas, viewpoints, beliefs, judgments and relational connections between objects should be coherent in order to be consistent. Finally, perspective is referred to as a phenomenon from which one understands something from a particular point of view for a specific reason. Most knowledge is structured using the dual dimensions of perspective and purpose.

The Boisot I-Space KM Model (1998): Sirje suggests that the Boisot Knowledge Management model is based on the key concept of an "information good" that varies from a tangible commodity. Boisot differentiates information from data by highlighting that information is what the analyst will derive from the data as a result of his or her perceptions or prior knowledge. Dalkir Boisot (1998) suggests the following two primary points:

- The rate at which data can be organised and translated into information determines the extent to which it is diffusible.
- Data that is less organised requires a common context in order to make it more diffusible.

In his citation, Dalkir (2011) visualises the Boisot's model as a three-dimensional cube from uncodified to codified, concrete to abstract and un-diffused to diffused.

Based on the above three dimensions, Dalkir suggests a Social Learning Cycle (SLC). It uses the I-Space to model the dynamic flow of knowledge through a series of six phases. Firstly, awareness is gained from the available data through scanning. Secondly, knowledge is codified, hence problems are solved through a logical sequence of reasoning, During the fourth-dimension insight is conceptualised and then distributed. The fifth dimension is absorbing the newly codified insights in order to produce the new learning. Lastly is the process of embedding abstract knowledge into concrete practise.

The Social Learning Model is always multidimensional. The last stage of it leads to information access and transfer. Moreover, this last stage is preceded by abstraction that facilitates

knowledge creation and diffusion. In order for the knowledge to be effectively operationalised, the SLC has to link the content, information and KM, then systematize the categorisation and classification of the knowledge.

Knowledge assets at the opposite end of I-Space (least abstract, least codified, and most diffuse) have the greatest degree of uncertainty. Therefore, they have the least ability to do value-added work. Knowledge is always an asset and very important for any organisation that intends to effectively perform the value adding work. It is therefore imperative for organisations to move their knowledge assets into the region of minimum entropy. Thus, among the most crucial components of SLC is the dynamic nature of knowledge. It is at this juncture when the fifth dimension of SLC where data is codified and filtered in order to produce the new learning. It is the stage where meaningful information is produced for applications in diverse situations.

Boisot Model perceives that most organisations are living organisms. They are dynamic and hence they have the potential to grow and develop knowledge assets within themselves and therefore require a dynamic Knowledg Management strategy which takes into account the complexity of the organisational learning cycle.

Evidence from a complementary documentary review of the Intelligent Complex Adaptive Systems (ICAS) theory (Sirie cites Dalkir (2011), Cristea and Capatina (2009)), has indicated that organisations have an adaptive and complex system. The systems use communications and control mechanisms in order to understand, describe and predict what should be a viable organisation. This according to the reviews is based on the cybernetics principles. Adaptive systems have many independent agents which interact with each other. Together, their combined behaviour gives rise to complex adaptive phenomena (Dalkir, 2011). Their behaviour makes the appearance of some complex phenomenon of adaptation possible.

Beer (1981) for instance was a pioneer in the treatment of the organisation as a living object. This is supported by other evidence from Cristea and Căpaţînă, 2009 who attest that there is no general authority to manage the way in which these agents should work, hence calling for an interactive approach if a good result of Knowledge Management is desired.

The way it operates is that inside the adaptive model, the intelligent components are made of self-organised people who remain a part of general hierarchies of these

organisations. Moreover, the biggest challenge that they face is to use the advantage given by the force of the people when they cooperate, keeping a global sense of unity. In order for the organisations to solve problems, they create options by using internal and external resources, hence adding value to the initial input. The knowledge therefore becomes the treasured resource as it is the only one who can frame the context where uncertainty exists. It is also the criteria of distinguishing information management from Knowledge Management. In this case, it is important to distance the anticipated responses from new responses during unanticipated circumstances. (Cristea and Căpaţînă, 2009).

Bennet on the other hand defines a method of Knowledge Management, using ICAS systems as a starting point. The survival of any organisation does not only dwell on the traditional bureaucracies, as this will not provide the necessary cohesion for survival of the organisation. Bennet suggests a new paradigm in which the company is viewed as a mechanism found in a symbiotic relationship with its environment. The Bennet model is focused on a variety of subsystems that communicate and develop in order to create an advanced and intelligent technology organization. (Cristea and Căpaţînă, 2009).

The last model is the 1992 European Foundation for Quality Management (EFQM) Excellence Model. It was structured as a framework for the evaluation of applications for the European Quality Award. It is presently a commonly used organisational structure in Europe and has become the basis for numerous national and regional quality awards.

The EFQM Model is a non-prescriptive paradigm that acknowledges that there are multiple ways to achieve sustainable results and is utilised as a management method and a realistic tool to assist companies to assess where they are on the road to success, providing valuable insight into any gaps and facilitating solutions. It also promotes the process of organisational self-assessment. The model acknowledges that there are several methods to achieving sustainable excellence in all areas of performance. The application of the EFQM model does not take into account the scale, structure, type and sector of the enterprise where the outcomes of self-assessments form the basis of the business planning process, as well as the basis for an operational and project evaluation.

- There are some basic principles within this strategy that are not static, and which alter overtime as successful organisations grow and strengthen. The existing indicative

concepts are Results Orientation which is based on the excellence in achieving results that impress all the organisation's stakeholders, visioning the Customer Focus through creating sustainable customer value, realistic, visionary and inspirational Leadership & Constancy of Purpose, Excellence in managing the organisation through a set of interdependent and interrelated systems, processes and facts, involving at the maximum level employees in order to recognise their contribution to the Organisation development,

- Continuous Learning, Innovation & Improvement becomes a need that may create innovation and improvement opportunities, there should be excellence in partnership development in order to develop and maintain value-adding partnerships and lastly Corporate Social Responsibility where the organisation operates and strives to understand and respond to the expectations of their stakeholders in society.

According to the EFQM Excellence Model, there are nine requirements, of which five are 'Enablers' and four are 'results'. The former addresses what an organisation does, and the latter incorporates what an organisation achieves. They are interdependent and interrelated since the outcomes are achieved by the enablers and the insight from the results helps to enhance the enablers.

Several Knowledge Management models have been implemented in this learning object. The first widely accepted model was the SECI (knowledge spiral model) model, which explained how tacit knowledge and explicit knowledge can be transformed in an organisation. The knowledge spiral model has been expanded, updated and alternative Knowledge Management models have been presented, taking into account the nuanced and diverse existence of knowledge, cultural and contextual influences.

Knowledge Management models help to assemble the puzzle in a manner that relates to a deeper understanding of both the components and the structure they make up. The model-driven approach not only allows for a clearer explanation of what is occurring, but also helps to provide a clearer strategy for achieving organisational objectives (Dalkir, 2011).

## 2.4.2.      Knowledge Management Challenges

The difficulties experienced in Knowledge Management can be attributed to the fact that dealing with people is much more complicated than the control loop. There are many obstacles, such as barriers to technology, which have many limitations, especially in terms of communication and workflow management. Another limitation is related to human abilities, in which the information delivered cannot be interpreted. In addition, obstacles in an organisation where a knowledge-sharing culture of the company has been badly implemented or under-utilised by management will impair Knowledge Management development. Finally, are staff obstacles where the human element is key and many of the problems mentioned above are linked to individual behaviour.

Newell (2002) proposes two assumptions and points out the obstacles that would be faced if Knowledge Management was implemented. Knowledge is held, and knowledge is something that individuals do. If knowledge is possessed, then the key obstacle is to extract it from people and make it accessible as an organisational resource, however if knowledge is something individuals do then the objective is to provide an incentivising environment that enables people to do things differently and ideally better.

From the article by Blackler (1995), the first part proceeds from the assumption that knowledge is possessed (embodied, embedded, encultured, encoded) and the second part proceeds from the assumption that knowledge is something that people do (activity, practice, process) as shown in the discussion above. The Knowledge Management challenges will therefore be as identified by Newell in his introductory chapter for each assumption.

## 2.5.   Informal Sector and Knowledge Management

The sector which is normally thought as a sector of low skilled or unskilled people is the informal sector. The position of the National Commission on Enterprises in the Unorganized Sector (NCEUS) - India is that majority of the informal workforce is unskilled (Sengupta et al. 2009: 3). This conclusion was made based on the fact that people working in informal sector earn low income associated with low productivity and low levels of formal education and training. In his article "The informal sector from a knowledge perspective", (Amit Basole,

2015) took a closer look at all these aspects. He disagrees with most policy and academic approaches used to address this issue, he claims that there exists a large reservoir of knowledge in the informal sector associated with well-established but poorly understood institutions of knowledge creation and transfer.

Basole (2012) believe that traditional knowledge (TK), Indigenous knowledge (IK) which is a subset of traditional knowledge, epistemology and institutions of this kind of knowledge production and transfer differ from modern knowledge. In recent years, most research and literature has emerged analysing the knowledge base of agro-forestry, biodiversity, medicines, crafts, ecology, etc. that have been created many years ago by peasants, artisans, women and indigenous people across the world. He claims that these people are the same people who are employed in the informal sector and controls the informal economy. He however thinks that the TK/IK paradigm for analysing and interpreting informal sector have not been satisfactorily deployed because informal sector employees and intrapreneurs are also found in other sectors such as production of food, garments, metals, industrial machinery, construction, plastics, textiles and other services that are mostly assumed as modern techniques and do not meet the requirements of a "traditional" industry. Nor that of the actors "indigenous people." In India, Sahasrabudhey and Sahasrabudhey (2001) proposed that the term *lokavidya* or people's knowledge, be used to refer to skills possessed by those who have not been able to get formal education and/ or training, They further suggest that value system and epistemology to be included in trying to transform India into a knowledge Society as envisioned by the National Knowledge Commission, They think they would do better if they recognize, study, and build on lokavidya products and used by the majority of employees in the country.

## 2.5.1. The Relationship between Wages, Productivity and Skills

In many Informal sector settings, the level of skill of any employee/ worker is usually determined by their wages and productivity. The existence of low wages and low productivity in this sector is used as an indication of its low skill base. Basole (2015) stresses that "the relationship between skill, productivity and wages is complex and is determined by institutional and structural factors". He believes that in order for a country like India to have a developing economy, it must have a surplus labor force,

According to Basole, there is hyper-competition between micro entrepreneur in product markets between microentrepreneurs who are forced to start their own business due to lack of jobs, and between workers in the informal labour market which is caused by the exclusion of many employees and/ or workers from formal employments.

Basole identifies one area for research on this relationship, he wants a research to be done in order to examine whether "the formal informal earnings gap results not just from observed worker characteristics (such as skill) but also from structural factors such as average firm size, degree of competition in the product market and the capital-labour ratio." He concludes that since productivity measures such as value-addition per employee/ worker rely entirely on market prices, and supper-competition in the market puts downward pressure on prices, this means firms in more competitive markets appear less productive than firms that enjoy less competition.

(Knorringa 1999; Leibl and Roy 2004) identified surplus labour in economy as a second confounding factor in determining the wages of workers, undermining skills and other characteristics of workers. This labour competition increases a profit margin to the employers since they pay little wages or, if the product market is competitive, the buyers will buy at lower prices instead of the workers (Heintz 2006). "For example, in the Banaras weaving industry, power looms are over ten times more productive than handlooms but hourly wages in both are almost the same" (Basole 2014).

## 2.5.2.  Knowledge in the Informal Sector

Not only economic factors discussed above makes someone assume that informal sector workers are unskilled but also Sociological and philosophical factors. Sociological factors such as the prestige or value attached to different types of knowledge and philosophical factors such as what counts as knowledge are equally necessary (Basole, 2015).

(Ilaiah (2009). gives an example showing that the knowledge of lower-caste workers and women, who are many in the informal sector, has traditionally been undervalued. (Sengupta et al. 2007: 84) argue that the NCEUS categorizes jobs performed by women as low skill even if that woman has "exceptional talent and many years of informal training".

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Basole concludes that all official studies and surveys that attempt to identify the knowledgebase of the informal economy in general are not adequate because they are not designed to capture people knowledge (lokavidya). India Censuses on Small Scale Industry (Government of India 2004, 2012) shows that about 90 per cent of informal firms failed to show their sources of technical knowledge for both years. This is because these firms operate with a collection of some collective knowledge no matter how small the firm is. By using existing knowledge these firms may innovate depending on the resource availability or changing customer and market demand, the survey does not provide a solution as to how knowledge work can be useful in the informal sector. This is because it was not designed to capture knowledge embodied into artisans and their informal networks as well as their ability to absorb knowledge from a formal sector.

**Small-Scale Industry Sector**

| Source | 2001 | 2007 |
|---|---|---|
| Abroad | 0.67 | 0.80 |
| Domestic collaboration | 5.58 | 2.11 |
| Domestic R&D | 4.84 | 3.22 |
| None | 88.91 | 92.83 |

*Table 2.1: Source of Technical know-how in the unregistered. Sources: Third Census of Small Scale Industry, 2000-2001 and Fourth Census of Micro, Small, and Medium Enterprises, 2006-07.*

Basole sites findings from NSS Employment Unemployment Survey (2011-12) which shows that 70 per cent of men from rural areas and 43 per cent of men from urban areas who are over 15 years of age have a general education level below the secondary level, and 83 and 55 per cent for rural and urban areas respectively for females. Job specific and other trainings related to the sector can hardly be found among the respondents. EUS data also shows that 89 per cent of the workforce in the informal sector reports to have not received formal or informal technical or vocational training. Based in these findings and similar NSS data, the NCEUS concluded that "nearly 90 per cent of the population above 15 years did not have any skills" (Sengupta et al. 2009:191).

How can we understand this conclusion? Basole comes with the following suggestion:

> *"The nature of the skill acquisition process as well as knowledge production in the informal sector is difficult to capture with orthodox surveys that equate these processes with years of schooling, attending a training program, receiving a certificate, etc. These are often absent in the informal sector. The process of knowledge acquisition is instead integrated with earning a livelihood"*
>
> *(Basole, 2015).*

He argues that the process of knowledge acquisition is instead integrated with earning income for living. Historically, a formal education is more preferred in academic and policy work than the informal education and training. Some informal workers gain such knowledge without realizing that the knowledge they have come from formal education and /or training but rather they think that knowledge was acquired through working. As a result, they provide negative responses in official surveys.

He says a common feeling is the one expressed to him by a sweetshop owner in Banaras when he asked him about how sweetshop workers acquired their skills in his sector: "There is nothing worth studying in that." he answered. At the same time Basole thinks that, there may be awareness in the informal sector that such hierarchies in formal sector cannot be justified. The study further shows that weavers in Banaras are constantly differing with the valuations placed by the labor market on the number of years someone spent on the informal training obtained in an informal sector versus formal diplomas and certificated obtained in formal training.

The notion that knowledge obtained on the job is equally important as the knowledge obtained in formal training is getting acceptance from many fields. From the fields of science history, learning philosophy and knowledge management. Science historians mention manual workers and artisans as the ones who created and developed science, philosophy and mathematics and their growth was due to their connection with solving practical problems (Connor, 2005). Scientific and technical knowledge was embodied into a typical artisan and embedded into daily routines, practices and activities of craft.

In his book "working knowledge" by Barnett (2000: 17), he identifies work as a site where creation of knowledge takes place and that, that knowledge is regarded as bona fide if and only if it is put into use at work, and that knowledge is tested by work and stimulate learning. To show how this theoretical perspective can be used in understanding the dynamics of knowledge creation and transfer in an informal sector, (Wood, 2008) gives an example of children from weaving families who play with shuttles on the warp, while their fathers/ brothers weave, or just 'hang about' in the workshop being accustomed to the sights and sounds of work.

## 2.5.3.      People's knowledge Institutions

There is a very little literature on the subjects of apprenticeships economics and on the on-job training although they play a very big role when it comes to informal sector. When an informal sector is concerned, such systems are the ones used in most cases to serve more people than the formal education systems. Research on modern artisanal firms shows how important the apprenticeships and other "hereditary systems" are (Parthasarthy 1999), Biswas and Raj (1996) who are development economists studying informal industries left out knowledge acquisition unresearched which is very wrong. The problem in studying such institutions and the skills they impart is not that they are unstructured or haphazard, but that our methods of inquiry are not appropriate. There are many factors affecting studies on informal training systems, but the main factor is that their training is thoroughly integrated into their ordinary life and work. It is always not easy for someone to find out the place and time where the training and/ or learning is going to take place. There is no formal documentation in the informal sector, learning and /or training cannot be easily quantified. Although there are no fees associated with apprenticeships, there are indirect costs such as time, the wage forgone during apprenticeships etc. The apprenticeship is provided according to relations such as family, gender, and relations of the community that are seen as "non-economic." The approach required to study all this is ethnographic of which economists are reluctant to undertake. As a result, most knowledge of such institutions comes from economic anthropologists (Barber 2004; also see examples in Basole 2012).

Basole argue that it is wrong to see an informal sector as a pool of unskilled workers when you approach it with the view that does not understand its knowledge institutions such as knowledge acquisition, knowledge transfer, knowledge sharing, inter-firm knowledge sharing and innovation. Research shows that informal sector workers have gone into long term training

which is equivalent or longer than the formal degrees, diplomas and certificates. He holds that it is common to see apprenticeships based on family and non-family, lasting from few months to few years in this sector. There are little or no financial barriers in order to enter into informal training as compared to formal education (although social barriers such as sex or age and norms may apply). It is possible to develop and structure well the systems of training so that employees and their trainers can understand the importance of personal discipline and have ambition to learn. Since the knowledge of skilled workers in the informal sector is embodied, it is the responsibility of their employers to make sure that those employees do not leave for greener pastures and/or new knowledge. This knowledge can be production knowledge or as soft as communication knowledge (Basole,2013).

Street-vendors, travel guides and taxi-drivers in Mumbai were interviewed by Basole (2013) in order to find out how do they learn English language. The survey shows that they learned from their seniors, public billboards and hoardings, customer interactions, modern mobile devices and other types of technologies. Barber (2004) finds out the strengths of such learning as lower barriers to entry, he stresses that emphasis on innovation and adaptation in resource-poor conditions often leads to development of tacit knowledge.

Basole (2014) discusses the importance of doing an investigation about firm level innovation in the informal sector. He says no matter how small the proprietor is, they take pride in their products and reputations.  New products are listed first in their product lists. Innovation is cumulative and conservative like in artisanal industries. Because intellectual property rights are not there, proprietors tend to guard careful their trade secrets.

People's knowledge (Lokavidya) is constantly growing, evolving, adapting and changing. It is what is now known as evolution of "artisanal industries" into "modern industries". The case of powerlooms highlights how important is for the traditional institutions in enabling technical changes (Haynes 2012). Basole says although the National Knowledge Commission of India report on "Innovation in India" (Government of India 2007) tried to address this issue by interviewing few SMEs, more work needs to be done.

