ASSESSING SUCCESSES OF KNOWLEDGE SHARING STRATEGIES AT EGERTON UNIVERSITY FROM THE PERSPECTIVES OF LIVESTOCK VALUE CHAIN ACTORS

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EGERTON UNIVERSITY

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DECLARATION AND APPROVAL

DECLARATION

This is my original work and has not been presented for an award of a degree in any other University known to me.

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KM18/2545/09

Signature..... Date.....

APPROVAL

This proposal has been submitted for examination with our approval as the University supervisors.

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DEDICATION

To my parents the late Henry Ong'ondo and mum Mrs. Jenipher Ong'ondo who both played a big role in laying the foundation of education in my life; my husband Prof. Raymond Ongus and sons Victor and Daniel for being there for me.

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ABSTRACT

Agricultural universities invest substantial resources in postgraduate research and generate knowledge products with the aim of providing practical solutions to known practical constraints impeding productivity in the livestock value chains. However, enhancing utilization of the knowledge products by the target beneficiary actors in the value chain has remained a challenge because of not using effective knowledge sharing strategies. Consequently, the gaps between research outputs and uptake are still large. Using a case study of Egerton University, which is reputed for agricultural research and training, this research aimed at determining (i) the most frequently used knowledge sharing strategies, (ii) most targeted actors, (iii) preferences and perceptions that actors have on the relevance and accessibility of the knowledge products and sharing strategies, and (iv) skills in use by the actors that they can associate with the knowledge products generated at Egerton University. Data was collected through desktop review of theses defended between January 2005 and December 2011, and a stratified random sampling cross-sectional survey of livestock value chain actors. The sampled knowledge products most frequently targeted operators in the livestock value chain. Dissemination of the knowledge products was 25 to 29 times more ($P<0.0001$) through the library than any other sharing strategy examined, despite the limited access to the library by most actors. The actors perceived media briefs to be the most accessible and scientific publications the least accessible. Actors considered Masters Theses more relevant to their knowledge needs than the Doctorate Theses. Of knowledge and skills presently used by actors in their enterprises, majority (61%) did not associate any of the knowledge and skills they were using to have been generated at Egerton University. Instead, most actors were applying knowledge and skills that they learnt on their own over a period of time. These results imply that the defined primary beneficiaries of knowledge products from the university are actually not reached. This research provides an opportunity for universities to take greater participation roles in extension and outreach programs to directly transfer their knowledge products to primary beneficiaries.

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LIST OF ABBREVIATIONS

AgGDP:	Agriculture Gross Domestic Product
ASALs:	Arid and Semi Arid Lands
ASARECA:	Association for Strengthening Agricultural Research in Eastern and Central Africa
CIHR:	Canadian Institute for Health Research
CTA:	Technical Center for Agriculture
EARC:	East Africa Resource Center
GDP:	Gross Domestic Product
GFAR:	Global Forum Agricultural Research
GoK:	Government of Kenya
MDGs:	Millennium Development Goals
ICT:	Information& Communication Technology
IGAD:	Inter-Governmental Authority on Development
ILRI:	International Livestock Research Institute
IPRs:	Intellectual Property Rights
KCC:	Kenya Cooperative Creameries
KT:	Knowledge Transfer
NEMA:	National Environmental Management Authority
UNCTAD:	United Nations Centre for Trade and Development
UNDP:	United Nations Development Programme
UNIDO:	United Nations Industrial Development Organization

CHAPTER ONE

INTRODUCTION

1.1 Background Information

The Millennium Declaration targets 2015 as the date to reduce by 50 percent, the number of people living in extreme poverty. The agricultural sector plays a major role in Kenya's economy by directly contributing to 29.3 percent of the GDP annually with 40 percent of this contributed by the livestock sub-sector (EARC, 2014). The sub-sector is estimated to support about 80 percent of the rural population livelihoods, and 50 percent of employment in the agricultural labor force (GoK, 2010). Agricultural practices to enhance productivity have become increasingly knowledge intensive. Associated with these investments is research to continuously generate new knowledge products. Universities, with their core functions of generating and disseminating knowledge play a crucial role in the advancement of agriculture and livestock value chains. They generate research outputs through post graduate applied research projects on the basis of defined problems affecting diverse actors in the livestock value chain (World Bank, 1999; CTA, 2009).

In the concept of value chain, the various actors in the chain operate independently at each level to develop competitive advantage. However, the different levels are linked and have to work together whenever there are dominant chain problems that can only be solved when the different levels effectively cooperate. These linkages help to sustain competitive advantage and to prevent the systematic failure of the entire chain. The challenges faced by the different categories of actors in the value chain may not be chain-wide, though the solutions could none the less efficiently have favorable effect on a number of chain partners (Porter, 1980; Grijpink, 2010).