Basole (2015) concludes by pointing out that the ongoing arguments should not be taken to mean that formal education is not equally important and/ or the existing knowledge about knowledge institutions in the informal sector is sufficient. Sengupta et al. (2009) suggests the

answer to be "NO" to the question asked by NCEUS which asks, "Is the mode of working of the existing systems of informal on-the-job skill acquisition through the traditional methods sufficient?" Large difference to skill improvement, integration with modern techniques into traditional occupations and more income can be achieved by well-designed and informed policies. NCEUS Highlights that, vocational education and training programs provided by the Government of India did not succeed to help people in an informal sector to get employment (ibid, p. 10). Basole claims that informal sector workers and entrepreneurs have remained disconnected with government institutions. He suggests that vocational education and training be built on existing informal institutions with the involvement of participants from informal sector. He suggests seeking for examples from other developing countries like Nigeria's National Open Apprenticeship Scheme (NOAS) and other countries discussed by NCEUS (ibid, p. 40-41). To do this, he suggests further research to investigate knowledge creation, transfer, sharing, integration and innovation using suitable approaches to the mode in which the informal sector is operating. He also suggests a political will that will demand dignity and equal status for people knowledge (lokavidya) and formal knowledge

## 2.6.  Communities of Practice

Lave and Wenger (1991), depict the term communities of Practice (CoPs) as "a movement framework that incorporates people who are joined together in activity and within the meaning of activity has for them and for their entire organisation". It is critical to note that these are not groups. A community of practice can be characterised as "a bunch of experts casually bound to one another through presentation to a common lesson of issues, common interest of arrangements, and subsequently themselves epitomising a warehouse of information" (Stewart 2001 in Botha et al 2008). Cases might incorporate a coming together of medical caretakers who talk about their clients' issues during their everyday lunch times (Wenger 1996), Petro physicists included in deep-sea petroleum investigation at Shell who meet week after week to deliberate on issues and the problems they confront in their day-to-day work and how to address them (McDermott and Kendrick, 2000),

Learning is seen as emanating from the process of social preparation of becoming a professional, because it gives the person a social setting of being part of the community in which (s)he lives. The social development of personality shapes each person's understanding

and translation of reality. Learning and the creation of new knowledge can take place inside the social setting of the community and can thus be shared through social practices. Botha et al. (2008) summarised the key variables with respect to communities of practice as follows:

• "Learning is social phenomenon"

• "Knowledge is part and parcel of the culture, values and dialect of the community in question"

• "Learning and community participation are inseparable"

• "We learn by doing and thus knowledge and practice are indistinguishable"

• "Empowerment is key to learning. The paramount learning situations are when learning ultimately provide results to the person (improves performance of what he is doing) and adds value to his community of practice."
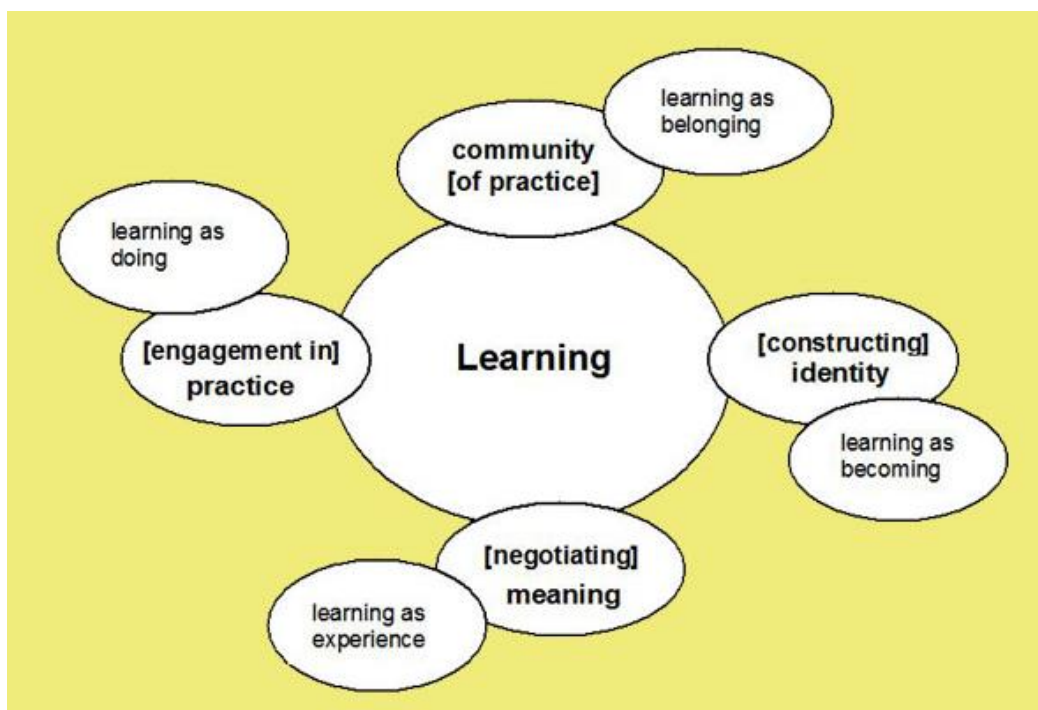


*Figure 2.4: Components of Wenger's social theory of learning. Source: Adapted from Wenger (1998: 5).*

The diagram above clearly emphasises the singular nature of the community of practice and therefore not placed in the center of Wenger's learning hypothesis, in spite of the fact that it is an essential component since it logically ties together all the components into one coherent

system (Murillo E, 2011). As noted previously, it is a key concept, likely because it inspires the recognizable human involvement of taking an interest in a group of like-minded peers, as implied within the passage where Wenger (1998) formally presents the concept: Being alive as human creatures implies that we are continually locked in within the interest of ventures of all sorts, from guaranteeing our physical survival to looking for the loftiest delights. As we characterize these ventures and lock in within their interest together, we are connected with each other and with the world and we tune our relations with each other and with the world in like manner. In other words, we learn. Over time, this collective learning comes about in communities of practice that reflect both the interest of our undertakings and the specialist social relations. These practices are hence the property of a kind of community made over time by the interest of a shared undertaking. It makes sense, subsequently, to call these organisations as communities of practice" (Wenger 1998).

Murillo contends that inside this long portrayal, which is not entirely a definition, the three components of engagement, venture and practice merit specific accentuation, since Wenger employed them to connect the concepts of community and practice into one unitary concept. He does this by representing the three metrics of practice as a source of cohesion of a community (of practice), for example, what makes the particular type of community co-exist. He therefore presents them as fundamental or distinctive indicators of the communities of practice (Wenger 1998):

- Mutual engagement: individuals construct the community and the practice by conducting practice-related exchanges with each other in a systematic manner.
- Joint venture: individuals collectively arrange and decide on what their community is all about and they hold each other responsible to this understanding.
- Shared mission: over time, individuals create a set of shared asset values that permit them to lock in within their community more effectively.

The collective presentation of these three measurements could be a fundamental and adequate condition for the presence of a community of practice and they too give a clearer way of operationalising Wenger's model than the prior depiction.

"A group of public sectors" internal auditors from various nations in Eastern Europe and Central Asia were having their 34th official assembly. They gathered for seven days to learn

and share experiences on how others within the region(s) were practically doing when conducting internal audits within their organisations and made manuals and other publications that they felt were necessary for improving internal auditing. As it were, some of the founding members were still part of the gathering, but the shared work, stories, and artefacts made during the extra time gave their gatherings a sense of coherence and reason. On the off chance that one was a fly-on-the divider at one of their occasions one would take note of how new members were warmly invited into "the family", how numerous people stepped up to take the initiative or share their war stories, and how optimistic core members were to advance the practice of internal auditing of public sector organisations in their localities. Evening occasions, organised by the host nation, were "continuously enthusiastic – with singing, dancing and a song composed and sung by all members" (The PEMPAL Internal Auditors Community of Practice).

## 2.6.1. Historical Background

The existing literature in this area indicates that community of practice is not a new term, with respects to its history and its present nature. Storytelling is one of the most seasoned forms of learning and sharing practices, within the history of human existence. The thought of communities of practice came from American pragmatist, C.S. Pierce's concept of "the community of inquiry" (Shields, 2003) and John Dewey's rule of learning through occupation (Wallace, 2007). Lave and Wenger (1991) reformulated the thought into 'Situated learning' in their book. Wenger (1998) further reformulated the idea by refining its ingredients and published his book titled 'Communities of Practice' Wenger (1998).

## 2.6.2. CoP Formation and Membership

According to Wenger (1999) and Kimieck (2002), there are diverse levels of support in a community of practice:

1. Nuclear group – a limited meeting in which excitement and dedication motivate the community.
2. Complete bond – individuals are recognised as disciples and characterize the community.

3. Peripheral cooperation – Individuals who have a place in the group but are less dedicated and specialised, possibly because of the fact that they are newcomers or have no dedication to the project.

4. Transactional interest – individuals who are outside the community but connect to the community occasionally to provide  or receive  a benefit, without being    part of the community;

5. Passive access – a large number of people who have got access to the merchandise created by the community, with its distributions, its site and its tools.

On the other hand, the Communities of Practice are formed by people who lock in a common mindset of human achievement within the domain of mutual learning: A tribe learning to survive, a group of experts searching for advanced ways of communication, a team of engineers collaborating on comparative problems, a school-based student clique, a network of health professionals researching creative methods or a group of first-time managers supporting one another to adjust to their new managerial positions  (Etienne and Beverly Wenger-Trayner, 2015).

## 2.6.3.    CoP Growth

Lave and Wenger, (1991) emphasised that a community of practice can grow organically or intentionally as the group may have a common interest in a specific subject, or they may have an objective of learning new things which are related to a certain field of their interest. Wenger (1991) contends that living things grow. They are not born in their final state, but advance through progressive changes. This process proceeds until it is time for them to pass on. He further expounds his articulation by giving the following example.

"The infant you were holding in your arms seventeen years ago was very distinctive from the young person you just dropped out at the theatre, who is again very diverse from the grown-up she will be in another seventeen to come when she will make you a granddad. Her needs, capabilities, and desires are so drastically changed that she may barely be recognizable, and however she remains the same individual. Whereas she is changing each day, there are identifiable stages in her development".

He further recognizes five stages that a "community of practice" must pass through from its embryonic stage until it is no longer relevant. These stages are "potential, coalescing, maturing, stewardship and legacy" (Wenger 1991).

**Potential:** Wenger contends that the society is not yet a society at this point. It is, or could be, a free collection of individuals who are sometimes linked around a situation or a mutual interest. However, like an embryo, it already incorporates a few basic components of the culture and has the full capacity to become one. In some cases, this free network introduces the possibility of creating a group, and this prospect helps to focus people's attention. In such situations, private conversations are intensifying, and people are starting to see their relations in a new light. As the sense of shared space grows, the need for more productive intuitions grows and creates shared or similar interest. Someone else usually also steps up to take on a few responsibilities to get the community underway (Wenger, 1991). A few people attended a few interviews with new members to find out what the community's main issues are. Others have just organised a preparatory assembly to talk about the creation of the community (Wenger, 1991

Figure 2.5. summarizes the stages of development of a community of practice:
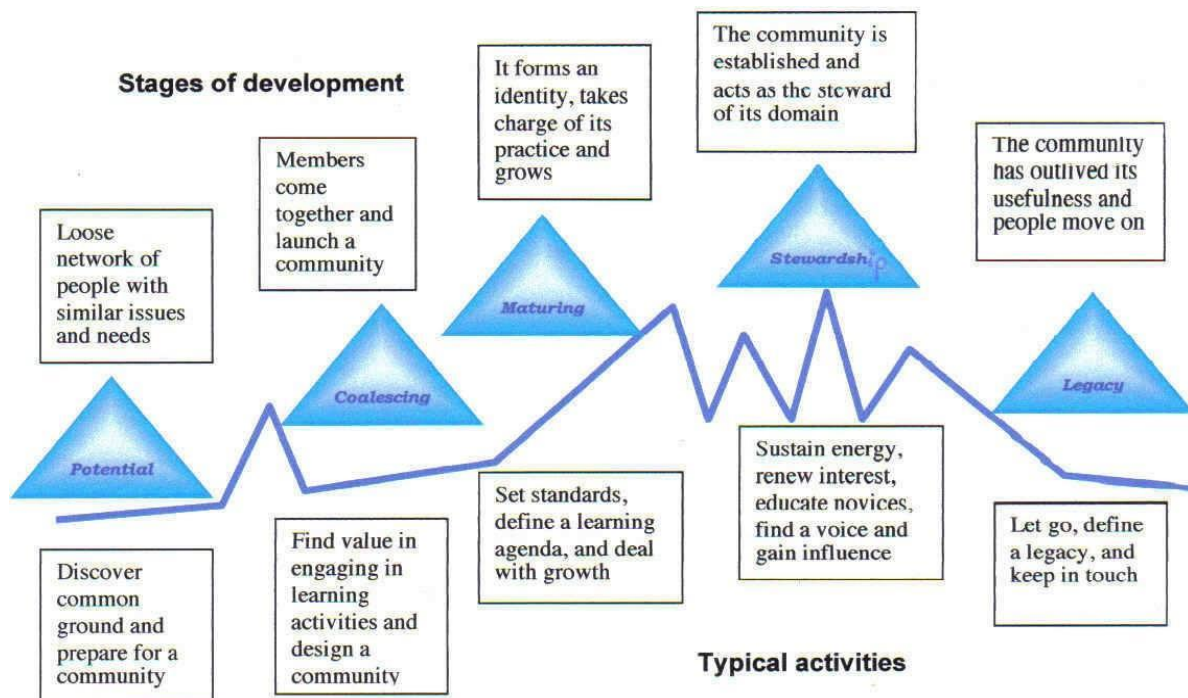


*Figure 2.5: Stages of development of "Communities of Practice" Source: (http://esflive.archiv.zsi.at/files/CoP_development_stages.pdf): Retrieved September 2018.*

**Coalescing:** At this point, Wenger (1991) notes that while the group may be born, it will still be in its formative development. Individuals have seen their trusts strengthened by the unveiling of the capacity of their communities and their determination to help them, but the community's confidence has yet to become a reality in their lives. The society will understand its value after which its individuals have started to address problems together.He suggests that when this organisation is successful, the interchanging of open and private spaces starts to take place. Notions that entice potential group individuals become public. The o rganised ways of group life — week after week meetings, reports, websites — are set up. There will also be a response workshop where the community plan will be reviewed. Simultaneously, confidential interactions are becoming more coordinated and more functional. Individuals get to know each other better and understand who to call for help. As the individual's continue interacting, they constantly discover more common interests and begin to discover new ways to support each other and begin exchanging resources, layouts and tips. The community begins to take shape.

**Maturing:** After establishing the importance of learning together, the group needs to move one step further into the domain and create a targeted communal identity. Now that the group has consolidated, people realize that they have some valuable information to share, that relationships between community members are continuing, and that the community has enough strength to thrive. Like a child enduring the transitions and struggles as he / she progresses into adulthood, the group recognises that he / she has an entire lifetime ahead of them and that they must take charge of his / her destiny. At this point, a community is ready to establish a self-conscious identity as a group. Developing a communal identity is a major step up from merely creating value for the participants and the organisation by resolving problems that occur or exchanging ideas and tools that are considered best practice. In order to achieve this, members of the community need to maintain the principles of self-awareness, concentration and unity. Being able to create a common activity requires a strong engagement and an emphasis on in-depth discussion. Public efforts are becoming more focused and proactive in setting criteria for recurring issues and regular operations, identifying information gaps and introducing measures to resolve them. It also requires some additional support from the organisation.  It also requires to be more comprehensive with respect to the participation of all key stakeholders. This might disturb the informal intimacy of the original group of participants, and backlash has existed in some societies. They also agree, however, that these measures prepare the society to assume a growing responsibility for managing information in its domain.

**Stewardship:** Wenger (1991) establishes that it is in the fourth stage that the group establishes its personality as a community. This stage is the beginning of an active life. As a boy, you still think that adults are stable. You are looking for an identity that is extremely hard to find, but they know who they are. You have got one false start after another, but they are making progress by searching for a clear path. As it was, once you arrive at this once-distant adulthood, you understand that the stability of adults is more a case of embracing duties that require a firm concentration than an inner state of mental achievement. Adults like children, go through steady adjustments while they mature. Similarly, communities of practice continue to evolve until they reach maturity. Like all life forms, they respond to their environment, but they also define the environment. They are widening their scope, tackling new problems, and testing modern projects.

As new individuals interact and new problems arise, the group should redirect its attention to address the needs of its changing membership profile. Innovators frequently leave, either because they are frustrated with the power structure or because they believe they need to move forward. The community must strive to find new innovators. As individuals settle into their established routines, they begin to find new sources of inspiration. Changes that occur in concentration, participation and connections with the community and the world — bring about new challenges and opportunities that continue to develop alongside the communities. Indeed, communities go through mid-life crises in which they doubt their importance and validity for their existence. It is also helpful to provide re-establishment events — similar to dispatch but building on a longer history — to give members of the community an opportunity to reflect together on their successes, their lessons learned, and the importance of the performance delivered, and to prepare the path ahead.

Despite the fact that one can acknowledge that maturity is the ultimate objective of community development activities, there is still much to be achieved. Taking an unmistakable duty to handle expertise in its domain means developing its practice to its full potential. To this end, the community must begin to consider, on a deliberate basis, all the knowledge it has gained and the information it can produce. It needs to preserve its vitality and explore the driving edge of its practice. Furthermore, it should begin to look more closely at the channels of expertise that it can reach. These skill sources can be viewed and taped from relations with similar groups and networks outside the organisational environment. In the midst of coordinating the

stewardship, societies periodically direct their attention to their relationships with the association and other organisations. They are attempting to make an effect on the organisation they reside in. Now that they have developed their practice, they strive and aspire to have a voice that represents the authority over those within their sphere.

**Legacy**: In the final stage, Wenger (1991) asserts that, like all life forms, communities of practice must eventually die and make way for new life. Their space may not be significant now, and individuals can move on to other interfaces and exercises. Some communities will combine with others. Again, a domain could have ended and become so diverse that it makes no sense to maintain one community and its original divisions in separate forms as though they were different. In this case, the public space of the community is lost, despite the fact that a few members can still stay in contact as alumni. Unlike a group whose function is finished when a larger task has been completed, a community of practice does not have 'finishing' programmed in its description. Still, the end or death is an essential part of its normal development. While one does not intend for the death of a community, one needs to be prepared for this eventuality. Few communities can outline their value. Typically, one of the risks of over institutionalising a group, like all organisational substances, appears to want to live for the sake of survival. In addition, a community could have a fundamental sense of connection and of distinguishing evidence. Group members may also require such types of assistance to be given in a way that respects the community and shuts it down. (http://esflive.archiv.zsi.at/files/CoP_development_stages.pdf)

It is through the process of exchanging knowledge and experiences with a community that individuals learn from one another and have the ability to improve themselves individually and professionally before the unforeseen growth comes into effect.

## 2.6.4.    Elements of CoP

For any group of people to be a community of practice, it should contain the following three elements: "The domain, the community and the practice" (Wenger, 2005).

**Domain**: This is an area of interest in the community of practice where the community interact and share information in order to solve a common problem around them

Community:  these are community members who spend their time and effort in participating to solve domain problems, this participation helps in generating a knowledge of their interest. Interested members join the community from anywhere, with the help of the internet, communities can be very large and comprises many people scattered all over the world.

**Practice**: this entails on how members of the community work in order to solve their problems in their area of interest, all the facilities, norms, stories, mechanisms used to accomplish their work are shared among community members.

Members of the community work jointly and discuss various solutions, help one another and share important information among themselves. The relationships that they build assist them to transfer knowledge from one another which is made possible while fulfilling their interest in the domain.

Community members are actively engaged in an activity related to the community. They develop a shared reservoir of resources which includes but is not limited to stories, tools, experiences, and ways of solving recurring problems which takes some time and sustained interactions.

| | |
|---|---|
| Problem solving | "Can we work on this design and brainstorm some ideas; I'm stuck." |
| Requests for information | "Where can I find the code to connect to the server?" |
| Seeking experience | "Has anyone dealt with a customer in this situation?" |
| Reusing assets | "I have a proposal for a local area network I wrote for a client last year. I can send it to you, and you can easily tweak it for this new client." |
| Coordination and synergy | "Can we combine our purchases of solvent to achieve bulk discounts?" |
| Building an argument | "How do people in other countries do this? Armed with this information it will be easier to convince my Ministry to make some changes." |
| Growing confidence | "Before I do it, I'll run it through my community first to see what they think." |

| | |
|---|---|
| Discussing developments | "What do you think of the new CAD system? Does it really help?" |
| Documenting projects | "We have faced this problem five times now. Let us write it down once and for all." |
| Visits | "Can we come and see your after-school program? We need to establish one in our city." |
| Mapping knowledge and identifying gaps | "Who knows what, and what are we missing? What other groups should we connect with?" |

*Table 2.2: The table above summarizes how communities of practice look like. Source: Communities of practice a brief introduction (Etienne and Beverly Wenger-Trayner, 2015).*

## 2.6.5.      Virtual communities of practice

Virtual Communities of Practice (VCoP) are just like normal communities of practice discussed by Wenger *et al.* (2005) above, except that VCoP are communities of practice that operate through the internet using social media application tools. All current and future literature reviews about communities of practice cannot do without mentioning the popularity of online communities of practice.

Innovations and developments in technology are said to be the main contributor to the current increase of the number of such studies and publications in that topic. Social media applications such as WhatsApp, Facebook, twitter, wikis and other social media networking tools are a good example. Knowledge Management practitioners are also playing a very big role in promoting and making sure that these tools are used. Source: (http://www.informationr.net/ir/16-1/paper464.html).

Citing other authors, E Murillo (2011) argues it should be made clear in relation to the literature about virtual communities of practice two important clarifications should be made with respect to the virtual community of practice literature.

Firstly, he cites Rogers (2000) and Davenport (2004) to argue that some communities of practice which are promoted as Virtual Communities of Practice are actually not Virtual Communities of Practice, but rather teams or workgroups formed temporarily to accomplish a certain task. The nature of their online interactions during the implementation of that project

leads into impressive online collaboration. He argues that this collaboration lasts after accomplishing the project and that dismantling a team at the end of the project distinguishes them from communities of practice, which are considered to be persistent and expanding (Barab *et al.* 2003).

Secondly, he writes, the second problem about communities' literature of which he thinks is the major problem. He argues that many published papers use a definition of practice which is not rich enough. He writes that it either lacks model or side steps. He holds that Wenger's (2003) theoretical framework lacked a developed alternative theory causing doubt on the characteristics of the studied community.

## 2.7.   Storytelling and Knowledge Management

Storytelling is commonly being used in Knowledge Management initiatives. Knowledge Management is an evolving multidisciplinary approach that formalises the capture, codification, exchange and distribution of knowledge. This field survey takes a social constructionist framework to evaluate how narrative analysis of organisational stories can provide a conceptual structure for the study of organisational knowledge sharing.

Storytelling has been an important practice not only in transferring and sharing knowledge, sharing norms and values, but is also used to develop trust and commitment between the members sharing the stories. Storytelling also facilitates learning (acquiring new knowledge), unlearning (forgetting un-needed knowledge) and generates emotional connections among those sharing stories.

Using stories in Knowledge Management is a development of an essential natural ability that has connected communities for centuries (David Snowden, 1999). He believes that storytelling is a complex knowledge disclosure mechanism that provides a largely self-sustaining and low-cost means of capturing and reusing knowledge

## 2.8.   Knowledge Management Enabling Conditions

Informal sector firms need   to be aware on the impact of Knowledge Management in order to become competitive in the market. This section tries to exploit the impact that Knowledge

management enablers (success factors) make in order to ensure firms' continuity and competitiveness. After going through Knowledge management literature from the internet, several libraries and other sources, there is very little written about Knowledge Management in informal sector, when looking at favourable conditions for knowledge management, knowledge creation, knowledge transfer, knowledge sharing and knowledge use, I had to stick to the general knowledge management literature assuming that those best practices from the formal sector can also suit in the informal sector.

After going through the knowledge management literature, many scholars identified trust, efficacy, reciprocity, leadership, Incentives, culture, Information and Communication Technology systems (ICTs) and openness in communication as important Knowledge Management success factors in organizations. The factors are discussed in detail below.

## 2.8.1. Trust

Rousseau et al (1998), describe trust as a psychological state which comprises the willing ness to accepting risks that may result from positive expectations from another person due to their behaviour. Trust is personal's true belief that the other person is honest, competent, reliable, eligible, kind and open when sharing knowledge (Cornellisena et al, 2011).

Yusof and Suhaimi (2006) argue that relationships in faculties between knowledge recipients and knowledge provider is mostly contributed by Trust. Knowledge sharing among faculty members is promoted by trust through enabling a more proactive approach and open relationships. Open relationships allow smooth knowledge transfer and sharing.

Capacities to solve more complicated and/or mutual problems that may arise is increased by knowledge exchange and sharing. Knowledge exchange and sharing is a byproduct of trust (McEvily et al, 2003). In order for any knowledge sharing initiative to be effective, trust must be there.

## 2.8.2. Efficacy

From online dictionary (www.dictionary.com) efficacy is defined as "the ability to produce a desired or intended product" in knowledge management context, it is described as beliefs of an

individuals on the value of shared knowledge to other individuals, self-efficacy of knowledge refers to individual ability and willing ness to perform a given task . Competence and ability to share was partially reproduced from individual beliefs. Knowledge self-efficacy determines the ability/ capacity of a staff member to arrange and provide valuable knowledge that will help the faculty or school to perform better (Lu, Leung, and Koch,2006). Faculty members have to believe that performance of the school/university (Ba, et, al, 2001), research problems solving skills (Constand et al, 1996) and competitive advantage achievement (Wasko and Faraj, 2005) can be enhanced by their knowledge and capabilities.

Wako et al (2005) argue that, because the focus of knowledge self-efficacy is on content of knowledge, and the assessment of the value of knowledge is personal then the member of research community may not be willing to share information. Since someone may think that a likelihood that a person, he/ she wants to share information with will not receive that information then he/she will not share

It is believed by Almahamid et al (2010) that when individual knowledge and skill acquisition is increased, it also improves the self-efficacy of members. It is expected that the improvement will be higher if a member believes that the value of a shared knowledge will be raised by new knowledge (Cabrella and Cabrella, 2002). Fact finding behaviour of a member is more likely a result of higher self-efficacy (Hazzan and Seger, 2010). This leads to the conclusion that knowledge efficacy positively influence knowledge sharing.

### 2.8.3.   Reciprocity

From the oxford dictionary reciprocity is defined as ^the practice of exchanging things with others for mutual benefit, especially privileges granted by one country or organization to another". A number of scholars believe that reciprocity in knowledge management is important because it provides a conducive environment for sharing of knowledge in university faculties that leads into achieving long term goals of co-operation within universities (Bock et al,2005). Reciprocity can inspire knowledge sharing in organizations because persons who share knowledge with others expect to get another useful knowledge from others in return (Davenport and Prusak, 2000). Due to above discussions on reciprocal knowledge, Kankanhalli et al (2005) define this knowledge as "future knowledge requests met by others". Lin (2007) writes that the

expectation to receive knowledge from someone else can be an incentive for knowledge sharing. A sense of being owed makes knowledge contributors feel that, it is their responsibility to share their knowledge and improve their interpersonal relationships that increase future expectation of receiving continuous support and help from others. This resulted from reciprocity behaviour as confirmed by Lin (2007). Cho et al (2007) stresses that Knowledge management outcomes were indicated by an important perception that a member will receive knowledge, and that of the use of knowledge sharing mechanisms were indicated by the perception of reciprocity. This leads to the conclusion that reciprocity in organization leads to knowledge sharing.

## 2.8.4.    Leadership

In their article, The Balance (https://www.thebalancesmb.com/leadership-definition-2948275) define leadership as "the art of motivating a group of people to act toward achieving a common goal", while  In a business settings, this can mean "directing workers and colleagues with a strategy to meet the company's goals" Involvement of high level leaders in performing organizational activities is referred as Management support (Jarvenpaa and Ives, 1991).  The support from top level leaders implies that top leaders understand the importance of knowledge management in an organization and shows the extent to which high level leaders were involved in knowledge sharing practices. Support from high level leaders is crucial in any knowledge management initiatives, growth of knowledge management practices can be achieved because they in courage voluntary participation in vital knowledge (Kang et al, 2008). In order for the members to be willing to share their knowledge, they have to be informed about the support of the initiative from the top management, otherwise they might feel uncomfortable to share their knowledge.

MacNeil (2004 put emphasis on the importance of a notable top leadership support and involvement in order for knowledge management practices to be effective, this is because top leadership has a big influence in creation and maintenance of positive knowledge sharing culture (Lin et al. 2009). In order to create a culture that stimulates a continuous sharing of knowledge, Personal support and top leadership orientation is crucial (Xu et al, 2014). Leibowitz et al (1999) believed that, it is not possible for any Knowledge management and sharing initiative to be of success without commitment and involvement of top leadership. Top

leaders who push for knowledge sharing behaviours publicly among its influential members act as a drive for overall collaboration in the firm. This concludes that leadership is important in influencing knowledge sharing.

## 2.8.5.    Incentives

From oxford dictionary, incentive is defined as "a thing that motivates or encourages someone to do something" These incentives can be monetary rewards such as salary incremental and/or bonuses and promotion into higher levels of leadership in an organization (Hargadon, 1998).These incentives helps in shaping employees behaviour( Cabrera and Bonache,1999).Lin (2007) found out that incentives in organizations were a motivating factor for employees to share knowledge because of the belief that they might get additional income or promotion. In universities, members value some intangible incentives such as additional sabbatical leave, financial support for a research project and support for attending or conducting seminars (Gustad, 1960).

Research shows that sharing of knowledge among employees in an organization can be encouraged when incentive system is in place (Al et al, 2007). Incentives are believed to stimulate employee efforts which contribute to the institutional performance.  Work without an incentive system hinders knowledge sharing in an organization (Yao et al, 2007). Employees will be willing to share their knowledge with other employees if and only if they are assured to get appropriate rewards from their top leaders. Knowledge Sharing is stimulated by incentives, these incentives make an employee feel that their contributions were realized (McDermott and O'Dell, 2001). In this regard, incentives stimulate knowledge sharing.

## 2.8.6.    Culture

From the oxford online dictionary, culture is defined as "the arts and other manifestations of human intellectual achievement regarded collectively". Culture in organizations is a very crucial factor in creating a friendly environment for knowledge creation and sharing culture that helps in achieving an effective knowledge sharing (Hoof and Huisman, 2009). Yaacob and Hassan (2005) suggests that, it should be fully understood that knowledge sharing practices in universities is its common culture. Processes like finding facts, supporting and getting support,

asking for questions, looking for advice from others, advising others on what should be done and how it should be done, how can something be done differently etc. should be the culture of the organization.

In order to in courage the culture of sharing, institution members in universities should be encouraged by their institutions to work more effectively, efficiently, collectively and to share (Cheng, 2002). Lin et al (2004) expect to see employees in universities voluntarily helping one another and sharing knowledge when one encounters a problem which have not been resolved. The culture that will make someone feel to share his/her knowledge have to be developed in higher learning institutions (Haribaran and Cellular,2005). From the above, institutional culture influences knowledge sharing and transfer.

## 2.8.7. Information and Communication Technology systems (ICTs)

Knowledge management involves knowledge creation, knowledge transfer, knowledge sharing, knowledge transformation and knowledge storage for future use. ICTs Can me a vehicle for performing all those functionalities including fast searching and retrieval when needed. Knowledge sharing in research universities is continually facilitated by ICTs infrastructure (Hansen et al, 1999). McCampbell et al (1999) argue that the role was assigned to ICTs infrastructure due to their ability to support searching of information and knowledge, online collaboration, and communication. ICTs infrastructures are needed in universities because they enable interaction and research collaboration that results into more sharing of knowledge (Arthur,1998). ICTs infrastructure facilitates knowledge sharing by connecting people all over the world (Connelly and Kelloway, 2003). A great cost has been reduced in communication by ICTs infrastructure because it removed physical boundaries and barriers that existed before which required face to face meetings. Online social gathering is a good platform for knowledge sharing and transfer among people who are physically located very far apart (Jarvenpaa and Staples, 2001). ICTs infrastructure allows members to easily share information, even those who are very busy can slot a time wherever they can interact. Jarvenpaa and Staples (2001) find out that technical and Social connectivity have been increased in Universities' by ICTs infrastructures through knowledge sharing. Institutions must decide on what kind of solution

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will be suitable and applicable for the nature of their activities and strategies. ICTs infrastructure blays a big role in all knowledge management processes.

## 2.8.8.    Openness in communication

According to oxford online dictionary, openness is referred as "lack of secrecy or concealment, frankness" knowledge sharing is encouraged by openness in organizations, this sharing nourishes the knowledge of faculty members (Bennet and Bennet, 2003). Samaha (2006) finds out that if communication between members, teams, departments and faculties is open then new knowledge in teaching and research perspective is acquired. supportive culture in higher learning institutions is created, bureaucracy and secrecy will be completely removed, and effective research teams are built. If there is open communication about understanding of the work requirements, joint achievements, and collaboration among staff then the preferred mean to implement knowledge management initiative and strategy is Knowledge sharing (Panteli and Sockalingam, 2005). Openness in communication contributes to knowledge sharing practices in organizations.

## 2.9.  Study objectives

The main objective of this study was to investigate how these "communities of practice" (of these backyard mechanics) became established, and how they maintain and improve their collective knowledge.

# Chapter 3. Methodology

## 3.1. Study sites

This study was conducted in all three districts of Dar es salaam region with a total population of 4,364,541 people according to the 2012 census and online discussion forums. These districts, together with their population in brackets, are Kinondoni (1,775,049), Ilala (1,220,611) and Temeke (1,368,881). These districts were purposely selected and have a number of these garages.

## 3.2. Study Design

A descriptive cross-sectional study was performed, which used both qualitative and quantitative techniques to collect data. the study consisted of key informant interviews and documentary reviews. This design did not only allow for a wider scope while at the same time guaranteeing easy management of the study, but also made generalisation of the results as simple as possible. Although the term "gereji bubu" is today used to refer to all small scale, semi-organised and unregulated garages in Tanzania, this study focused solely on informal garages which operate in physical locations, however, did not include those operating in mobile locations. This study did not disaggregate "gereji bubu" mechanics in terms of activities and garage size in terms of the number of workers.

Sample size determination: some degree of heterogeneity was assumed to exist with reference to the availability, levels of access and utilisation of these services in the three study sites. These Sites were treated as clusters with further assumption of minimal variations within the cluster on the parameters of interest. The sample size in this case refers to the number of respondents to be included in the interviews.

This study was to engage (Martin *et al*., 1987) formulae for computation of a minimum sample size for large and unknown population:

$$S = Z^2 \text{ x (p) x (1-p)}$$

$$C^2$$

Where: S = required sample size

Z = for chosen confidence level (in this case 95%);

P = population variability (in this case 50% maximum variability for the conservative sample

E= level of precision (in this case 5%).

Using the above formulae, the overall sample size was estimated to be 384 individuals, the sample was supposed to further be increased by 10% to account for contingencies such as non-response or recording error resulting in a sample size of 419. Due to an avoidable circumstance (at the time of interview, the new government were closing down some of these garages) the sample size was reduced to 118. 100 survey questionnaires and 18 key informant interviews with garage owners where the resulting sample which was thereafter divided equally into the three study sites of which the resulting sample size for each site was 39 respondents.

The data collection tools were pre-tested in Kiswahili (Tanzania's national language) at one of the garages on each study site. This exercise was done in order to check for ambiguity and amendments like (arrangement of the questions order, options for the questions and skipping pattern). The garages that were selected for pre-testing of the tools (pilot study) were characteristically similar to the garages that were enrolled into the actual study.

Inclusion and exclusion criteria: The study included staff of all selected garages, male and female, of any age willing to be interviewed during the day of the interview. Those who were not willing to be interviewed were excluded.

In order to understand how knowledge is created, transformed, transferred and shared among Backyard Mechanics workers, a survey questionnaire was shared and filled in by respondents

in selected garages. In order to find out how and when these garages were established, eighteen key informant interviews were conducted with selected garage owners. Apart from that, Knowledge, Knowledge Management and Communities of practice literature was used to find out how others have written on this area.

### 3.2.1. Survey Questionnaire

In the survey questionnaire, I wanted to know general characteristics of the respondents, these include but not limited to age, sex, area of specialisation, level of education and how those skills were obtained. On the second part I wanted to know how selected respondents were able to share information (give and take) when they face difficulties in their day-to-day activities and what factors promote and /or hinder them from sharing of information, their readiness to give or accept assistance from their fellow workers in case they face strange problems. How do they find solutions when they face new problems? Questions like if they do accept assistance from others, what motivate them from thinking that the assistance will be of benefit to them.

### 3.2.2. Key Informant Interviews

With key informant interviews, I wanted to know how long the selected garages have been into existence, what was the motive behind establishing those garages, how were these garages established, and how do they maintain and transform their existing knowledge without computers and other technologies in order to cope with the everchanging car manufacturing and repair technology. Also, social media and discussions with some clients was used to get more information about customer experiences with these garages.

### 3.2.3. Discussion Forums

Online discussion forums were other methods that I used to gather information about back yard mechanics, I chose jamiiforums platform as my tool for data collection. Jamiiforms (www.jamiiforums.com) Affectionately known as 'The Home of Great Thinkers', the platform that began as an act of youthful audacity now boasts about 100,000 registered members, attracts at least 150 new ones daily most of them Tanzanians, and gets about 50,000 visitors every day (Alexa Traffic Analysis, July 2012).

The forum has a motor vehicle section where forum members share their views and/ or experiences about motor vehicles. As a member of this forum, I posted a thread asking if there is any member who have ever repaired his/ her motor vehicle in backyard mechanics and if so, what were their views about future existence of backyard mechanics (gereji bubu) in the city of Dar es Salaam and Tanzania at large.

My strategy was not to tell anyone that I was doing a research, so participants had a room to post anything that they knew about backyard mechanics, I got so many responses. These responses varied from very general to very specific and some of these responses were quoted in the findings and conclusions chapters. I only chose responses that were related to Knowledge and knowledge management for the sake of making analysis work simple.

## 3.3. Data collection:

Desk Review: the search involved published and unpublished studies performed in Tanzania and elsewhere. Time frame was not indicated because very little research has been done in this area of communities of practice in the knowledge era. In cases where best practices could be used to inform other researchers and intellectual community as whole, theoretical papers were also referred to. Words and phrases such as knowledge management, knowledge creation, knowledge sharing, communities of practice, knowledge retention and knowledge transfer; KM was used as tracers to electronic literature. Snowballing sampling techniques was used to get a touch with organisations or institutions from which more literature on the subject matter under investigation could be accessed.

The subject matter under investigation was reviewed and analysed thoroughly. In particular, the publications to be reviewed included but was not limited to knowledge, knowledge management, organisational management, communities of practice, knowledge economy and other related documents. A careful collection and review of these publications and other documents provided overall introductory insight and facts on how communities of practice have managed to transfer knowledge from one generation to another, how these communities integrate their existing knowledge with new knowledge in order to solve new problems and the identification of knowledge management practices that enable knowledge conversion processes such as externalisation, internalisation, combination and socialisation.

Questionnaire surveys: A semi structured questionnaire was used to collect data from "gereji bubu" workers during the day of interview. Interviews were conducted. Respondents were asked a number of questions that from their perspective provided the researcher with useful lessons related to feasibility and acceptability of the study. In addition, social economic and demographic information of these garage workers were collected using the same questionnaire. Interviews were representative of the sample since these garages were taken from the same cluster and operated in similar situations.

Interviews were conducted during working days since most workers or car owners are employed and/or self-employed and take their cars to these garages during weekends. By doing so, garage workers had enough time for the interview exercises. It is also important to note the timing of these interviews, since it is difficult to conduct interviews when the work schedule is very tight.