Actors in the livestock commodity value chains can be categorized into operators, enablers and supporters. The operators include livestock producers, traders, butchers and consumers. The supporters provide extension service, credit, research and include the non-governmental organizations. The enablers are the policy and regulating bodies charged with policy formulation and enforcement of standards. These actors face diverse challenges and information needs. They are therefore bound to have different perspectives on knowledge products and the success of sharing strategies used to disseminate them (Muthee, 2006).

The utilization of the knowledge products by the value chain actors can be enhanced through effective knowledge sharing strategies, which require a better understanding of the strategies that effectively reach them. The findings presented in the theses generated in postgraduate research are actually empirical evidence-based solutions to constraints which primary beneficiaries in the value chains face. Therefore, uptake of those knowledge products can enhance productivity and value of livestock enterprises, and in essence a pathway to closing the gap between research outputs and uptake to enhance productivity.

When analyzing the challenges, experiences and methods of knowledge sharing for wider use is the reason for generating knowledge. This explains why Universities use diverse knowledge sharing strategies to disseminate their research findings, and to increase visibility in reaching more value chain actors. The knowledge sharing strategies used at Universities include among others the library, web, scientific publications, extension materials, media briefs and policy briefs. In Egerton University the policy requires that all postgraduate students must publish their research findings in a peer reviewed journal before they graduate. This contributes substantially to knowledge sharing.

The application of knowledge is affected by interactive process by which knowledge is put into practice by the end user. The creation of knowledge does not necessarily guarantee its accessibility or use by the targeted audience. The generated knowledge may be inadequate, unable to solve the problem of the end user, or the end-user may be unable to use the knowledge because of its complexity. Nesheim, *et al.* (2011) further noted that despite institutions deliberately setting up mechanisms for intra- institutional knowledge sharing and dissemination across units, these cannot be relied upon as mechanisms that actually contribute to knowledge application. Their concept of knowledge application is measured against the extent to which knowledge acquired is beneficial to the users of knowledge.

1.2 Statement of the Problem

Egerton University is reputed for agricultural excellence and invests a lot of resources in research activities that target livestock value chain actors, but the research output remains underutilized by the primary beneficiaries. This could be due to the choice of knowledge sharing strategies or lack of awareness by the target audience. Consequently, the desired impacts on increased productivity and value of production have not been realized. There

could also be a possibility that either the knowledge generated does not meet the information needs of the target beneficiaries. In order to design an effective management of agricultural information and communication at the university, there is need to characterize the strategies for knowledge sharing used and the perception of the target beneficiaries' of the knowledge products generated.

1.3 Objectives of the Study

The overall objective is to contribute to increased uptake of research outputs for enhanced productivity and value of livestock enterprises.

The specific objectives were to:

i. Identify the livestock value chain actors most targeted by the knowledge products generated at Egerton University.
ii. Identify the most frequently used knowledge sharing strategies for disseminating knowledge products generated at Egerton University.
iii. Determine the perceptions that actors have about the relevance and accessibility of the knowledge products and sharing strategies at Egerton University.
iv. Determine skills used by actors that can be used to associate origin with the knowledge products generated at Egerton University.

1.4 Research Questions

i. Who are the livestock value chain actors mostly targeted by the knowledge products generated at Egerton University?
ii. Which are the most frequently used knowledge sharing strategies for the knowledge products generated at Egerton University?
iii. What are the perceptions that actors have about the relevance and accessibility of the knowledge products generated and sharing strategies used at Egerton University?
iv. Which of the skills that actors are using can they associate origin with the knowledge products generated at Egerton University?

1.5 Significance of the Study

There is need to improve the dissemination of research outputs and to strengthen communication of research findings generated through agricultural postgraduate research projects as they are formulated to solve constraints in the value chains. The outputs of these research activities can contribute to closing the gap between generated knowledge and the target clients. This study can contribute to improved information and communication for sustainable productivity in the livestock value chains.

1.6 Scope and Limitation

The desktop study was confined to theses generated in Egerton University between the years 2005-2011 that targeted actors in the livestock value chain. The survey was carried out in Njoro district, Nakuru town and their peri-urbans. The variables of interest were limited to knowledge products generated in Egerton University and the knowledge sharing strategies used to disseminate them.

1.7 Definition of Terms

Desktop study: Gathering and analyzing information, already available in print, electronic or published on the internet

Enablers in the value chain: These are people or services whose activities play a role in enhancing and creating opportunities in the value chain.

Explicit knowledge: Knowledge that is recorded, expressed and is easy to share and store and in different formats.

Extension materials: These are brief messages contained in brochures, posters, videos and verbal presentations aimed at motivating the target audience to change the way they do something by communicating the benefits of an alternative technology, and how to correctly apply the technology.