All garage workers who were willing to be interviewed during the day of interview were interviewed. This was possible because these garages are normally small in size (5 to 15 workers per garage) and many garages were found in one large open space.

Focus Group Discussion (FGD): this technique was also used to gather information from these garage workers. Since it was difficult to gather all the required information using a questionnaire, this method assisted to gather relevant information from people of similar backgrounds or experiences to discuss a specific topic of interest (in my case knowledge management practices in these garages).

## 3.4. Data analysis:

Quantitative data were verified and cleaned. Once verified and cleaned, tha data was exported to SPSS for further analysis. SPSS version 16.0 was used for analysis and standard data entry forms were developed prior to the analysis phase. Simple descriptive statistics and graphic illustrations are used in presenting key demographic characteristics of the study subjects in the next chapter.

Thematic content analysis was also used for qualitative data analysis. The process was iterative and was performed concurrently with the data collection process. Tape recorded Focus Group

Discussions (FGD) was translated and transcribed. Codes and categories were created in such a way that they represent the contents of the data as much as possible. All these were manually completed, and no computer software was deployed.

In the findings chapter, section 5.8.2, some testimonials were direct quotes from respondents as noted down by the interviewers during the interview session which were originally in Kiswahili language, these quotes were later translated into English. Other quotes were obtained from a discussion about Backyard Mechanics in Tanzania posted on Tanzanian based Social Medial Networks

## 3.5. Limitations of the study

Notwithstanding the study's success, the following were some of the limitations which in one way or another may have affected my final findings. First, the sample size was reduced dramatically due to unforeseen circumstances caused by the new government in Tanzania. The new government decided to close down some of these garages claiming that they were operating illegally. Secondly, the budget was another constraint which made it difficult to reach some of these garages which were located in remote areas.

# Chapter 4. Motor Vehicle Repair and Maintenance

## 4.1. Introduction

This chapter draws a picture of the car repairing by using cases where this paper is based. The advancement of engine and motor vehicle repair, maintenance basics and principles, the qualities of a good motor vehicle mechanics, the qualities of a great engine vehicle workman and overseeing information in engine repair and upkeep industry that empowers them to maintain in spite of the fast-changing innovation, will be addressed.

## 4.2. Motor vehicle repair and maintenance basics and principles

The number of motor vehicles in the world continues to increase, creating an increasing demand for motor vehicle repair and maintenance work. Motor vehicle repair professionals and mechanics may secure both formal and on-job training in order to enhance their capacities in their specific areas of specialisation.

### 4.2.1. Vehicle Repair and Maintenance-Meaning

Vehicle repair and maintenance professionals diagnose and fix problems with a vehicle's engine, brakes, body or electrical components. Possible job titles may include automotive service technician, heavy equipment mechanic or collision repair technician (https://study.com/directory/category/Mechanic_and_Repair_Technologies/Vehicle_Repair_and_Maintenance.html).

Automotive service and heavy equipment mechanics use screwdrivers, hammers, lathes, welding equipment and power tools to repair engines, brake parts, belts and steering systems. Collision repair specialists use pry bars, pick hammers, plasma cutters and soldering equipment to restore the frames of damaged vehicles. In some auto repair shops, technicians may have a particular specialty, like air conditioning systems or glass installation.

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## 4.2.2. Maintenance, Repair and Operations (MRO)

MRO includes keeping up, repairing, and supplanting in case vital gadgets, gear, apparatus, and supporting utilities in mechanical, business, legislative, and private establishments. Over time, this has come to incorporate both planned and preventive support as cost-effective practice. Planned reviews have to come to drop beneath MRO domain.

Of late, 'predictive maintenance' uses sensor information to screen and monitor the system. It is at this point where the assessment of the mechanical patterns is done to anticipate the engine defunct before it happens (Federal Standard 1037C and from MIL-STD-188and from the Department of Defense Dictionary of Military and Associated Terms).

In airplane support, upkeep, repair and overhaul administrations incorporate assessment, modifying, change and the supply of save parts, adornments, crude materials, sealants, coatings and consumables for flying machine fabricating and MRO.

The marine transportation, industrial plant/equipment and commercial facilities market sectors depend on scheduled or preventive paint maintenance programmes to maintain and restore coatings applied to and also concrete and masonry assets in environments subject to attack from erosion, corrosion and environmental pollution.

The marine transportation (Federal Standard 1037C and from MIL-STD-188and from the Department of Defence Dictionary of Military and Associated Terms) offshore structures, ("AAP-6 - Glossary of terms and definitions"). NATO Standardization Agency. North Atlantic Treaty Organization) mechanical plant/equipment and commercial offices advertise divisions depend on planned or preventive paint upkeep programs to preserve and reestablish coatings connected to steel steel ("Commercial Electrical Contractor and Domestic Electrician Leeds"). 247 Electrical Services Leeds. Retrieved 2017-01-26) and also concrete and masonry assets in situations subject to assault from disintegration, erosion and natural contamination. in environments subject to attack from erosion, corrosion and environmental pollution.

Over time, the MRO has been standardized. The United States Department of Defense uses the following definitions (Commercial Electrical Contractor and Domestic Electrician Leeds"). 247 Electrical Services Leeds. Retrieved 2017-01-26). Any activity such as tests, estimations,

substitutions, alterations, and repairs — aiming to hold or re-establish a useful unit in or to an indicated state in which the unit can enhance its performance its required capacities requires a technical attention. All activities taken to hold the material in a serviceable condition or to reestablish it to serviceability should include assessment, testing, overhauling, classification as to serviceability, repair, modifying and recovery.

The above also applies to All supply and repair activities taken to keep a force in good condition to carry out its mission requires a schedule that may be persistently maintained. Such a notion is applicable too to the telecommunication, commercial real estate, and engineering in general.

Producers and industrial-supply companies frequently allude to MRO as contradicted to original equipment manufacturer (OEM).OEM incorporates any mission related to the coordinate fabricate of merchandise, where MRO refers to any upkeep, repair or redesign action to keep a fabricating plant or office running. . Maintenance is entirely associated to the ideation, in which the concept of practicality must be included. In this scenario, maintainability is considered as the ability of an item, under stated conditions of use, to be retained in or restored to a state in which it can perform its required functions, using prescribed procedures and resources (Airworthiness Manual, Doc 9760 *(3 ed.). Montreal (Canada):* International Civil Aviation Organisation. *2014*). Overhaul extends to the concept of improving performance over and above original design specification. Update amplifies to the of improving performance over and above original design and plan specification.

Over time car maintenance has picked up the back of preventative support. Modern advancement is continuing to expand the scope of the field. The basic types of maintenance falling under MRO include: Preventive or planned support, where equipment or facilities are inspected, maintained and protected before any break down can occur.

The fundamental sorts of upkeep falling beneath MRO include: Preventive or planned support, where hardware or offices are assessed, kept up and ensured some time recently break down or other issues occur.

Predictive upkeep, which employs sensor information to screen the system then persistently assesses it against chronicled patterns to foresee failures before they occur. Architectural preservation utilizes MRO to protect, restore and re-establish structures with stone, brick, glass,

metal and wood, which coordinate the initial constituent materials where conceivable, or with appropriate polymer advances when not, or chosen (C.V. Horie and Butterworth-Heinemann, 2010).

### 4.2.3.    Preventive Maintenance

Preventive maintenance is performed with the expectation of maintaining a strategic distance from disappointments, security infringement, avoidable costs and misfortunes, and to preserve unique materials of manufacture. The viability of a preventive maintenance plan depends on the RCM examination which it was based on, and the ground rules utilised for fetched effectiveness (RCM Reliability Centred Maintenance Analysis. MTain.com. Retrieved 5 August 2016).

### 4.2.4.    Corrective Maintenance

Corrective maintenance of the equipment after its break down is most costly. This not only can damage that particular spare part but also can damage other parts and cause multiple damage, but also consequential repair/replacement costs and loss of revenues due to down time during overhaul can be significant. Modifying and resurfacing equipment and infrastructure damaged by erosion and corrosion, as part of corrective or preventive maintenance programmes, includes ordinary forms such as welding and metal flame-spraying, as well as built arrangements with thermoset polymeric materials (Industrial Polymer Applications: Essential Chemistry and Technology (1st ed.). United Kingdom: Royal Society of Chemistry, 2016).

### 4.2.5.    Predictive Maintenance

More recently, advances in sensing and computing technology have given rise to 'predictive maintenance'. This maintenance strategy uses sensors to monitor key parameters within a machine or system and uses this data in conjunction with analysed historical trends to continuously evaluate the system health and predict a breakdown before it happens. This strategy allows maintenance to be performed more efficiently, since more up-to-date data is obtained about how close the product is to failure (Kaiser, Kevin A.; Gebraeel and Nagi Z, 2009).

## 4.3. Qualifications and characteristics of a good motor vehicle mechanic

Many individuals use reliable auto repair technicians when they need their vehicle(s) repaired. Automobile shops often include their own expenses like rent and other charges in the cost of repair of a customer's vehicle. An auto repair mechanic can offer a great arrangement for their services. The mechanic will have every tool or alternative to fix problems like a dead battery, flat tire and issues related to engines. An important part of car maintenance is repairing, oil change and replacing worn out brakes.

Sometimes people approach a non-licensed mechanic to fix their car. Potential problems that a customer choosing to use non-licensed mechanics include being overcharged, not receiving a bill of the charges and also the customer may not receive a warranty for the repair work. A certified licensed mechanic will always provide a printed receipt and undertaking of satisfaction. A good auto repair mechanic will ask the customer's consent before making any modification or replacement to their vehicle. A certified auto repair shop is equipped with up-to-date tools and technology (Sumeet Khanna, 2014).

Khanna suggests some of the qualities that a good auto repair mechanic and/ or garage should possess:

### 4.3.1. Complete familiarity of auto parts

There are plenty of different auto parts available in the market today. An auto mechanic should have complete knowledge of these parts. Car owners do not possess adequate knowledge regarding vehicle parts and therefore depend on the capability of the auto mechanic. The best way is to determine whether the chosen car specialist knows his business or not is to ask them to make a distinction of few parts. Test whether they are assertively answering the queries or rather causing further confusion.

### 4.3.2. Good background on automobile repair services

Previously, vehicles were simpler, and any mechanic would be fit for the services. Today the auto market scenario is totally different. More high-tech and multifarious vehicles are running on roads like family sedans, sport cars, pick-up trucks, and many more. There is an immediate requirement for experts who have a varied background in automobile services. There is no room for lapse in automotive repair as this would increase costs for the vehicle owner. A mechanic should possess certifications of different training programs and should be well experienced in the auto repair field. The mechanic's real practice of automotive repair is beneficial for vehicle owners.

### 4.3.3. Certification in the automobile industry

ASE certification is the most famous and widely recognised one, when it comes to the automobile industry. With an ASE certification, the mechanic will ensure satisfactory automotive services. This is due to the fact that an ASE certification requires two years' work experience and passing a series of examinations. The test series include engine repair and performance, electronic systems, heating and air conditioning, brakes, axles, suspensions, and mechanical transmissions. There are separate tests for repair technicians, parts specialists, and engine machinists.

### 4.3.4. Reputation of the auto repair centre

ASE certifications are applicable only to individuals and not to auto garages. An auto centre with professionals like an ASE certified mechanic can display the ASE sign in the garage. An auto centre having 75% ASE certified mechanics are itself given the 'Blue Seal of Excellence' from the ASE. Besides ASE recognition, other signs in an auto repair centre include well-organised customer services, latest and modern equipment, well-mannered staff, affordable service charges, and guaranteed repair. These factors help build reputation of an automotive centre.

## 4.3.5.　　Recommendation by family and friends

An auto repair mechanic can give testimonials to family members and friends. Potential customers will therefore be able to ask for referrals and recommendations. Local business listings also serve as a good source of information. It is important to choose the best auto repair mechanic to repair your car in order to keep it running for a longer period.

## 4.3.6.　　Education Level and Technical skills

The minimum educational requirement for work in this field for developed countries is a high school diploma. Many aspiring vehicle repair and maintenance professionals receive on-the-job training. However, employers often prefer job applicants who have some formal training. Technical and community colleges offer programs that lead to a certificate or associate degree in automotive service technology, diesel mechanic technology or collision repair. These programs include both classroom-based and hands-on experience components.

## 4.4.　Knowledge Management in automotive Repair

Finkbeiner (2017) argues that the automotive aftersales business is not merely limited to workshop concepts and the division of spare parts. In recent years, and with higher standardisation and electrification of onboard security systems and components in the car, it has become difficult to reliably identify errors and blockages within the systems of a vehicle by trial and error, as the computerisation of passenger cars has increased enormously. Motor vehicle diagnostics and repairing is not very different with the way diagnosis is done in the medical industry. The diagnosis report produced by a computer gives errors found it the electrical and electronic equipment's which are used to assemble the motor vehicle. He holds that "diagnosis" sums up the examination of defaults during the repair of a vehicle, managing quality control and, in cases of ambiguous functioning, statistical analysis of the vehicle's features.  He insists that diagnostic tools, suitable software – with its reading of diagnostic trouble codes [DTC] - and hardware are required for the complexity of cars' electrical systems the most essential requirements for the task of repairing, however, are professional knowledge and expertise.

He further argues that the use of professional tools becomes difficult for any layperson when the data available about the vehicle hardware, as well as the depth of information provided by the software, is abundant This means that, currently, in order to conduct automotive repairs and apply diagnostic tools to their full range, the end-user (repair professional) needs to be well trained on the one hand, but, on the other hand, must also acquire the corresponding professional understanding, skills, experience and knowledge about the electronic and mechanical systems of a vehicle.

The European Commission has recognised the value of the automotive secondary market, as it is interested in setting standards regarding automotive repair and the diagnosis of exhaust and electrical systems" (Pp. 11).

He writes "German legislation started to promote the monitoring of the emission-related components of the vehicle to reduce fumes and exhausts in the late 1980s. In the ambit of the Euro5 (EC No 715/2007) and Euro6 regulations (EC No 595/2009) of the European Commission, car manufacturers are obliged not only to reduce and control vehicle emissions, which was the focus of previous regulations, but also to provide access to "vehicle and repair and maintenance information" (EC 2009, Art. 3 § 11). The term vehicle repair and maintenance information describe "all information required for diagnosis, servicing, inspection, periodic monitoring, repair, reprogramming, reinitialising or the remote diagnostic support of the vehicle and which the manufacturers provide for their authorised dealers and repairers, including all subsequent amendments and supplements to such information. This information includes all information required for fitting parts or equipment onto vehicles" (EU 2009, L188/5).

This regulation replaces the European block exemption (1400/2002), which the automotive industry was part of from 2002. Furthermore, with this directive, service handbooks, technical manuals and DTCs, and monitoring and test data among others have to be accessible by information-seeking end-users" (Pp. 11.).

He stresses that the unrestricted access to vehicle repair information – which can be used to retrieve the technical information – is the essential subject of this regulation, along with the constant monitoring of emissions. It is necessary for there to be effective competition in the market for vehicle repair, as well as maintenance information services, as they contribute to the improvement of the internal market's functioning, specifically in regards to free movements of

goods, freedom of establishment and providing services (EU 2009, L188, p. 3). Most of the information referred to is relevant to onboard diagnosis systems (OBD) "and their interaction with vehicle systems" (p. 3).

For the players in the automotive aftermarket, especially diagnostic tool producers, this regulation extends previously collected and gathered repair data due to the inclusion of original data about how to conduct repairs on a specific model and what are the corresponding spare parts to be used" (Pp. 12).

He also argues that "the access to vehicle repair information, however, does provide another challenge to the people who are directly affected in the field of automotive repair".

Despite the information about parts and components of vehicles being made available, only professionally experienced and knowledgeable mechanics have acquired the skills needed to make a successful repair possible by combining the information and data provided with personal expertise. Furthermore, with their skills and expertise, repair professionals can assess the proposed data, processes, and repairs, and might be able to even improve and optimize them. Capturing these improvements by social media provides an advantage not only to automotive aftermarket stakeholders, but also to the professional repair community, as innovative new approaches for repair can be spread quickly and further developed" (Pp. 12).

## 4.4.1.     Offline-Knowledge Online: The Automotive Mechanic's Asset

In His book titled Social Media for Knowledge sharing in automotive, Finkbeiner (2017) gives the following descriptions about how experience and knowledge is acquired in automotive repair and maintenance.

The automotive repair shop environment, where the work of diagnosis and repair is carried out by the mechanic, acquires experience and knowledge regarding repairs. In the field of automotive diagnostic, the expert is the one executing the repair work and is in possession of the expert knowledge that defines their professional setting.

"The community of workshop employees consists of many expert mechanics who, within their community, bundle repair knowledge informally." The mechanics play a vital role in dealing, translating and applying data and information in the context of their professional expertise, since data and information alone are not practical for the purpose of repairing. An essential asset for car diagnostic and repair is built up by the professional experiences and knowledge of the mechanic (p.12).

He holds that information about applied repair and diagnostic knowledge is a high priority for Original Equipment Supplier (OES) to offer better service performance and improvements in test equipment, tools and service training.

In addition, he says, any OEM that tries to distribute a perfect vehicle and aims at the satisfaction of the customer and market share, is highly interested in the obtaining of repair data about their products (p. 13).

Finally, he stresses that, "the end-customer benefits, as he/she can rely on a constantly improving service and a possible reduction in repair costs due to optimisation by transparency and the accessibility of the repair data of their own vehicle" (p. 13).

He suggests that, firms and other organisations should use information about technological developments because of the demographic Using technology will help and give advantage to motor vehicle repairers to share their knowledge even though they are very far apart and differ in time and space.

Organisations bring about virtual communities in their organisation as an entity that assist in in gathering expert knowledge, transforming that knowledge to another form of knowledge and retaining that knowledge for future use (Amin and Roberts 2008, p. 359). He suggests that it is crucial to gather and make the information as well as the "know-how" of the mechanics accessible to key stakeholders in order to prevent the loss of this knowledge as well as obtain a competitive knowledge advantage (p. 13).

In addition, he suggests that organisations can enhance customer satisfaction by understanding what triggers the intention of mechanics to engage in the sharing of repair know-how in online forums. The mere creation of a social media tool is not enough to be successful if the provider

fails to understand the motives that are driving the target audience's engagement to share their know-how in the organisation (p.13).

Finkbeiner (2017) concludes that the impulse for this research is the establishing acceptance of social media tools for daily work routines; and to actively engage the target audience in virtually sharing knowledge, instead of losing substantial and practical repair expertise, is its aim. (p.13).

## 4.4.2.    Social Media and Knowledge

Social media communities and networking are "a necessary and effective method of boosting bridging and linking social capital thus enhancing social cohesion" (Gilchrist 2009, p. 22). People who are physically located in different places share information and knowledge smoothly through the use of internet. These people who are communicating via internet using various online social media tools such as WhatsApp, Facebook, SharePoint services, twitter and other online collaboration tools are popularly known as online communities.

These social media application tools facilitate to transform tacit knowledge into explicit knowledge and vice versa. If used properly and positively, these applications can be used to transform tacit knowledge into explicit knowledge, explicit knowledge into tacit knowledge as stated earlier, resulting into accumulating more knowledge that can lead into creation of new knowledge. Nonaka (1994), Dreyfus and Dreyfus (1986) point out that social media tools cannot capture all expert tacit knowledge which is held in people. This means that not all expert knowledge (tacit) embedded in people people's heads can be articulated, coded and captured into computer systems using these applications.

Automation of processes and mechanisms of doing certain activities are a result of the value created by converting tacit knowledge into explicit knowledge. Once extracted, explicit knowledge becomes the key the key knowledge of all automation processes which were previously done by people and even using human energy.

In order to show the value of knowledge and information available on the web (Finkbeiner, 2017) hold that the Web contains feedback, information and knowledge regarding products and problem-solving which are of high value, and programmes that can manage these intangible

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goods for the task to minimise potential loss while enhancing strategic resources can be established by organisations (p. 13).

He further insists that the focus of any big organisation has not been public repair networks of practice [NOP] and that neither OEMS nor suppliers have, to date, been using the possibilities social media offers in the context of building an exclusive NOP on the Internet. organisation (p. 14).

Kharabsheh (2007) suggest that if someone understands the importance of motivating knowledge sharing about motor vehicle repairing in social media networks, then this will be a reason for both Original Equipment Manufacturers (OEMs) and suppliers to be innovative and get a competitive advantage over others due to the dynamic nature of contemporary organisations. By so doing the new knowledge about motor vehicle repair and all other related processes and mechanisms involved in repairing the motor vehicle is noted out. As more and more knowledge is generated and integrated with old knowledge, the new knowledge is generated.

Lin and Chen (2008); Kharabsheh (2007) and De Carolis (2003) suggests migrating from traditional off-line motor vehicle diagnostic tools into on-line (cloud base) software solutions for serving the same purpose in order to provide a wide range of advantages for online communities to sharing knowledge. They suggest a campaign be done to make sure that these platforms are filled in by as many users as possible. By so doing they think the generation of knowledge will be fast and effective.

### 4.4.3. Social Media for Repair-Knowledge Management

The introduction of social media as a tool for people to communicate and socialize online has enhanced the speed and flexibility of which people use to easily communicate online (Boown, 2011). Brown argue that the speed and flexibility brought about by social media tools will bring about interconnectivity between virtual communities. Vanderkaay (2010) stresses that social media "reflects a yearning for human connection and self-expression by revealing doubts, asking questions and sharing lessons learned". Additionally, "businesses must learn to harness real-time data as key signals that inform, a far more efficient feedback loop for product development, customer service, and resource allocation" (O'Reilly and Batelle 2011, p. 211).

It is a good practice to process these raw data and information into useful knowledge which can then be used by the target group of people.

Eventually the integration and exchange of knowledge adds value to the existing knowledge while at the same time it creates a recognition (Vanderkaay 2010). The value of online forums is normally increased by active users who contribute tirelessly their ideas, problems and solutions in the forum (Gupta and Govindarajan 2000). They further argue that the more knowledge is used and shared, the more the new knowledge and value it gets. Davenport and Prusak's (1998) view it as "ideas breed new ideas, and shared knowledge stays with the giver while it enriches the receiver … only new knowledge resources—ideas—have unlimited potential for growth" (pp. 16–17).

Face to face knowledge sharing and exchange have been very important for decades for corporations and other organisations to survive (Wright and McMahan 1992). As have been proved by Lin *et al.* (2009), Knowledge sharing is very key to be more competitive, leading to long survival of any organisation.

Chen *et al.* (2010) defines knowledge as that process and its related mechanisms used in internalising and externalising knowledge. This process of giving and getting knowledge happens either from within an organisation or in collaboration with other external stake holders.

If used efficiently and effectively, Knowledge management will smoothen the whole process of harvesting knowledge from external environment i.e. internalising and sharing (externalising) of internal knowledge (von Hippel 1994).

Knowledge sharing is referred as that process or mechanism of internalising and disseminating the new and/or improved knowledge to the people in an organisation who have common problems to be addressed (Chen *et al.* 2010).

 like Davenport and Prusak (1998) understand knowledge management (KM) as the processes and mechanisms for acquiring and disseminating knowledge within an organisation or from its external stakeholders. Effectively applied KM would, therefore, smooth the process of external knowledge exploitation (von Hippel 1994) and of internal knowledge sharing (Szulanski 1996)

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for the creation of new intellectual assets that are the foundation of competitive advantage (Ndlela and Du Toit 2001; Wenger and Snyder 2000; Spender 1996; Grant 1996).

The sharing of knowledge refers to a mechanism of acquiring and disseminating new or improved knowledge (Chen *et al.* 2010). In a virtual network, this means that knowledge is acquired and disseminated within the same space in a continuum.

In the case of motor vehicle repair field, the technicians would meet online to discuss issues related to motor vehicle diagnostics and other related issues and would therefore form their online community where they will give and receive knowledge. This section is an extract from the book titled "Social Media for Knowledge sharing in automotive" written by (Finkbeiner, 2017).

## 4.5.  Bakyard Mechanics "Gereji Bubu" or Silent Garage

From under the tree in Temeke Wailes, Temeke district or in an open space in Sinza Mori, Kinondoni district or on a roadside of Uhuru, Ilala district and other areas like those in Dar es Salaam and other parts, all over the country of Tanzania, you will see a tricolour line of motor vehicles and motorcycles parked along those areas. These areas have turned out to be garages. Some people have even turned their residential houses into these garages popularly known as "gereji bubu" or in English silent garages.

These garages have existed for decades and it seems no one is going to stop them as they are the most preferred by people (car owners) because they are cheaper, and closer to where they customers reside compared to other formal garages that are located in industrial areas. These garages are discouraged by the government, but they fail to eliminate them for un-known reasons although many people think that it is due to political reasons. Politicians wants votes from these people during elections, therefore when elections are close, they stop harassing them.

The owners of these garages do not hold permits to work in those areas. They frequently face problems with regards to the government during times when there are no upcoming elections. Local government authorities would ask for the permits from the owners of these garages. If they don't provide one (they obviously don't have one), the motor vehicles and motorcycles found at these garages are towed to brokers until the fine is paid.

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For example, Mwenge area in Kinondoni district have many of these garages. Almost every corner of this area including the bus stand and all other areas around it have one or more "gereji bubu" which in turn distorts the reputation of this area and results in a loss of income for the government as these garages are not registered and therefore do not pay taxes. Below is a picture of a typical garage taken in 2012.



*Figure 4.1: Backyard Mechanics "Gereji Bubu" in Mwenge, Dar es Salaam.*

# Chapter 5. Research findings

## 5.1. Social-demographic characteristics of the respondents

A total number of 100 garage workers were asked to fill in the questionnaires and 18 garage owners who consented took part in the one-to-one in-depth interviews. Out of those hundred respondents who filled in questionnaires, 95 (95 per cent) were males and 5(5 per cent) were females. The distribution of respondents by age, gender and district are presented in the figures below where more than three quarters of these were aged between 18 to 45 years.

| Gender | Kinondoni | Ilala | Temeke | Total |
|--------|-----------|-------|--------|-------|
| Female | 2 | 0 | 3 | 5 |
| Male | 32 | 30 | 33 | 95 |
| **Total** | **34** | **30** | **36** | **100** |

*Table 5.1: Distribution of respondents by sex and district.*

| Age group | Frequency | Percentage | Valid Percentage |
|-----------|-----------|------------|------------------|
| Below 17 years | 10 | 10.0 | 10.0 |
| 18-45 years | 79 | 79.0 | 79.0 |
| 46-64 years | 11 | 11.0 | 11.0 |
| Above 65 years | 0 | 0.0 | 0.0 |
| **Total** | **100** | **100.0** | **100.0** |

*Table 5.2: Distribution of respondents by age.*

## 5.2. Respondents' Skills

Respondents were asked about their skills, how their skills were obtained and their levels of education. The results show that the majority of the respondents (forty-three per cent) had engine and/or mechanical skills, twenty-five per cent had electrical and wiring skills and the smallest group had skills to deal with gear boxes (five per cent) as summarised in table 4 below. These skills were obtained by either formal education via different vocational trainings (thirty-five per cent) or on job training (forty-five per cent) as indicated in table 5 below. The highest

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level of education reached for each responded was also recorded. Majority of respondents (thirty-eight per cent) finished primary education by the time of the interview, thirty per cent had secondary education and twenty-six per cent have technical or vocational training as summarised in Table 5.5 below.
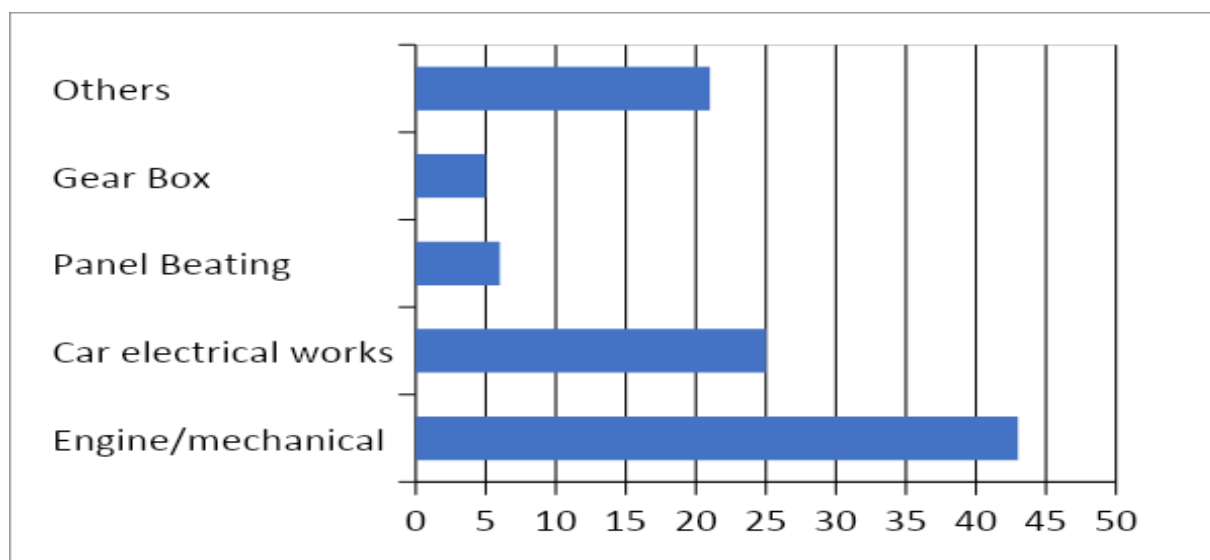


*Figure 5.1: Area of specialisation.*

| Specialisation | Frequency | Percentage | Valid (%) | Cumulative (%) |
|---|---|---|---|---|
| Engine/mechanical | 43 | 43.0 | 43.0 | 43.0 |
| Car electrical works | 25 | 25.0 | 25.0 | 68.0 |
| Panel Beating | 6 | 6.0 | 6.0 | 74.0 |
| Gear Box | 5 | 5.0 | 5.0 | 79.0 |
| Others | 21 | 21.0 | 21.0 | 100.0 |
| **Total** | **100** | **100.0** | **100.0** | |

*Table 5.3: Area of specialisation.*

| | Frequency | Percentage | Valid (%) | Cumulative (%) |
|---|---|---|---|---|
| Formal Education | 35 | 35.0 | 35.0 | 35.0 |
| On Job Training | 65 | 65.0 | 65.0 | 100.0 |
| **Total** | **100** | **100.0** | **100.0** | |

*Table 5.4: How these skills were obtained?*

| Education | Frequency | Percentage | Valid (%) | Cumulative (%) |
|---|---|---|---|---|
| Primary education | 38 | 38.0 | 38.0 | 38.0 |
| Secondary Education | 30 | 30.0 | 30.0 | 68.0 |
| University education | 5 | 5.0 | 5.0 | 73.0 |
| Technical Education | 26 | 26.0 | 26.0 | 99.0 |
| none | 1 | 1.0 | 1.0 | 100.0 |
| **Total** | **100** | **100.0** | **100.0** | |

*Table 5.5: Education level.*

## 5.3.  Awareness on Knowledge sharing

Knowledge sharing is an important aspect in any organisation in order to have a competitive advantage over others that do not share information. Basing on that notion, this survey intended to assess the level of awareness of the respondents about knowledge sharing

whether it can help garage associates to solve their technical problems. Their levels of approvals were matched using the scales that ranged between agreeing (fifty per cent), strongly agreeing (forty-six per cent) and very few disagreed and strongly disagreed (two and one per cent respectively) as shown in figure 1 and table 7 below.
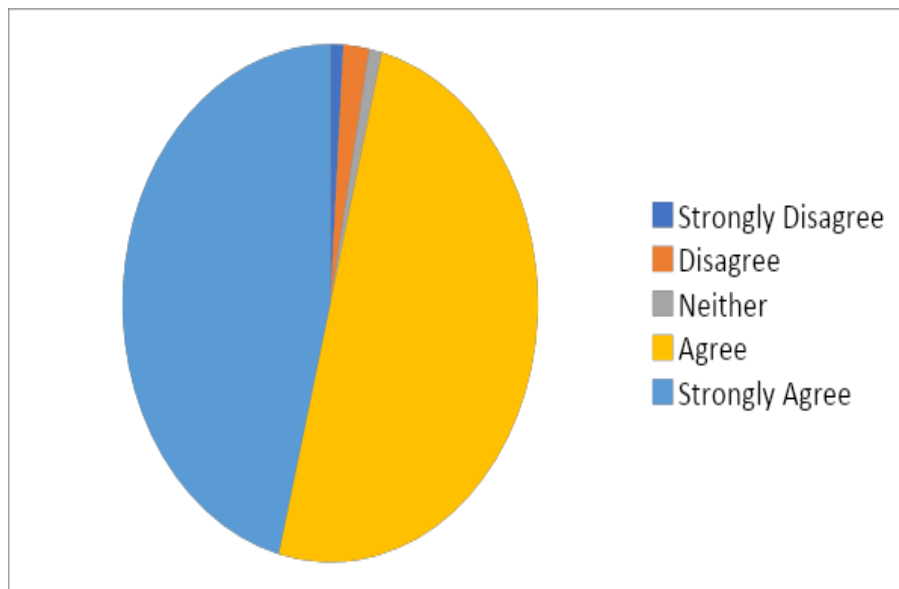


*Figure 5.2: Knowledge sharing can help solve problems?*

| Scales | Frequency | Percentage | Valid (%) | Cumulative (%) |
|---|---|---|---|---|
| Strongly Disagree | 1 | 1.0 | 1.0 | 1.0 |
| Disagree | 2 | 2.0 | 2.0 | 3.0 |
| Neither | 1 | 1.0 | 1.0 | 4.0 |
| Agree | 50 | 50.0 | 50.0 | 54.0 |
| Strongly Agree | 46 | 46.0 | 46.0 | 100.0 |
| **Total** | **100** | **100.0** | **100.0** | |

*Table 5.6:I believe that sharing knowledge can help garage members solve problems*

## 5.4. Knowledge sharing practices

In order to establish current levels of knowledge sharing among the garage associates, respondents were asked as to whether they have gained any help from their colleagues within their garages. Four per cent said they did not get any help, forty-nine per cent agreed that they gained help and forty-three per cent strongly agreed that they gained help as summarised in Table figure 2 and table 8 below.
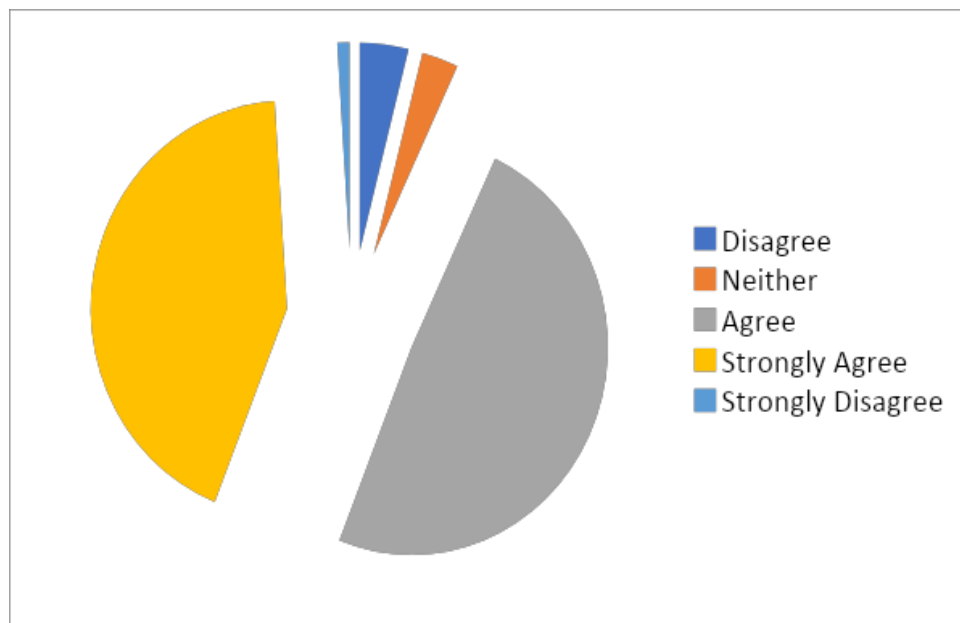


*Figure 5.3: Percentage of the gain from other respondents within the garage.*

| Scales | Frequency | Percentage | Valid Percentage | Cumulative Percentage |
|---|---|---|---|---|
| Disagree | 4 | 4.0 | 4.0 | 4.0 |
| Neither | 3 | 3.0 | 3.0 | 7.0 |
| Agree | 49 | 49.0 | 49.0 | 56.0 |
| Strongly Agree | 43 | 43.0 | 43.0 | 99.0 |
| Strongly Disagree | 1 | 1.0 | 1.0 | 100.0 |
| **Total** | **100** | **100.0** | **100.0** | |

*Table 5.7: I have gained help from other members within the garage.*

## 5.5.  Willingness to share knowledge

Respondents were also asked about their readiness to share their knowledge to their fellow garage associates. Majority of respondents said that they strongly agree to share their knowledge if asked to (fifty-three per cent), forty-four per cent said they do agree and only two per cent disagreed. More details can be found on figure 3 and table 9 below.



*Figure 5.4: wish to share my knowledge with other garage members*

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| Scales | Frequency | Percentage | Valid (%) | Cumulative (%) |
|---|---|---|---|---|
| Disagree | 1 | 1.0 | 1.0 | 1.0 |
| Agree | 44 | 44.0 | 44.0 | 45.0 |
| Strongly Agree | 53 | 53.0 | 53.0 | 98.0 |
| Strongly Disagree | 1 | 1.0 | 1.0 | 99.0 |
| Neither | 1 | 1.0 | 1.0 | 100.0 |
| | | **Total** | **100** | |

*Table 5.8: I wish to share my knowledge with other garage members*

## 5.6. Factors influencing knowledge sharing

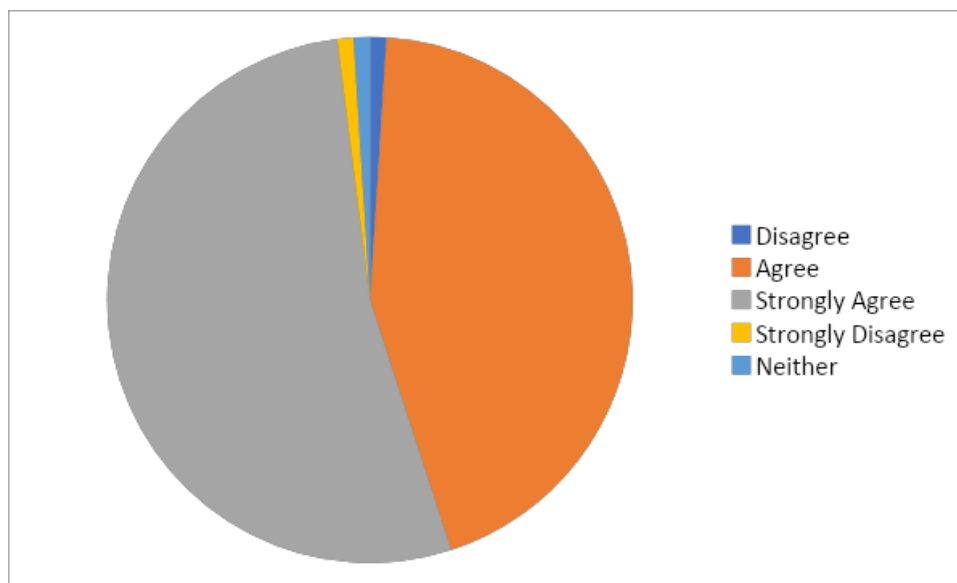The survey also established some factors that influence knowledge sharing in these garages. In this component, the intention was to look at how trust, reciprocity, reputation and personal gains among the garage workers can influence or hinder knowledge sharing in these garages.