Information channel disposition: The users' preferred means and styles of obtaining the needed information.

Information demand characteristics: The quality pattern that users expect in the needed information.

Knowledge product: Any product that provides information that the target audiences are seeking. This could be in either print or electronic format, or both.

Knowledge sharing strategy: An approach used to **s**pread knowledge to larger groups.

Linkage agents: Individuals that have contact with both researchers and users, and are capable of building a bridge allowing a better interaction between them.

Media briefs: Summarized document in print or electronic media to launch and promote a new product and highlight the scope, objectives and target audience.

Policy briefs: A document which outlines the rationale for choosing a particular policy alternative or course of action, commonly produced in response to a request directly from a decision-maker.

Scientific publications: Literature that report original empirical and theoretical work in the sciences and social sciences in the context of previous scientific investigations and by citation of relevant documents in the existing literature.

Tacit knowledge: The knowledge that is acquired through all those things that one knows how to do but does not know how to explain.

Value chain: Interlinked value-adding activities that convert inputs into outputs which in turn add to the bottom line and help create competitive advantage.

Value chain actors: The chain of actors who directly deal with the products including producers, processors, traders and those who own them or move the product from conception to end consumer.

Value chain enablers: The services provided by various actors who never directly deal with the product, but whose services add value to the product.

Value chain supporters: The regulatory framework, policies, infrastructure at local, national and international level.

CHAPTER TWO

LITERATURE REVIEW

2.1 Livestock Production in Kenya

As the world becomes increasingly interconnected and more multifaceted, so is the need to improve food security. This is done by protecting and promoting people's livelihoods with agriculture and the livestock subsector as livestock farming makes important contributions to food production, income generation, job creation, economic growth, and poverty alleviation. In Kenya, the livestock sector contributes about 12% of Kenya's Gross Domestic Product (GDP), 40% to the agricultural GDP and employs 50% of agricultural labor force (EARC, 2014). About 60% of Kenya's livestock herd is found in the arid and semi-arid lands (ASALs), which constitute about 80% of the country with an estimation of 10 million Kenyans living in the ASALs deriving their livelihood largely from livestock. Livestock play important roles in Kenya's socio-economic development and contribute towards household food and nutritional security

Among the livestock, dairy cattle is fundamental in the livelihoods of the rural people who take up dairy farming to produce milk for consumption by the family and for cash income. Livestock is also used for traction, and it acts as a symbol of prestige as well as to cushion them from crop failures (Bebe *et al*, 2003). The majority of cattle are kept by pastoralists in mixed herds with a minimal percentage of the smallholders keeping either ruminant or non-ruminant livestock. Small-scale dairy farming activity is mostly found in the Central and Rift Valley Provinces and the Coastal lowlands, with a higher concentration of smallholder dairy farms in peri-urban areas. There are also a limited number of large-scale dairy farms owned both by private firms and public institution. Livestock income in Kenya decreased by 4 per cent between 1997 and 2007 as observed by Kimenju and Tschirley (2009) despite the fact that growth in the sector could greatly motivate the local economies, increase food security and positively impact on social stability. Onono *et al*. (2013) noted that the constraints to cattle production impact negatively on production parameters thus affecting the level of productivity of cattle systems. The farms are considered as part of livestock production and productivity had stagnated in the country due to a number of production and productivity constraints identified among others as poor governance in key agricultural

institutions the liberalization of agricultural economy. As a result the livestock industry's capacity has declined in operation capacity, quality standards and unfair trade practices. The role of the livestock chain then comes to play as the marketing process starts at pastoralist level with small traders buying from the local community and selling on small lots at local community markets. The bigger traders consolidate smaller groups and trek then to main markets.

2.2 Impact of Livestock Value Chains

Livestock value chains are networks that work together to achieve the full cycle of bringing a product from the design and conception (e.g. live animals, meat, milk, eggs, leather, fiber, manure) through intermediary phases of production, processing, delivery, consumption and disposal. Since value chains do not focus merely on the physical transformation of inputs within one unit, to offer the possibility of capturing economic returns that can be found in different links in the value chain (UNACTAD, 2000).

Value chains are particularly important for livestock systems because of the various ways they serve to improve rural livelihoods. Performing activities in links of the chain with higher levels of value addition significantly reduce actors' vulnerability, especially if they receive relevant knowledge products (UNIDO, 2001). Development actors require information on how the chain operates and how to improve. The value chain approach provides a framework to analyze the nature and determinants of competitiveness in value chains in which all actors have equal opportunities to participate. It also provides the basic knowledge products needed for designing and implementing appropriate development programs and policies to support livestock value chains (Rich *et al.*, 2009).