## 5.6.1. Trust relationship

When asked about how trust can influence knowledge sharing, whilst 40 respondents (forty per cent) agreed that they share knowledge because they trust the member whom they share with, 32 respondents (thirty-two per cent) strongly agreed, and 15 respondents (fifteen per cent) disagreed as shown in table 10 below.

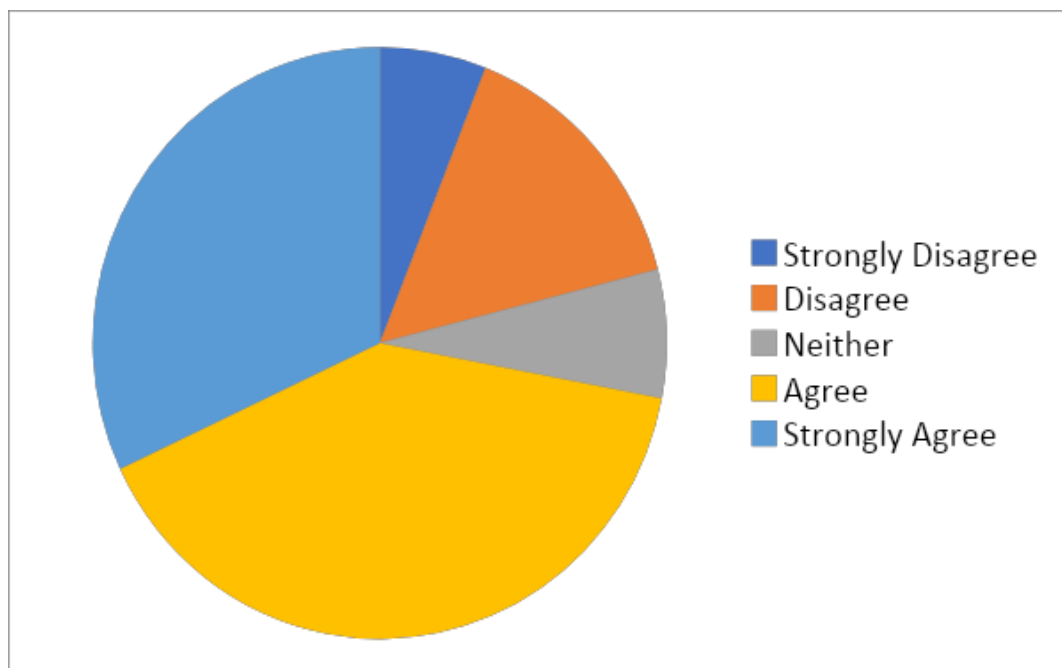| Scales | Frequency | Percentage | Valid (%) | Cumulative (%) |
|---|---|---|---|---|
| Strongly Disagree | 6 | 6.0 | 6.0 | 6.0 |
| Disagree | 15 | 15.0 | 15.0 | 21.0 |
| Neither | 7 | 7.0 | 7.0 | 28.0 |
| Agree | 40 | 40.0 | 40.0 | 68.0 |
| Strongly Agree | 32 | 32.0 | 32.0 | 100.0 |
| **Total** | **100** | **100.0** | **100.0** | |

*Table 5.9: Trust relationship*

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*Figure 5.5: I share knowledge because I trust the member who I share with*

These results correspond to the story below which I heard from one of the clients of these garages in Kinondoni, Dar Es salaam during a key informant interview with the garage owner.

"Last year I drove to Bukoba in Northen Tanzania which is about 1,000 Kilometres from Dar es salaam. While in Bukoba my car lost pulling power, was miss-firing and it was smoking a lot. I went to one of local garages "garage bubu" to seek for a solution. After spending three solid days without a solution, I decided to call my technician in Dar es Salaam known as Hashim who is familiar with my car. After explaining my problem to Hashim (my technician in Dar es salaam), he requested to speak to the technician in Bukoba (Fred)."

Hashim gave step by step instructions over the phone to Fred as to what should be done without telling him why. After following instructions from Hashim, Hashim asked him to start the car. After starting the car, I saw a heavy smoke coming from the car exhaust than before and I heard a very large sound from the engine which lasted for few seconds, then the car went to a normal silent mode, and the problem was solved.

When Fred asked Hashim as to what the problem was, and what was the cause, Hashim refused to disclose the information to Fred because he did not know him therefore, he did not trust him.

Hashim gave Fred his number so that if he gets a similar problem, he could support him over the phone with some payments". (Undisclosed interviewee)

## 5.6.2. Reciprocity:

About thirty-six per cent of the respondents agreed that sharing knowledge can be mutually encouraged within their garages, thirty-five per cent agreed and only thirteen per cent strongly disagrees. More details are summarised in table 11 and figure 7 below.

|  | **Frequency** | **Percentage** | **Valid (%)** | **Cumulative (%)** |
|---|---|---|---|---|
| Strongly Disagree | 13 | 13.0 | 13.0 | 13.0 |
| Disagree | 15 | 15.0 | 15.0 | 28.0 |
| Neither | 1 | 1.0 | 1.0 | 29.0 |
| Agree | 35 | 35.0 | 35.0 | 64.0 |
| Strongly Agree | 36 | 36.0 | 36.0 | 100.0 |
| **Total** | **100** | **100.0** | **100.0** | |

*Table 5.10: Scales indicating respondents believing that knowledge can be mutually encouraged.*
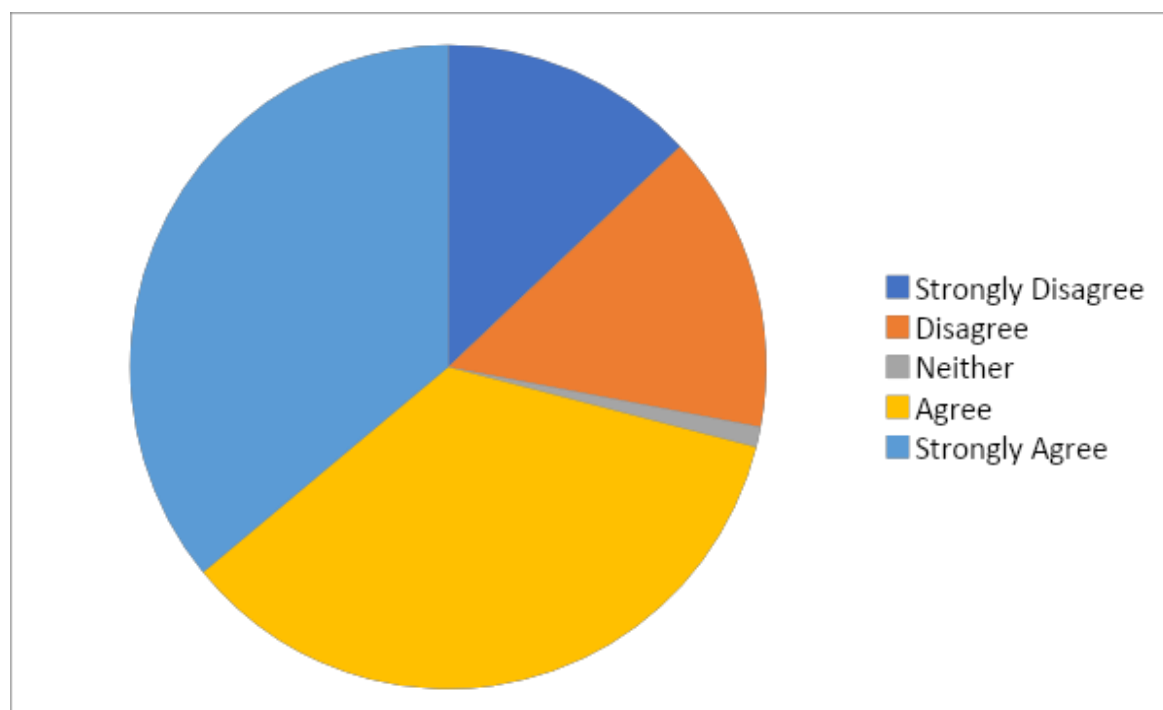


*Figure 5.6: Scales indicating respondents believing that knowledge can be mutually encouraged within our garage.*

## 5.6.3.    Reputation

When inquired about their preference of a individuals whom they would like to share information with, forty-four per cent of the respondents strongly agreed to share knowledge with people who have a high reputation in their field, twenty-nine per cent agreed and nineteen disagreed making the total percentage of respondents who agreed to seventy-three. More details on table 11 and figure 8 below:

*Table 5.11 Respondents' preference on where to share knowledge*

|  | **Frequency** | **Percentage** | **Valid (%)** | **Cumulative (%)** |
|---|---|---|---|---|
| Strongly Disagree | 4 | 4.0 | 4.0 | 4.0 |
| Disagree | 19 | 19.0 | 19.0 | 23.0 |
| Neither | 4 | 4.0 | 4.0 | 27.0 |
| Agree | 29 | 29.0 | 29.0 | 56.0 |
| Strongly Agree | 44 | 44.0 | 44.0 | 100.0 |
| **Total** | **100** | **100.0** | **100.0** | |

*Table 5.11: Respondents' preference on where to share knowledge*



*Figure 5.7: Respondents' preference on where to share knowledge.*

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## 5.6.4.    Personal gains

Table 12 below shows that majority of respondents (over eighty per cent) think that people do not like helping others, but they rather contribute to the community for personal gains.
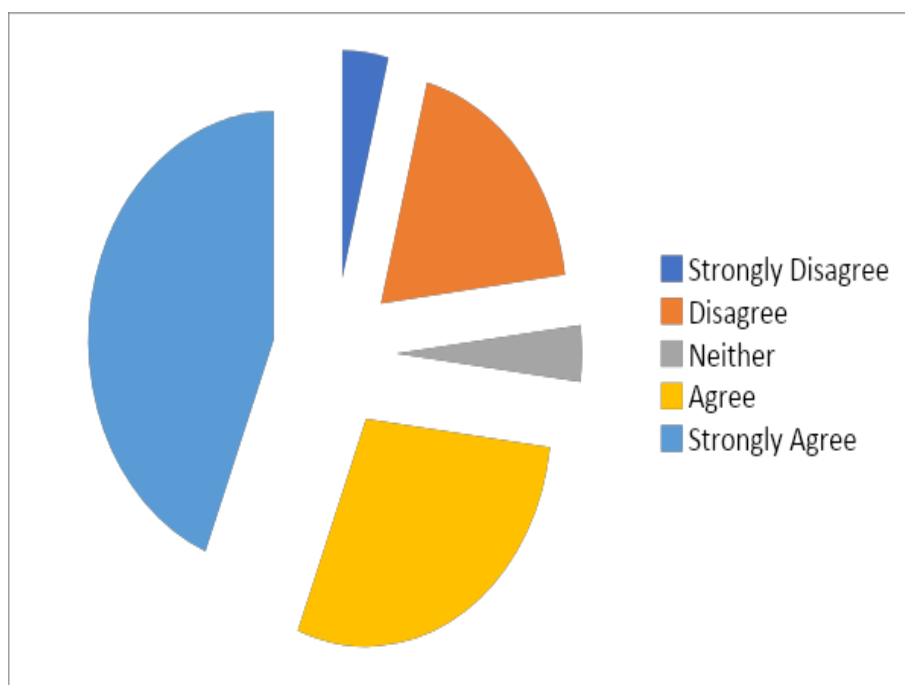
|  | Frequency | Percentage | Valid (%) | Cumulative (%) |
|---|---|---|---|---|
| Strongly Disagree | 4 | 4.0 | 4.0 | 4.0 |
| Disagree | 11 | 11.0 | 11.0 | 15.0 |
| Neither | 3 | 3.0 | 3.0 | 18.0 |
| Agree | 33 | 33.0 | 33.0 | 51.0 |
| Strongly Agree | 49 | 49.0 | 49.0 | 100.0 |
| **Total** | **100** | **100.0** | **100.0** | |

*Table 5.12: Rickety scales indication why people do not like contributing to the community for personal gain*

## 5.6.5.    Institutional Knowledge Advancement

The results further show that hundred per cent of the respondents believe that sharing knowledge would help advance the organisational knowledge (of these garages) as indicated in the table below.

|  | Frequency | Percentage | Valid (%) | Cumulative (%) |
|---|---|---|---|---|
| Agree | 47 | 47.0 | 47.0 | 47.0 |
| Strongly Agree | 53 | 53.0 | 53.0 | 100.0 |
| **Total** | **100** | **100.0** | **100.0** | |

*Table 5.13: I believe that sharing knowledge, would help advance the knowledge of the garage as a whole.*

## 5.7.  Knowledge creation, Transfer and storage

In this section I wanted to know how knowledge is captured, transferred and stored for future use in these garages. A respondent was given the option to choose one or more answers from a selection list.

## 5.7.1. What do you do when you get a new problem?

Respondents were asked what they do upon facing new problems in their area of expertise. Many responses such as "ask from other colleagues" were the most preferred method of seeking a solution; this method was mentioned (45 times) which is approximately 54.2%. Another picked selection was "Try and error" was the least selected option (5 times) representing 6 % of total selections. The table below summarizes the results.

*Table 5.14: What do you do when you get a new problem?*

| Choices | Frequency | Percentage |
|---|---|---|
| 1. Search from internet | 16 | 19.3 |
| 2. Search from data bank (Internal network) | 17 | 20.5 |
| 3. Ask from other colleagues | 45 | 54.2 |
| 4. I do try and Error | 5 | 6 |
| **Total** | **83** | **100** |

*Table 5.14: What do you do when you get a new problem?*

## 5.7.2. What do you do when you get a solution to a problem?

Respondents were also asked what they do when they get a solution to a problem in their area of expertise. Results shows that "share a solution with colleagues" was the most preferred method of transferring knowledge to others; this method was selected by 75 respondents which is approximately 64.1% of total selections under this category, followed by storing the solution in the databank for future use (thirty-three point three per cent) and "I don't tell anyone" was the least selected option (3 respondents) representing two point six per cent of total selections. The table below summarizes the results:

| Choices | Frequency | Percentage |
|---|---|---|
| 1.  Share a solution with colleagues | 75 | 64.1 |
| 2.  Store in the databank for future use | 39 | 33.3 |
| 3.  I don't Tell any one | 3 | 2.6 |
| 4.  Other | 0 | 0 |
| **Total** | **117** | **100** |

*Table 5.15: What do you do when you get a solution to a problem?*

## 5.7.3.    Ways on which collaborations contribute to the results the business

Collaboration in the contemporary organisation has long been seen as a sign of an effective and high functioning team. In order to understand their level of understanding about the importance of collaboration, respondents were asked to choose one or more answers from the responses list among 9 options the way they think collaboration contributes to the results of their businesses. The table below shows that "process improvement" was the most selected option i.e., 55 respondents (twenty-seven point two per cent of total responses selected), followed by "innovation" 41 respondents (twenty point three per cent) and the least selected option was employee satisfaction which was selected by two respondents only (one per cent).

Table 16 below summarizes the results.

| Choices | Frequency | Percentage |
|---|---|---|
| 1.  Cost reduction | 17 | 8.4 |
| 2.  Process improvement | 55 | 27.2 |
| 3.  Quality improvement | 31 | 15.4 |

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| | | |
|---|---|---|
| 4. Innovation | 41 | 20.3 |
| 5. Customer satisfaction | 25 | 12.4 |
| 6. Gives new insight and ideas | 15 | 7.4 |
| 7. Market Development | 15 | 7.4 |
| 8. Employee satisfaction | 2 | 1.0 |
| 9. Other | 1 | 0.5 |
| **Total** | **202** | **100** |

*Table 5.16: Summary showing how collaborations contribute to the results of business.*

## 5.8. Garage owners' interviews

These were purposely selected as it was intended to interview all those garage owners willing to be interviewed from selected garages. Key informant interviews on the age of the garage, how the garage became established, how they cope with changing car manufacturing technologies and what the main aim(s) of establishing these garages were asked.

## 5.8.1. How this garage was established?

Out of the eighteen garages visited, the study discovered that these garages were established by individuals or groups of individuals with similar back grounds in terms of technical skills. These skills range from those obtained from formal education to those obtained through on job training. Their age ranged from 2 to 32 years old. The reasons for their establishments can be grouped into four categories as follows. Those who just wanted to be self-employed, those who wanted to get employment but could not get a formal employment, those who felt that they were not earning enough income from being employed and those who just love this job.

Many of the key informants interviewed expressed that after the idea of establishing these garages, they secured their capital through loans or savings obtained through earlier employments. Acquired basic working tools and working spaces and started working.

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## 5.8.2. Some testimonials on how these garages were established.

"We started as 3 young guys after leaving our old garage where we gained our skills. We formed a new garage which is managed by ourselves. The garage is 8 years old and we wanted to be self-employed." – James, 38, Kinondoni (interview).

"I was advised by my friends whom we shared same knowledge and skills to establish our garage. We solicited a capital and managed to establish this garage. The garage is 2 years old. We formed this garage because we wanted to be self-employed." – Sadam, 25, Kinondoni (interview).

"Our Garage was established many years back (1998) by our late father who passed away in 2015. It survived for a short while after the death of our father and we recently decided to re-establish it. The garage is six months old now. It is aimed at improving collaboration between the workers of this garage." – Abdu, 43, Kinondoni (interview).

"After my training, I joined a certain garage (name withheld), I found myself benefitting others rather than having mutual benefits (not enjoying the fruits of my education), I decided to form my own garage. My garage is 20 years old. This garage was established in order for me to be self-employed as well as improving learning capacity." – Hashim, Temeke (interview).

"My garage was established 15 years ago with the main purpose of providing mechanical solutions to daily problems, be self-employed and I love this job. Another reason for establishing this garage was to assist friends financially when they are stack. I am planning to look for a bigger space so that I can work freely." – Rashid, 42, Temeke (interview).

"We formed a group of people with diversification of car mechanical skills; we hired this area and started working. Our garage is 7 years old now. The purpose of establishing this garage was getting away from hassles of being employed, increase my level of skills and create communication with new friends." - Samson, 33, Temeke (interview).

"After my training, I wanted to be self-reliant, I secured an open space, started looking for customers, Thank God, I managed to get them and there I am. I started this garage 18 years ago with the aim of being self-employed, create communication with new friends as well as learn

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and exchange ideas with peoples whom we share interest." – Anthony, 54, Kindondoni (interview).

"Our garage was established 28 years ago. The purpose of establishment was mainly for income generation, give mechanical solutions for daily problems, self-employment, acquisition of new skills, and create communication with new friends.  It was established by first sharing the idea, second looking for a suitable space, then mobilisation of resources although it was very difficult at the beginning." – Mohamed, 60, Kinondoni (interview).

"I secured an open space, I purchased few working tools, I started working alone. I currently have 10 youths whom I am working with. My garage was established 3 years ago. The establishment purposes include unemployment and looking for more learning opportunities." – Abas, 25, Ilala (interview).

"I was working with another garage, I was not satisfied with the income I was getting therefore I decided to look for an open space; I borrowed money, purchased working tools and started working. My garage is 1 year old." – Sudi, 29, Ilala (interview).

"We started by solving minor problems because of the small size of the area we were using and deficiency of technicians. We currently have 5 main technicians and 8 assistants.  I established this garage because I wanted to be self-employed and my garage is one and a half years old." – Daniel, Kinondoni (interview).