Livestock systems represent a potential pathway out of poverty for many smallholders in the developing world (ILRI, 2008). The majority of the world's rural poor, and a significant proportion of the urban poor, keep livestock and use them in a variety of ways that extend far beyond income generation. As a result, livestock systems are characterized by long marketing chains featuring great distances, numerous phases of weight gain and feeding regimes, many levels of traders and transactions, a multitude of steps and stages of processing, and a variety of employment-creating services and inputs. On the consumer

side, the delivery of livestock products through informal markets tends to serve poor consumers, creating an even tighter focus on the poor (Muthee, 2006).

Livestock value chain performance in Kenya is relatively poor compared to other value chains. In the beef value chain, producers' share of terminal price is exhibited at 50 percent while other commodities yield upwards of up to 90 percent of the terminal market price due to high competition among buyers (Pelrine, 2009). The market is dominated by traders, butchers and transporters who operate as cartels and beef up their margins at the expense of the overstocked producers (Muthee, 2006). The dairy value chain on the other hand is well commercialized but trade is mainly dominated by small scale and informal traders, especially in the rural areas. However, the dairy value chain remains highly competitive with the informal channels dominating milk marketing by handling over 70 per cent of milk. The formal channels also exist in the livestock value chain though sales in the sector lack price controls.

The challenge for producers within value chains is to determine how and where to position themselves to maximize the benefits of globalization. In the context of knowledge generation and sharing among livestock value chain actors, there is the possible support ranging from informing producers about risks and opportunities associated within the value chain, to assisting actors entering these chains. Such support can be achieved through specific policy instruments that enable the upgrading processes within and across the production networks (Kaplinsky, 2000).

The constraints in the livestock value chain have been summarized by Rota and Sperandini (2010) as:

> "• *External constraints:* Adverse macroeconomic conditions (high taxes, high interest rates), lack of institutional support;
>
> • *Quality constraints:* Little understanding of processors' requirements, lack of laboratories and instruments for quality control, price and quality of the veterinary services;
>
> • *Financial constraints*: Lack of capital to invest in assets, equipment and inputs that would improve quality;

• *Gender constraints:* In comparison to men, women face higher disadvantages, in particular in terms of mobility, access to assets and to productive resources, and access to market information, with the result that they find it more difficult to access and maintain profitable market niches and capture a larger slice of incomes;

• *Infrastructure constraints:* Lack or inadequacy of, among others, roads, electricity, weighing stations, cattle dips, slaughtering and processing facilities (which raises transaction costs, exacerbates information asymmetries between producers and traders, and discourages investment in processing);

• *Information constraints:* Limited access to market-related information (e.g. on prices, value chains, competitors, consumer preferences);

• *Skills and knowledge constraints*: Lack of business management skills (e.g. production planning) and, in particular, inadequate access to the knowledge and technologies needed to meet rising sanitary standards, making it extremely difficult for smallholders to gain credible certification of compliance with marketing requirements; and

• *Market constraints*: Low demand, a multiplicity of intermediaries (which increases the charges and shades the transparency of the operation).

The extensive livestock value chain actors face various challenges. The factors range from tough conditions for participation in the chain, to public legislation such as tax regulations that impact on the functioning of the chain. Poor infrastructure such as lack of roads, electricity, weighing stations, cattle dips, slaughter houses and processing facilities raise the cost of transactions for the actors. Though information of variable quality is generated that could help alleviate the problems of the actors, lack of effective information management systems between the operators, supporters and enablers constrains their informed decision making and feedback.

2.2.1 Actors in the Livestock Value Chain

The livestock sector is characterized by an increased number of actors that comprise of livestock producers who are primarily pastoralists living in arid and semiarid districts. The producers work are closely linked to traders and middlemen who purchase small numbers of livestock from livestock producers on a daily basis and sell them to secondary traders. The

secondary traders purchase larger numbers of livestock from producers as well and sell them in terminal markets. The secondary traders play an important role in transporting animal by truck individually if they can fill the entire truck or by teaming up with other traders if necessary to fill the truck and deliver them to butchers and slaughterhouses. Several service providers play a critically important role at the collection and marketing stage. These include brokers who link potential buyers and sellers, the local authorities who own the markets at which the various livestock transactions are carried out and charge levies, animal health service providers, the Ministry of Livestock, and community-based livestock development groups, input suppliers. The product processors may include milk firms like KCC, manufactures of animal feeds and poultry processors like Kenchic. Other actors are the product consumers, and infrastructure providers, NGOs that empower actors to improve horizontal linkages and bargaining power, market brokers, veterinarians, animal health workers, groups and representatives of livestock actors associations, financial institutions that provide working capital to actors to expand their operations and policy makers (Muthee, 2006; Ngore *et al.* 2011; Farmer and Mbwika, 2012)