"I did set my goals of forming my own garage once I finish my training. After training we created a group of 3 students, and we started a garage work. Our garage is 5 years old aimed at self-employment, creating cohesion between garage workers and updating technical skills." – Daudi, 26 Kinondoni (interview).

"We started as car washers, later on we started learning how to fix car problems because people who came to wash their cars also wanted to repair their cars, because of that we realised that opportunity which led into establishment of this garage. The garage is 8 years old and was established because we had no formal employment therefore wanted to be self-employed." – Ghabriel, 46, Temeke (interview).

"This garage was formed as part of petty trade, taking into consideration the current un-employment rate in Tanzania. The main purpose is creating employment to un-employed youths. For example, we currently have many young trainees in this garage. I have 20 years' experience in this field although this garage is only 3 years old." – Haji, 51, Ilala (interview).

"I obtained these skills from other garages in the streets. After realising my strengths, I decided to establish my own garage, I acquired few working tools and employed some technicians in order to form this garage. The purpose of establishing this garage was mainly for income generation, self-employment and enhanced skills. The garage is about 6 years old." – Ally, Ilala (interview).

### 5.8.3. How do you cope with car manufacturing technologies?

Many respondents showed a great concern over new car manufacturing technologies. They are unsure whether they will be able to survive in the market by using their old techniques of solving car problems. In the past when they faced a new problem, they would discuss among themselves and their networks, look for a solution in their internal networks, internet, car manufacturers websites and sometimes do try and error.

With modern cars, most of their parts are diagnosed by computers which make it difficult for these garages to compete as they are not in possession of the new technologies. The hardware and software used to diagnose those cars are complicated and expensive. They are afraid that with the advancement of the modern car industry, if they do not acquire the technology to keep up with formal mechanics, they may become obsolete, resulting in the closing down of their businesses and the loss of many jobs.

### 5.8.4. How do you establish connections with big and formal Garages?

Trained garage workers from big, formal garages who were laid off for reasons such as redundancy during economic crisis or theft etc. These workers normally have connections with other workers with whom they used to work before they left. For that reason, when backyard

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mechanics workers need any spare part or any service from the formal garages, they use their old connections.

There was one respondent who worked at a large, formal garage, who did not want to disclose his identity, mentioned that sometimes they manage to steel spare parts from their garages because their salaries are so low. Once they are in possession of those spare parts, they sell them to these backyard mechanics. This also helps in establishing connections between workers in formal garages and those working in "gereji bubu".

Some workers from the large, formal garages decide to be self-employed for various reasons, are the ones who establish these backyard mechanics. Since they have worked with those large, formal garages, they are able to maintain connections with their old employers.

## 5.8.5.    Some testimonials on the challenges

"We look for solutions relating to new technologies over the internet and also discuss with friends and colleagues on new issues. In certain cases, we do try and error although sometimes it cost our customers." – Prince, 47, Kinondoni (interview).

"In fact, we have more challenges now than before due to advancements in car assembly technologies. Most modern cars come with a lot of electronics which are mostly diagnosed by computers. This situation is forcing us to send our kids to school so that they don't inherit our old techniques of solving problems." – Patrick, 59, Kinondoni (interview).

"Modern tools for diagnosing modern engine cars are too expensive which makes it difficult to deal with modern car engines." – Mashaka, 38, Temeke (interview).

"We don't have diagnosis tools therefore when we get modern cars, we take them to other garages that have more sophisticated tools for the diagnosis of the car, after knowing the problem we take it back to our garage in order to fix the problem." – Godi, 34, Kinondoni (interview).

"We have a lot of challenges that are facing us all but because we have a big network, we normally communicate with people in our network who might have faced a similar problem before, if that does not work, we go to other external networks to seek for a solution.  These

solutions are shared among network members for future use." – Gwandumi, 60, Ilala (interview).

"For new technology, we normally seek information from websites of car manufacturers such as TOYOTA (www.toyota.com), Mitsubishi (www.mitsubish-motors.com), Suzuki (www.globalsuzuki.com), etc. to know the types of spare parts used for that particular car and what are their associated problems, and how can they be resolved." – Rodrick, Kinondoni (interview).

## 5.9. Findings from Social Media Networks

Social media networks and the Internet as a whole have become important and reliable sources of information if used responsibly. It is a simple and cost-effective platform that modern researchers use to gather information quickly. One media group called Jamii Forums (www.jamiiforums.com) is among the largest social media networks in Tanzania specialising in social, social sciences, politics, hard sciences, science and technology, education, culture and more.

One of the issues discussed in the science and technology sub-group of Jamii Forums is the future existence of backyard mechanics (gereji bubu) in the city of Dar es Salaam and Tanzania at large. Forum members discuss problems and difficulties that car owners have faced when utilising these backyard mechanic services.

Most of the forum users whom in one way or another faced the hassles of backyard mechanics, complain that the services of these garages are no longer reliable. Technicians spend a lot of time trying to solve a single mechanical problem and sometimes they end up finding the incorrect solution to the problem. By replacing wrong spare parts or providing an incorrect solution to a problem my lead to increasing maintenance costs for car owners and could potentially create new mechanical problems. It is for this reason forum members predict the natural death of these backyard mechanics (if they don't change) is imminent. The emergency of new, cheap, modern and formal garages (especially Chinese) with modern diagnostic and repair tools is causing a further threat to these backyard mechanics.

Below is an extract from one of the threads I posted in this discussion forum (translated from Swahili).

"Good day members of this forum, I am always happy with the way issues are discussed in this forum, today I have an issue with the backyard mechanics where we take our motor vehicles for diagnostics and repair.

I own one car (Rav4) for more than four years now, when I go to these backyard mechanics, there is something that happens very often which I real don't like. I need your help so that I know where the problem is.

I have met with some technicians who are always in a hurry and runs into making pre-mature conclusions before making a thorough diagnostics and tests in order to know the real problem. For example, the brake pedal stacks on the flow of the car once pushed while the cars is in a slow moving queue, when speeding up the problem disappears and the brake pedals does not stack any more, it does not stack even when I reach bore holes or bumps on the road. The technician is suggesting that we replace shock-absorber, both links and the stabilizer bush. I don't agree with him by 80 per cent.

It is not my first time for an issue like this to happen to me, I have witnessed the car to have been brought to a garage with a problem A, the technician says it is problem B, and repairs problem B at a very big cost, and surprisingly to find out the following day that the same problem still exists. And because we don't have any warrant and/or a contract of work with the garage in writing, then I have nowhere to claim for a loss I have encountered.

I don't like this issue, I don't know whether I am the only one having this problem, is it the car which have irreparable problems, or this is the way that this garage uses to still money from its clients.

Thank you all, I request for your advice on this for now." – Besar (Online discussion forum)

"That is one sir, the second issue is many of these backyard mechanics have no system and/or procedures of servicing motor vehicles. For example, service manuals of most motor vehicles advise on what kind of a service should be done after certain kilometres. A service of a car

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which have travelled for 5000 km for example, should not be the same as the car which have travelled 15000.

Now these experts of ours, if you service your car every 3500 kilometres, then when you take it there it is air filter, oil filter, engine oil, brake adjustments, Automatic Transmission Fluid (ATF) that is it unless you reported a different problem which is why you took the car to the garage." – Ndalilo (Online Discussion Forum)

"You are very right sir, thanks, if god wishes we will look for a solution regarding a system and /or procedure of doing our service because I do believe that not having a system of car service in place contributes to more damage to our cars and increases maintenance costs." – Besar (Online Discussion Forum)

"The problem of brake stacking in my car was caused by one of new brake pads I replaced recently not sitting properly in its position. It was wearing away on its lower side resulting into poor contact with brake lining. It is very difficult problem to diagnose, I found the solution through surfing over the internet and many people ended up changing a lot of things without any success. For me I replaced the new brake pad with the old one and the problem seems to be solved." – Besar (Online Discussion Forum)

"Very sorry, it also depends, both sides can be a problem. For a technician, if he is in a hurry or uses experience only to solve mechanical problems, he/she is the one who provides such controversial answers. Also, if a client is in a hurry, or shows the technician that he/she is capable of doing the work then the technician decides to mention any defect although that is unprofessional. I am a technician, but sometimes it takes more than one month to diagnose a car, but once I give a solution, I am sure of it. Backyard mechanics tend to take more work than they can handle, if they don't have a good task management system they will probably fail." – Fundibenz (Online Discussion Forum)

"I totally agree with you, as a technician and expert, it does not bring a good picture to other people if a client assumes the work of the expert. There are clients who have no idea on how to go about any mechanical problem, but they are very troublesome. One the other sine we have technicians who are not confident, and they don't know what they are doing, they don't want

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to listen to the car history or previous repairs so that they can understand the problem in deep, what he thinks is right cannot be changed.

I have met with some of these backyard mechanics, it is as if they are looking for an extra work to so that they can increase their income, you will hear this spare part is not good, this spare part has to be changed but the spare part he /she is talking about was changed less than a month ago. Those are some of the issues that causes a technician to lose credibility to a client

If you're a professional, I think it is better if you keep an ear open to new and different ideas especially when you are not very sure with the problem you are dealing with, it will help you learn. Also, it is important to set a limit as to what extent you will listen to a client and diplomacy is very important when the client asks so much." – Musa Namangaya (Online Discussion Forum)

"Very nice Mr Besar,

Very sorry for everything that you have been going through with that crook portraying to be a mechanic. As you mentioned earlier, poor diagnostic or not doing any diagnosis at all is the source of all the problems.

Diagnosis is not something simple as many people think, this art needs a good expertise and/ or understanding of the motor vessels or systems that you want to diagnose. Experience, technical knowhow of the basics, laws and ethical sciences, developments and technological changes in motor vehicle and other automobile assembly technology, use and understanding of diagnostic tools, and the other most important aspect which is usually forgotten is time.

Motor vehicles and other machines are normally systems made up with a collection of subsystems. Those sub systems are collection of metals and other materials from different parts in order to perform a given task. In order to perform their given tasks, these systems have to obey scientific laws. For example, a piston in a master cylinder moves ups and down if there is an internal combustion in the engine. This combustion changes heat energy into mechanical energy causing pistons to move up and down (no doubt that our friends who are gurus in chemistry understands better and can be in a better position to explain about this process). By

not understanding scientific laws, it is a very big obstacle towards succeeding in any of your diagnosis exercise.

Motor vehicle manufacturers can use different systems in order to accomplish a certain task for different reasons such as saving money, improving their systems or even just be different from others. Mercedes Benz for example is relying so much in air systems in implementing different solutions in their cars such as car – door - locks, switching off diesel engines and also for changing gears in automatic gear boxes which does not use electronics. Others use electronics or levers to perform these same tasks.

Every automobile manufacturer understands better their products and their functioning than peoples outside their circles. There are certain circumstances where some other experts outside their circles can understand their products and their function better than the manufactures. I think these are two different issues although under the modern world which use computer systems, motor vehicle manufacturers use special tools and applications that are capable of communicating with the motor vehicles manufactured by them in order to diagnose those motor vehicles.  It is important to use these tools because they are the ones which can communicate properly with the motor vehicle hence provide a right diagnosis. For others it is like trying to communicate with a Chinese without knowing the language. It is very difficult." – Styvo254 (Online Discussion Forum)

"Hi, It just happened to me few minutes ago, I we at the Backyard mechanic to check for Air Brake System (ABS), the ABS light on the dash board is on all the time, The technician there introduced the issue of gear box oil while I know for sure ABS is related to brakes, these are Dar Technicians." – Black Marxist (Online Discussion Forum)

# Chapter 6. Conclusion and Discussion

## 6.1. Conclusion

This study found out that Backyard Mechanics in Tanzania "gereji bubu" were established by individuals or groups of individuals who had similar backgrounds and complementing technical skills. These skills were obtained through either formal education or on-the-job training. The idea of establishment of these garages arose due to several reasons, such as retrenchments in their previous formal garages, lack of employment in formal garages, looking for better income, independence, self-employment, etc. After decision to establish these garages were made, the founders of these garages secured their capital through loans or contribution of savings obtained from their earlier employments, they acquired basic working tools and a working space or an un-occupied building and thereafter opened up a garage.

Backyard Mechanics maintain and improve their collective knowledge through collaboration and knowledge sharing. This sharing is from both within and outside their networks, and it is very informal and not documented anywhere. This has been possible because community members trust each other, get mutual benefits and are recognised for their contributions that lead to innovation, process and quality improvements of their products and services.

The study also found that "storytelling" and "learning by doing" practices are the main knowledge management practices used by these garages for internalising and externalising knowledge, followed by internet searches and internal networks. Storytelling and learning by doing are the basic elements of most communities of practice (CoP).

The study further realised that there is a great concern over the future of these garages among community members. In terms of modern cars, their engines are diagnosed by computers. This in turn will make it difficult for the informal garages to compete as they often cannot afford the necessary hardware and software due to their complexity and cost. This concern can only be resolved by making their businesses formal, acquiring right technical skills, increase their capital and use appropriate technology as per future needs.

## 6.2. Discussion

The findings from interviews, surveys and online discussions forums resemble that found on literature except for the new concerns faced by "gereji bubu" owners on major technological changes that are happening now in car assembly technologies.

The study shows that trust, reciprocity, reputation and personal gains among the garage workers influences knowledge sharing practices in these garages. This is equivalent to what was observed in literature review, for example on trust Yusof and Suhaimi (2006) argue that relationships in faculties between knowledge recipients and knowledge provider is mostly contributed by Trust. Knowledge sharing among faculty members is promoted by trust through enabling a more proactive approach and open relationships. Open relationships allow smooth knowledge transfer and sharing. On reciprocity, Davenport and Prusak (2000) finds that reciprocity can inspire knowledge sharing in organizations because persons who share knowledge with others expect to get another useful knowledge from others in return. Cabrera and Bonache(1999) found out that incentives in organizations were a motivating factor for employees to share knowledge because of the belief that they might get additional income or promotion.

On the establishment of these garages, this study further found out that Backyard Mechanics in Tanzania "gereji bubu" were established by individuals or groups of individuals who had similar backgrounds and complementing technical skills due to different reasons such as retrenchments in formal sector, lack of employment in the formal sector etc. This resembles the way communities of practice are formed, For example Etienne and Beverly Wenger-Trayner (2015) writes that Communities of Practice are formed by people who lock in a common mindset of human achievement within the domain of mutual learning: A tribe learning to survive, a group of experts searching for advanced ways of communication, a team of engineers collaborating on comparative problems, a school-based student clique, a network of health professionals researching creative methods or a group of first-time managers supporting one another to adjust to their new managerial positions.

The study further found out that Backyard Mechanics maintain and improve their collective knowledge through collaboration and knowledge sharing. This sharing is from both within and

outside their networks, and it is very informal and not documented anywhere. This is consistent with what is written by other scholars such as Wenger and Basole.

Wenger (2005) argue that, in Communities of Practice, community members are actively engaged in activities related to the community. They develop a shared reservoir of resources which includes but is not limited to stories, tools, experiences, and ways of solving recurring problems which takes some time and sustained interactions.

These findings are also consistent with the study conducted in India by Basole (2015) who argue that it is wrong to see an informal sector as a pool of unskilled workers when you approach it with the view of understanding its knowledge institutions such as knowledge acquisition, knowledge transfer, knowledge sharing, inter-firm knowledge sharing and innovation. Research shows that informal sector workers have gone into long term training which is equivalent or longer than the formal degrees, diplomas and certificates.

The study also found out that "storytelling" and "learning by doing" practices are the main knowledge management practices used by these garages for internalising and externalising knowledge, followed by internet searches and internal networks. This is also consisted with other scholars who have written about storytelling, for example David Snowden (1999) believe that using stories in Knowledge Management is a development of an essential natural ability that has connected communities for centuries. He believes that storytelling is a complex knowledge disclosure mechanism that provides a largely self-sustaining and low-cost means of capturing and reusing knowledge.

The auto mobile engineering qualification has a wide scope and can provide great opportunities for employment. Automobile engineering training deals with vessels that have motor engines- being an automobile engineer is more than being a mere technician.    All those seen in automobile repair centres and motor vehicle auto garages are generally known as technicians, those technicians perform their day-to-day activities in solving motor vehicle mechanical problems using their hands (i.e manual work). In developed countries, an automobile engineer does the functions of designing the whole system of an automobile vessel from the engine system, gear box system and all other accessories, they use their design to instruct and/or produce manuals that help technicians to solve mechanical problems.    The term engineering was derived from the word engine and is where the whole engineering concept comes from.

As a student choosing a career it is important to make your decision based on how sustainable that career will be or even if it will be relevant 10 years into the future.

If it is possible for a backyard mechanic to go to school and grow their knowledge, it would be advisable to gain knowledge in modern automobile repair tools. When referring to automobile engineering/repairing, statistically Tanzania orders more than 50,000 motor vehicles every year (http://www.thecitizen.co.tz/magazine/businessweek/1843772-3373464-55mnhlz/index.html). These are the motor vehicles which 'formal automobile mechanics' and 'backyard mechanics' will be competing for to repair when owners face mechanical problems. Tanzania's construction sector is growing at 20 per cent annually (https://www.tanzaniainvest.com/construction/tanzania-construction-sector-report) and these are good users of heavy machines like graders, cranes, forklifts and excavators, whose repair and maintenance cannot be done by backyard mechanics (gereji bubu). Currently in most towns in Tanzania, there are Chinese investors who have established modern motor vehicle repair garages with modern diagnostic tools of which technicians from backyard mechanics cannot use and/or operate. For the current growth rate and changes is technology there are few years before these backyard mechanics, whose technicians cannot even use a computer, will face a natural death. Remember technology saves time, money and delivers high quality services.

Looking 10 years into the future, it is possible that Tanzania may benefit from having a motor vehicle and/or automobile vessels assembly plant, one is owned by Tanzania Peoples Defence Forces (TPDF) which is not doing well. According to the current global situation, Africa and Asia are good and conducive places for industrial investments. Whites have polluted their environment due to many and heavy industries which forced them to establish and enforce strict laws against environmental and air pollution therefore coming to invest in Africa or Asia is inevitable, it is just a matter of time. China's fast economic growth is stimulated by Americans, some Americans have established their manufacturing plants and companies in China due to the earlier reasons of environmental pollution in their country and cheap labour in China. In the next 15 years, Tanzania will not be what it is today.

Eligible backyard mechanics technicians should be encouraged to go to school and study in order to keep up with advancing technology. They should try to learn new things and terminologies in their area of specialisation, understand where the world is, and where it is

headed in terms of their career industry and they should know the global technical and social requirements of their careers. The current world is like a global village due to globalisation, equipping one's self with the right knowledge could bring about opportunities to work anywhere in the world.

Diagnosis is not as simple as many people think, it is an art that needs good expertise and/or understanding of the motor vessels or systems that need a diagnosis. Experience, technical knowhow of the basics, laws and ethical sciences, developments and technological changes in motor vehicle and other automobile assembly technology, use and understanding of diagnostic tools, and the other most important aspect which is usually forgotten is time.

Automobile manufacturers understand their products and their functioning better than people outside their circle. There are however certain circumstances where some other experts outside their circle can understand their products and their function better than the manufactures. These are two different issues, although under the modern world, which use computer systems, motor vehicle manufacturers use special tools and applications that are capable of communicating with the motor vehicles manufactured by them in order to diagnose those motor vehicles. It is important to use these tools, as they are the ones which can communicate properly with the motor vehicle and hence provide the correct diagnosis. Where for others it is like trying to communicate with a person that speaks a foreign language without knowing the language. It is very difficult.

## 6.3. Areas for further research

Authors highlighted some research themes which aim at bridging the gap between the existing Knowledge Management theory and empirical work. They grouped their areas for further research according to the knowledge processes.