The operators rely on enablers like input suppliers who are the primary actors to enable them to carry out their activities in a competitive environment. The enablers like extension workers and veterinarians provide the livestock producers with technical assistance which improves the creditworthiness for borrowers. The credit providers help the operators to maximize profit and minimize losses. The Non Governmental Organizations (NGOs) contribute unique skills, innovative methods and capacities that enable them to work well with actors and other stakeholders to carry out participatory educational activities. They also bring to the value chain expertise in resource-conserving practices, methods for community empowerment and participation and local solutions to agricultural problems (Anandajayasekeram *et al.,* 2008)

The enablers in the value chain rely on the supporters to be able to accomplish their obligations to the operators. Since the supporters develop policies and frameworks that govern the enablers, government policies may have positive or negative impact on the value chain. A positive policy environment can strengthen value chain efficiency whereas a negative policy environment will discourage financial investment. Further, all actors in the value chain value chain need access to infrastructure such as roads, premises, electricity,

telecommunications, etc. in order to be efficient and to maintain security. Ultimately the choices made by actors in the livestock value chain must be consistent with governmental policy and assure financiers that the government is in favor of the development of the value chain (Table 2.1).

Table2.1: Livestock Value Chain Actors

Value Chain Operators	Value chain supporters	Value chain enablers
• Producers • Processors • Transporters • Retailers • Consumers	• Extension service providers • Credit facility providers • Veterinary and A.I service providers • Researchers • NGOs • Input Suppliers	• Kenya Dairy Board • Kenya Bureau of Standards • National Environmental Management Authority • Department of Veterinary Services • Kenya Revenue Authority

2.3 Role of Universities in Generating Knowledge

The mission of Egerton University is "to generate and disseminate significant knowledge and offer exemplary education to and innovatively influence national and global development". The mission clearly shows that the University is committed to sharing the knowledge generated through its various academic and research programmes. Universities remain key sources of new ideas and are central generators and repositories of knowledge in the modern society. They generate knowledge products that promote the community around them (Abreu *et al.,* 2008). Pursuing the mission of knowledge generation demands that universities practice openness and that the results of research activities be transferred to the targeted users.

There is a paradigm shift that has seen universities increasingly looking for innovative ways to develop and strengthen partnership with the society and community in a bid to remain relevant (Tripathi *et al*., 2010). The way the generated knowledge is developed, packaged,

disseminated and applied greatly affects the Universities' position in global competitiveness and ranking. As such Universities and academic institutions can no longer isolate themselves from the communities they exist in and continue to be center of knowledge excellence. Harmsworth and Turpin (2000) noted that whenever Universities generate new knowledge products, they disseminated or shared then for three reasons:

a) Create awareness of their research activities and findings which may be useful to the target audience. Such an awareness of their project's work are helpful through further word of mouth type of dissemination for the institutions to build identity and profile within the community they exist in.
b) Disseminate with the aim of creating an understanding among the targets audiences who are believed to be direct beneficiaries of the research output, hence the need to create a deeper understanding of the research findings contained in the knowledge products.
c) Disseminate for action with the aim of creating change resulting from the adoption of the research findings. These audiences are change agents who influence and bring about change within their organizations or communities so they need to be equipped with the right skills, knowledge and understanding of the research in order to achieve real change.

Fundamentally, new knowledge is generated and shared with the aim of contributing to the process of reaching decisions or taking informed actions that create effective program strategies while improving the existing ones. Hendricks (1999, p. 92) asserted that:

"It takes knowledge to acquire knowledge and, therefore, to share knowledge. Knowledge sharing presumes a relation between at least two parties, one that possesses knowledge and the other that acquires knowledge"

Despite universities being charged with the duty of generating knowledge, Hamel (2005) noted that knowledge creation through research and development is an understaffed, under-equipped, under-funded activity and too disconnected from the potential users to be really effective. Where the generated knowledge is concentrated in agriculture, the successes and failures lead to less adoption and little industrial applications. The ability to protect

Intellectual Property Rights (IPR) gives universities an opportunity to increase the source of funds, as well as provide incentives to researchers to produce innovations.

Maredia *et al.* (1999) noted that IPRs may be in conflict with the traditional role of universities to create, sustain and disseminate knowledge as a public good. Though the expansion of IPRs in agriculture has created new opportunities and challenges for research cooperation between the public and private sectors, it has reduced duplication of research efforts and enhanced access to research findings from universities.

Knowledge is recognized worldwide as a critical resource for practicing efficient farming and agricultural development. Knowledge products can take many different forms depending on the audience and their information needs. In institutions of higher learning like Egerton University, a lot of knowledge is generated through research, culminating in production of MSc and PhD theses. Knowledge products based on assessment of needs and demand for the products among targeted users ensure relevance, effectiveness, usefulness and value of the products. Knowledge products should be of high quality with a clearly identified audience and purpose.

Livestock knowledge products improve the quality of livestock production methods and enhance the understanding of the roles of livestock in poverty reduction. Sharing and exchange of knowledge is critical for agricultural development. For this reason knowledge sharing is closely linked to knowledge management since upon generation of knowledge products there is need to link them with their users, leading them to attain economic and/or competitive value in the market (Tsui, 2006). The knowledge generated needs to be shared with the target users. Livestock knowledge products allow examination of costs and revenues at each stage of the value chain actors, allowing them to identify opportunities and problems suitable for development interventions (Amare, 2010). This can only be achieved when the sharing strategies used are effective, and the generated knowledge is accessible to the targeted value chain actors.

2.4 Knowledge Sharing Strategies

Knowledge sharing strategies are the channels or methods used to communicate information to a desired audience. Different knowledge sharing strategies are used in

different organizations for dissemination of information. In Egerton University the generated knowledge is shared through scientific publications, conferences, workshops, extension materials, media briefs, the web, policy briefs, and the libraries among others. According to Mei *et al.* (2003), in knowledge sharing there is need for a communication plan that tailors the right message to the right audience through the use of the right communication vehicles to suit different target audiences. These should start right from the faculty level. Westbrook and Boethel, (2006) however argued that the effectiveness of the dissemination and utilization of research findings depend upon the level the knowledge sharing strategy is matched with the information needs of the targeted audiences as well as the extent that the audiences can use the knowledge product.

Inkpen and Tsang, 2005 noted that the once the knowledge is disseminated, knowledge transfer is effected when a knowledge receiver is affected by the experience of the knowledge source upon its use and application. Effective knowledge sharing is facilitated by entities that are willing to explore ways of using timely channels and end users who are willing to apply the knowledge they receive.

Actors in the livestock value chain have different information needs that they use to effectively conduct their business. The information needs have led to an increased prominence in the generation, sharing and utilization of livestock knowledge products. Information professionals play a vital role in developing tools to facilitate and enhance the knowledge sharing strategies. The tools include the manuals, technical reports, extension materials, conference proceedings, seminars presentations, expositions, exhibitions and newsletters, all which are basically grey literature and may be perceived by many scholars as "having a lower status than publications in peer-reviewed journal" (Tsui, 2006, p.13). The more conventional knowledge sharing strategies include mailing lists, the web, reports, radio, television, demonstrations, briefs, scientific publications newsletters, magazines and newspapers.

Mailing Lists

Mailing list can be drawn for prospective and existing target audiences to receive materials and information about completed researches and updates on researches in progress. The list may also be made up of nominated contacts in academic departments or individuals that

have already expressed an interest in research in a specific subject. The contacts could also be encouraged to disseminate copies of materials more widely within their own network. The advantage of mailing lists is that they are fast, cost effective and a convenient way of networking. The members of mailing lists are reached efficiently because the subscribers usually share common interests Mailing lists operate on the assumption that the message has been received by the recipient but this may not always be the case (Zhang, 1999).

The Web

The web can be used to disseminate relevant news, press materials and publications (published results) since it can easily serve as a as a primary point of reference for downloading publications and research findings. The web can also be easily updated constantly throughout and provide a link to the library. Websites have been known for easy access to information when the target audiences know it is there and interest has to be created to make them visit the web. Publicity to the web can be created through the use of the organization's brochures, newsletters and bulletins. Anything new that the visitor's attention needs to be drawn to should be flagged up to increase visibility. The channel characteristics of the World Wide Web and other Internet-based resources suggest that these resources constitute a hybrid channel with the persuasive capabilities of interpersonal communication and the broad reach of mass media. The constraints to the use of the web include the need for connectivity, information overload, limitation of physical access, need for ICT literacy, the inclination by the participants to use the Internet and cost implications (Rhodes, 2003; Lakeman *et al*, 1997; Mtega and Ronald, 2013)

Reports

These can be useful in publicizing and disseminating research findings in summary. They can be produced either as print or posted to the institution's website. This would be economical since it can be easily updated and distributed to a larger audience (Tsui, 2006).

Conferences and workshops

Though conferences consume a lot of time to organize and are expensive to host, they can reap much in terms of disseminating knowledge products. Conferences are an important forum to interact with the target audiences in a face-to-face capacity and to address issues

relevant to the research findings. This enhances adoption of research findings by the target audiences since it increases trust between the generators of the knowledge products and the targeted audiences. Conferences also provide a chance for discussions and feedback. Since scientific results are often discussed at conferences and, given that it is a growing channel of interest, conference organisers should encourage presenters to communicate with them about the status of the peer review of their presentations (Brown, 2004).