- Knowledge creation: results emanating to that may facilitate knowledge creation within a shared space.
- Knowledge storage/retrieval: research on of the incentives that are important in encouraging organisation members with valuable knowledge to contribute and share their knowledge and how much context should be included in stored information.

- Research on the degree of knowledge transfer: this has increased due to the use of information technology as well as the advancement of successful organisational and technical strategies for organising. Knowledge acquisition and distribution are required to enable knowledge transfer.

- Knowledge application: few issues that need research include the extent of the application of knowledge in organisations and factors contributing to the knowing – doing gap and how they can be reduced or eliminated.

- Alavi & Leidener (2001) acknowledge that there has been extensive research in the area of Knowledge Management. They suggest future research should focus on how ICT can support the management of multifaceted and dynamic nature of knowledge in a globalised world. They suggest that more emphasis should be placed on the knowledge application process rather than other processes.

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# Appendices

## Survey Questionnaire (English)

Student's Survey Questions for MS Thesis Paper

Hello, I am currently a graduate student at the University of Stellen Bosch (South Africa) and would like to conduct this survey as a part of my Thesis project. Your contribution to this survey is greatly appreciated.

1*      Your Sex:

    ○ Male    ○ Female

2*      Your age group:

    ○ 17 years or younger

    ○ 18-45 years old

    ○ 46-64 years old

    ○ 65 years or older

3*      What is your area of specialisationspecialisation

    ○ Engine    ○ Wiring

    ○ Panel Beating    ○ Gear Box

○ Other

4* How Did you attain these skills?

○ Formal
Education

○ On Job
Trainin

5* What is your education level?

○ Primary education    ○ Secondary
Education    ○ University
education

○ Technical
Education    ○ None of the above

***Please state whether you agree or disagree with the statements (6-13)***

6* I believe that sharing knowledge can help garage members solve problems

○ Strongly
Disagree    ○ Disagre
e

○ Neither    ○ Agree

○ Strongly Agree

7* I have gained help from other members within the garage

○ Strongly Disagree    ○ Disagree

○ Neither    ○ Agree

○ Strongly Agree

8*    I wish to share my knowledge with other garage members

○ Strongly Disagree    ○ Disagree

○ Neither    ○ Agree

○ Strongly Agree

9*    I share knowledge because I trust the member who I share with

○ Strongly Disagree    ○ Disagree

○ Neither    ○ Agree

○ Strongly Agree

10*    I believe that the motivation of sharing knowledge can be encourage by reciprocity within our garage

○ Strongly Disagree    ○ Disagree

○ Neither    ○ Agree

○ Strongly Agree

11*    I prefer to share knowledge with people who have a high reputation in their field

   ○ Strongly Disagree     ○ Disagree

   ○ Neither     ○ Agree

   ○ Strongly Agree

12*    I think people do not actually like helping others and are contributing to the community for personal gains

   ○ Strongly Disagree     ○ Disagree

   ○ Neither     ○ Agree

   ○ Strongly Agree

13*    I believe that sharing knowledge, would help advance the knowledge of the garage as a whole

   ○ Strongly Disagree     ○ Disagree

   ○ Neither     ○ Agree

   ○ Strongly Agree

14*    What do you do when you get a new problem? (You can choose more than one option)

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☐     Search from internet

☐     Search from knowledge base (Intranet)

☐     Ask from other colleagues

☐     I do try and error

☐     Othe  please r    specify: [                    ]

15*    What do you do when you get a solution to a problem?(You can choose more than one option).

☐     Share a solution with colleagues

☐     Store in the database for future use

☐     I don't tell any one

☐     Othe  please r    specify: [                    ]

16*    In what way does your collaborations contribute to the result of your business? (You can choose more than one option)

☐     Cost reduction

☐     Process improvement

☐     Quality improvement

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- ☐ Innovation
- ☐ Market development
- ☐ Customer satisfaction
- ☐ Employee satisfaction
- ☐ Gives new insight and ideas

- ☐ Othe please
  r    specify: _____

## Key Informant interviews (English)

Student's Survey Questions for MS Thesis Paper

Hello, I am currently a graduate student at the University of Stellen Bosch (South Africa) and would like to conduct this survey as a part of my Thesis project. Your contribution to this survey is greatly appreciated.

1\*     How old is your garage? \_\_\_\_

2\*     What is/are the main aim(s) of establishing this garage? (You can choose more than one option)

☐     Deliver mechanical solutions for daily problems

☐     Did not get a formal employment

☐     Wanted to be self employed

☐     Stimulate collaboration between garage workers

☐     Development of new knowledge

☐     Increase knowledge level

☐     Speed-up learning

☐     Independence of organisational and geographic boundaries

☐     Make new contacts or friends

☐     Learn and share area of interest

☐     Other please specify: _____

Please can you explain how this garage became established?

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3

4    Please explain how does your garage cope with changing car technology?

5*   Additional Comments you may wish to make:

# Survey Questionnaire (Kiswahili)

Student's Survey Questions for MS Thesis Paper

Halo, Mimi ni mwanafunzi wa chuo kikuu cha Stellen Bosch (Afrika Kusini) na ninataka kufanya utafiti kama sehemu ya andiko langu la shahada ya udhamili. Nashukuru kwa mchango wako.

1*    Jinsia yako:

○ Kike    ○ Kiume

2*    Kundi la umri wako:

○ Chini ya miaka 18

○ Miaka 18-45

○ Miaka 46-64

○ Zaidi ya miaka 65

3*    Wewe ni fundi wa nini kwenye magari?

○ Injini        ○ Umeme

○ Rangi        ○ Gia Boksi

○ Kitu kingine

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| 4* | Je, ulipataje ujuzi huu? |
|---|---|
| | ⊙ Elimu ya shule   ⊙ Mafunzo ya kazini |

| 5* | Je, kipi ni kiwango chako cha elimu? |
|---|---|
| | ⊙ Elimu ya msingi   ⊙ Elimu ya Sekondari   ⊙ Chuo Kikuu |
| | ⊙ Elimu ya Ufundi   ⊙ Hakuna |

***Jibu kama unakubaliana au hukubaliani na maelezo yafuatayo (6-13)***

| 6* | Naamini kwamba kubadilishana ujuzi kunaweza wasaidia wafanyakazi wa gereji hii kutatua matatizo mbali mbali ya kiufundi |
|---|---|
| | ⊙ Sikubaliani sana   ⊙ Sikubaliani |
| | ⊙ Hakuna   ⊙ Nakubaliana |
| | ⊙ Nakubaliana sana |

| 7* | Nimewahi pata msaada kutoka kwa wafanyakazi wengine wa gereji hii |
|---|---|

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○ Sikubaliani sana   ○ Sikubaliani

○ Hakuna   ○ Nakubaliana

○ Nakubaliana sana

**8\*** Ningependa kubadilishana ujuzi na wafanyakazi wengine wa gereji hii.

○ Sikubaliani sana   ○ Sikubaliani

○ Hakuna   ○ Nakubaliana

○ Nakubaliana sana

**9\*** Nabadilishana ujuzi na wafanyakazi wenzangu kwa sababu nawaamini

○ Sikubaliani sana   ○ Sikubaliani

○ Hakuna   ○ Nakubaliana

○ Nakubaliana sana

**10\*** Ninaamini kwamba uhamasishaji wa kubadilishana ujuzi unaweza kutiwa chachu na mgawanyo wa faida itakayopatikana kwa wafanyakazi wote

○ Sikubaliani sana   ○ Sikubaliani

○ Hakuna   ○ Nakubaliana

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○ Nakubaliana
sana

11* Napendelea kubadilishana ujuzi na watu wanaoheshimika sana katika Nyanja zao

○ Sikubaliani sana    ○ Sikubaliani

○ Hakuna    ○ Nakubaliana

○ Nakubaliana
sana

12* Nafikiri watu hawependi kuwasaidia wenzao ila wanachangia katika jamii kwa maslahi binafsi

○ Sikubaliani sana    ○ Sikubaliani

○ Hakuna    ○ Nakubaliana

○ Nakubaliana
sana

13* Ninaamini kwamba kubadilishana ujuzi kungeweza kusaidia kuongeza ujuzi wa gereji kwa ujumla wake

○ Sikubaliani sana    ○ Sikubaliani

○ Hakuna    ○ Nakubaliana

○ Nakubaliana
sana

14* Je huwa unafanyaje unapotata tatizo jipya katika ufundi wako? (unaweza chagua zaidi ya jibu moja)

☐ Natafuta kwenye mtandao

☐ Natafuta kwenye mtandao wa ndani ya gereji

☐ Nauliza kutoka kwa wafanyakazi wengine

☐ Najaribu jaribu

☐ Njia ingine( taja) : ☐

15* Je huwa unafanyaje unapotata sulihisho la tatizo jipya? (unaweza chagua zaidi ya jibu moja).

☐ Unawaambia wenzio suluhisho hilo

☐ Unalihifadhi pamoja na masuluhisho mengine kwa ajili ya matumizi ya baadae

☐ Simwambii mtu yeyote

☐ Ingine (taja) : ☐

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16*  Je, ni kwa jinsi gani ushirikiano wenu unachangia kwenye matokeo ya biashara yenu? (unaweza chagua zaidi ya jibu moja)

☐ Kupunguza gharama

☐ Kurahisisha kazi

☐ Kuongeza thamani ya kazi

☐ ubunifu

☐ Kuendeleza masoko

☐ Kuridhisha wateja

☐ Kuridhisha wafanyakazi

☐ Inaleta mawazo na mtazamo mpya

☐ Ingine (taja) : _____

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# Key Informant interviews (Kiswahili)

Student's Survey Questions for MS Thesis Paper

Halo, Mimi ni mwanafunzi wa chuo kikuu cha Stellen Bosch (Afrika Kusini) na ninataka kufanya utafiti kama sehemu ya andiko langu la shahada ya udhamili. Nashukuru kwa mchango wako.

| | |
|---|---|
| 1* | Je gereji yako ina umri gani? _____ |
| | |
| 2* | Je ni nini lengo au malengo ya kuanzisha gereji hii? (unaweza chagua zaidi ya jibu moja) |

☐ Toa masuluhisho ya kimakenikali kwa matazizo ya kila siku

☐ Sikupata ajira rasmi

☐ Nilitaka kujiajiri

☐ Kuongeza nguvu ya ushirikiano baina ya wafanyakazi wa gereji bubu

☐ Keendeleza ujuzi mpya

☐ Kuongeza ngazi ya ujuzi

☐ Kuongeza kasi ya kujifunza

☐ Kuondoa mipaka ya kitaasisi na kijografia

☐ Kutengeneza mawasiliano na marafiki wapya

☐ Kujifunza na kubadilishana mawazo kwenye maeneo tunayo pendelea
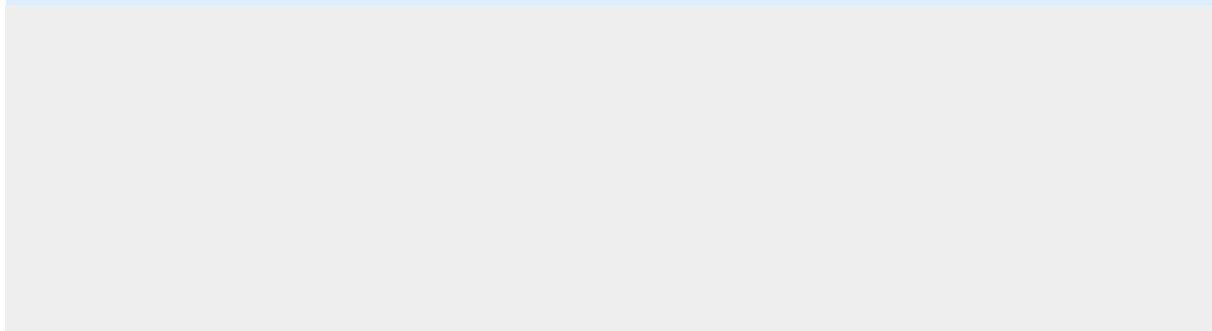
☐ ingine (taja): _____

3      Tafadhali unaweza kueleza kwa ufupi jinsi gereji hii ilivyo anzishwa?

4      Unaweza eleza jinsi gereji yako inavyo pambana na mabaliliko ya teknolojia ya utengenezaji wa magari?

5*     Kama una mawazo mengine yoyote ambayo ungependa kuyatoa:

# Approval Notice

## New Application

01-Sep-2016

Mwasubila, Jofrey JA

**Proposal #: SU-HSD-002905**

**KNOWLEDGE MANAGEMENT IN COMMUNITIES OF PRACTICE**

**Title:**

**A CASE OF DAR ES SALAAM BACKYARD MECHANICS "GEREJI BUBU"**

Dear Mr Jofrey Mwasubila,

Your **New Application** received on **04-Aug-2016**, was reviewed

Please note the following information about your approved research proposal:

Proposal Approval Period: **24-Aug-2016** -**23-Aug-2019**

Please take note of the general Investigator Responsibilities attached to this letter. You may commence with your research after complying fully with these guidelines.

Please remember to use your **proposal number** (**SU-HSD-002905**) on any documents or correspondence with the REC concerning your research proposal.

Please note that the REC has the prerogative and authority to ask further questions, seek additional information, require further modifications, or monitor the conduct of your research and the consent process.

Also note that a progress report should be submitted to the Committee before the approval period has expired if a continuation is required. The Committee will then consider the continuation of the project for a further year (if necessary).

This committee abides by the ethical norms and principles for research, established by the Declaration of Helsinki and the Guidelines for Ethical Research: Principles Structures and Processes 2004 (Department of Health). Annually a number of projects may be selected randomly for an external audit.

National Health Research Ethics Committee (NHREC) registration number REC-050411-032.

We wish you the best as you conduct your research.

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If you have any questions or need further help, please contact the REC office at 218089183.

**Included Documents:**

REC: Humanities New Application

Sincerely,

Clarissa Graham

REC Coordinator

Research Ethics Committee: Human Research (Humanities)

# Investigator Responsibilities

## Protection of Human Research Participants

Some of the general responsibilities investigators have when conducting research involving human participants are listed below:

1.Conducting the Research. You are responsible for making sure that the research is conducted according to the REC approved research protocol. You are also responsible for the actions of all your co-investigators and research staff involved with this research. You must also ensure that the research is conducted within the standards of your field of research.

2.Participant Enrollment. You may not recruit or enroll participants prior to the REC approval date or after the expiration date of REC approval. All recruitment materials for any form of media must be approved by the REC prior to their use. If you need to recruit more participants than was noted in your REC approval letter, you must submit an amendment requesting an increase in the number of participants.

3.Informed Consent. You are responsible for obtaining and documenting effective informed consent using **only** the REC-approved consent documents, and for ensuring that no human participants are involved in research prior to obtaining their informed consent. Please give all participants copies of the

signed informed consent documents. Keep the originals in your secured research files for at least five (5) years.

4.Continuing Review. The REC must review and approve all REC-approved research proposals at intervals appropriate to the degree of risk but not less than once per year. There is **no grace period.** Prior to the date on which the REC approval of the research expires, **it is your responsibility to submit**

**the continuing review report in a timely fashion to ensure a lapse in REC approval does not occur.** If REC approval of your research lapses, you must stop new participant enrollment, and contact the REC office immediately.

5.Amendments and Changes. If you wish to amend or change any aspect of your research (such as research design, interventions or procedures, number of participants, participant population, informed consent document, instruments, surveys or recruiting material), you must submit the amendment to the REC for review using the current Amendment Form. You **may not initiate** any amendments or changes to your research without first obtaining written REC review and approval. The **only exception** is when it is necessary to eliminate apparent immediate hazards to participants and the REC should be immediately informed of this necessity.

6.Adverse or Unanticipated Events. Any serious adverse events, participant complaints, and all unanticipated problems that involve risks to participants or others, as well as any research related injuries, occurring at this institution or at other performance sites must be reported to Malene Fouch within **five**

**(5) days** of discovery of the incident. You must also report any instances of serious or continuing problems, or non-compliance with the RECs requirements for protecting human research participants. The only exception to this policy is that the death of a research participant must be reported in accordance with the Stellenbosch Universtiy Research Ethics Committee Standard Operating Procedures. All reportable events should be submitted to the REC using the Serious Adverse Event Report Form.

7.Research Record Keeping. You must keep the following research related records, at a minimum, in a secure location for a minimum of five years: the REC approved research proposal and all amendments; all informed consent documents; recruiting materials; continuing review reports; adverse or unanticipated events; and all correspondence from the REC

8.Provision of Counselling or emergency support. When a dedicated counsellor or psychologist provides support to a participant without prior REC review and approval, to the extent permitted by law, such activities will not be recognised as research nor the data used in support of research. Such cases should be indicated in the progress report or final report.

9.Final reports. When you have completed (no further participant enrollment, interactions, interventions or data analysis) or stopped work on your research, you must submit a Final Report to the REC.

10.On-Site Evaluations, Inspections, or Audits. If you are notified that your research will be reviewed or audited by the sponsor or any other external agency or any internal group, you must inform the REC immediately of the impending audit/evaluation.

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*Participant Consent Form for Postgraduate Dissertation*

Jofrey Amanyisye Mwasubila

Postgraduate Dissertation

University of StellenBosch

**KNOWLEDGE MANAGEMENT IN "COMMUNITIES OF PRACTICE"**

**Introduction**

The purpose of this form is to provide you with information so you can decide whether to participate in this study. Any questions you may have will be answered by the researcher or by the other contact persons provided below. Once you are familiar with the information on the form and have asked any questions you may have, you can decide whether or not to participate. If you agree, please either sign this form or else provide verbal consent if you do not wish your name to be registered on the form. Please also indicate whether or not you are willing for your contribution to be audio recorded. Please note that this recording will not be made available to anyone other than the student and if necessary the supervisor. It will only be used for the purposes of transcribing the material.

Please note your participation is voluntary and you may decide to leave the study at any time. You may also refuse to answer specific questions you are uncomfortable with. You may withdraw permission for your data to be used, at any time up to 30/09/2018 in which case notes, transcriptions and recordings will be destroyed. Withdrawal or refusal to participate will not affect your relationship with the researcher.

**Purpose of the Study**

You have been asked to participate in a research study about knowledge management in communities of practice" a case of backyard mechanics". The purpose of the research is to investigate how the "communities of practice" (of these backyard

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mechanics) became established and how it maintains and improves its collective knowledge

**Use of the data**

The findings will be used to form part of my dissertation and will be used for education purposes only

If you wish to receive a copy of the final dissertation once completed I will happy to provide you with an electronic copy.

**Procedures to be followed**

To assist my research, I am asking you to agree to participate in a personal interview and/ or survey.  We can arrange for a time and date which is convenient to you once you have confirmed your consent. The interview and/ or survey will take no longer than 30 minutes to complete.

There are no foreseeable risks from participating in this study.

**Compensation**

You will not receive any type of payment for participating in this study.

**Statement of Privacy and Confidentiality**

In any publication based on the findings of this study, the data presented will contain no identifying information that could associate it with you unless you specifically request to have your real name associated with your responses.

**Contact Information**

My telephone number is:+255(713)478655

My email address is:jofreyam@yahoo.com

Alternatively, you may wish to contact my supervisor at chm2@sun.ac.za

**Confirmation and consent**

I confirm that I have freely agreed to participate in the research project of Jofrey Amanyisye Mwasubila. I have been briefed on what this involves and I agree to the use of the findings as described above. I give/ do not give permission for the interview

to be recorded. The recording will be used only to ensure the correct transcription of the interview and will be heard by me alone.

**Participant signature:**_____

Name:_____
__

Date:_____
__

I confirm that I agree to keep the undertakings in this contract.

**Researcher signature:**_____

Name:_____
____

Date:_____
____

*Please keep this form for future reference.*