Farmers' fairs and field days

The farmers' fairs and field days are used for the active participation of farmers and other actors to give farmers and the public the opportunity to witness the latest, proven technologies. This is combined with colorful exhibitions to display the latest technologies while providing face-to-face interactions between generators of knowledge and consumers (Singh *et al*., 2013).

Email/Mail base Lists

Email discussion lists are very effective in communicating to target audiences depending on their interests and levels. A topic of interest can be introduced in advance and a timed period set for discussion. This channel of communication allows members to consult, share experiences and provide feedback. The disadvantages include the fact that they rely on Internet connection, one must have the email contacts, the cost implications and ICT skills (Lakeman *et al.*, 1997; Mtega and Ronald, 2013).

Newsletters

Newsletters are cheap to produce and can be used to update target audiences with progress of the research progress and they can also be used to provide summaries of the research findings or other research related news that the generators of knowledge products would wish to disseminate (Tsui, 2006).

Scientific publications

These are made up of research articles that report original or empirical work. Most scientific papers published in journals may not be largely inaccessible. Most journals reach their readers after self archiving in the open access electronic archive. Through scientific

publications scientists increase the visibility of their publications, and consequently their citations through open access, while universities and research centers use the scientific publications to increase the demand for their research results (Moskovin, 2010).Shelton (2005) observed that open access journals are intended to be free for users but there are cost implications in their production which make them not free for publishers so they may charge article processing fee. Canessa and Zennaro, (2008)argue that due to the high journal subscription fees, most universities and research institutions can only subscribe to limited journals. As a result, users are able to access

just a small fraction of all the published articles, making research output to have only a fraction of its potential usage and impact.

Mass media

Mass media is a useful tool in creating awareness and stimulating interest among large audiences within a short time regardless of their proximity. New and improved agricultural technologies, developed in Agricultural Research Institutes, universities, the private sector and often by the farmers themselves, when disseminated among the masses can play a vital role in influencing adoption. The advantages of using mass media include the fact that a larger audience is reached at the same time. This makes it cost effective and fast. However, the constraint of mass media is that there is no audience research conducted to ensure all the targeted audience is reached (Singh *et al*., 2013, Mtega and Ronald, 2013).

Media briefs

This is a meeting in which formal information is given. In media briefing as used in this context, journalists are invited by the University management for briefings and they are given an opportunity to ask questions. However, speakers can just make statements without being asked questions. This is not the same thing as meetings where journalists' make subtle choices of presentation to make a subject more dramatic or interesting as this would clearly influence the conclusions that readers or listeners will draw about the authority of a study. The researcher should follow the presentation of their work in wider media, and endeavor to correct unfounded claims that deviate substantially from their peer-reviewed work. However, this should not interfere in any way with the style others choose to discuss their work (Brown, 2004).

Research and extension farmer linkage

The research and extension farmer linkage provides a mechanism for a reciprocated connection between researchers, extension workers and farmers or the end-users of the research out-put. Research and extension linkages are used to channel information between different livestock commodity value chain and to coordinate required tasks in the process, hence getting relevant knowledge to the targeted value chain actors. The linkage activities improve the resource use by avoiding duplication of effort and ensuring that critical tasks do not fall through the institutional cracks (Swanson, 1997). Extension is a non-formal education designed to provide people outside the formal education system with established skills and practices. Linkages are channels for the two-way communication of knowledge and resources among the stakeholders of a defined system. The main functions of linkages are to identify, plan and review programmes which are executed through collaborative tasks. The knowledge resources generated are shared and feedback evaluated (Elgar, 2003). The evaluation of the feedback is important in promoting modern agricultural practices. Generated knowledge from agricultural research is shared with targeted value chain actors using different information channels. The linkage between research extension and farmers is vital for effective knowledge sharing. Knowledge sharing strategies such as libraries, the web, journal articles, and conference proceedings are used to sustain linkages.

2.4.1 Effectiveness of Knowledge Sharing Strategies

Research in Universities and research institutions produce written materials. These are the knowledge products that reach the targeted audience when they are disseminated face-to-face and other media used to share and spread research knowledge. As noted in ASARECA Strategic Plan (2007), a paradigm shift is emerging in agricultural research, increasing pressure to match research outputs with client needs and with market and processing opportunities. Such a shift dictates that generated research knowledge should be used to build closer links with value chain actors in ways that will increase both research efficiency and effectiveness. This in turn will improve accessibility, utilization and adoption of the generated agricultural knowledge, bringing about the desired agricultural transformation. The characteristics of researchers and extension agents are important factors in shaping their perceptions and attitudes towards linkages between research and extension. The general

attitudes towards linkages appear to be higher for researchers as compared to extension agents.

There is need to explore and institutionalize linkages among institutions in order to have a viable strategy for extension organizations that obtain information and educational resources for use when reaching out to farmers to improve the efficiency of the scarce financial resources available (Munyua *et al*., 2002; Swanson, 1997). The flow of information depends largely on where it is generated, the media and channels through which it flows, and the strategies adopted to share the knowledge. The knowledge generated should be relevant, useful and socially appropriated by all the diverse targeted actors of the agricultural sector (GFAR, 2008). There are high hopes of efficiency gains and increased impact by use of knowledge sharing strategies like libraries and the Web. Traditionally libraries are well accessible and easy to use with the assistance of trained information managers.

The nature of the channels chosen essentially plays a vital role in the levels of success or failure of the communication. However the success levels largely depend on the literacy levels and socio-economic factors that affect the activities in the different settings (Age *et al.*, 2012). Though much progress has been made in the area of Information Communication Technology (ICT), reality shows that the use of the Internet as a knowledge sharing tool remains far removed from the daily reality of many targeted users of generated knowledge.

Problems arise in simple terms of cost, physical access, connectivity, ICT illiteracy, language skills and little content (van Doodewaard, 2006). In addition, the web is relatively uncontrolled, open, informal and based on the written word. This differ from the way knowledge is shared in African communities which tend to have a more hierarchical, formal and oral knowledge sharing tradition. This will hamper the use of the web in knowledge sharing by most ordinary people. Hamel (2005) emphasized the importance of localization of knowledge and knowledge tools including the Internet. Localization of the web content will greatly increase usage.

Systematic and strategic approaches to capturing, storing and sharing knowledge need to be built from the ground up. While some knowledge is already recorded in documents, a great deal of unwritten knowledge is embedded in the minds of people, intertwined with their knowledge and experience. The right approach should adapt the value chain concept and apply it to knowledge and information sharing along a continuum of knowledge harvesting, analysis, synthesis and dissemination, where at each stage value is added by using different approaches and tools for packaging and sharing knowledge, according to the needs of the targeted end users (Kaplinsky and Morris, 2000).The idea behind the approach is to generate new knowledge and then add value at every stage to ensure there is a dynamic flow of information to reach the broadest possible number of partners and stakeholders in the value chain.

For a long time researchers have shared their generated knowledge through peer-reviewed research publications. However, the content may not be accessible to audiences without research backgrounds due to the highly technical language used. Access to research journals may also be a limiting factor because of journal subscriptions (Tsui, 2006). Technical reports can also be used to share knowledge, though these reports are usually provided to research funders after research has been concluded. The knowledge sharing strategy used to reach the target audience should be accessible and relevant.

Researchers, policymakers, and service providers and other actors all have something to gain from knowledge sharing, but differences in their interests and backgrounds result in diverse challenges and knowledge sharing successes. Garforth *et al*. (2004) noted that knowledge sharing success goes beyond creating awareness about the knowledge products to include subjective elements such as perceptions, beliefs, attitudes and values and its practical use. The interventions in the area of agricultural knowledge sharing are primarily through improving the global flow of agricultural research information, ensuring its equitable access and appropriation by all agricultural actors and effective utilization (GFAR, 2008).

Knowledge sharing success is closely linked to the effectiveness of dissemination strategies. The strategies should be oriented toward the needs of the users to achieve the desired results of utilization and adoption. Various factors that may be associated with the level and rate of

uptake of a technology in any particular situation include characteristics of the detachability, how noticeable the channel of communication is the compatibility of the information resource with other existing resources.

Eventually, the flow and access to information determines how the value chain actors benefit most from it. Using multiple strategies and the choice of knowledge-sharing strategies depend upon available resources. However, using more than one strategy may be the best option as this increases knowledge sharing success through provision of messages tailored for diverse audiences based on their specific knowledge sharing needs (Tsui, 2006).

Barriers to knowledge transfer occur because knowledge transfer strategies essentially relate to the audience and the appeal of the channel through which information reaches the intended audience. The intended audience should be in a position to extract, conceptualize and internalize the knowledge. Other barriers to access, use and adoption of knowledge may be space and time, cost, social distance, culture and different mental frames (Hendricks, 1999)

Familiarity and similarity with the existing technology also plays a vital role (Rogers, 1995). Babu *et al*. (2012) noted that the factors that influence search behavior of the target audiences are mainly situational, psychological and socioeconomic. These largely affect how the target audiences perceive the accessibility, content and source of the information, and in turn their ability to translate it into specific action through adoption (Figure 2.1).

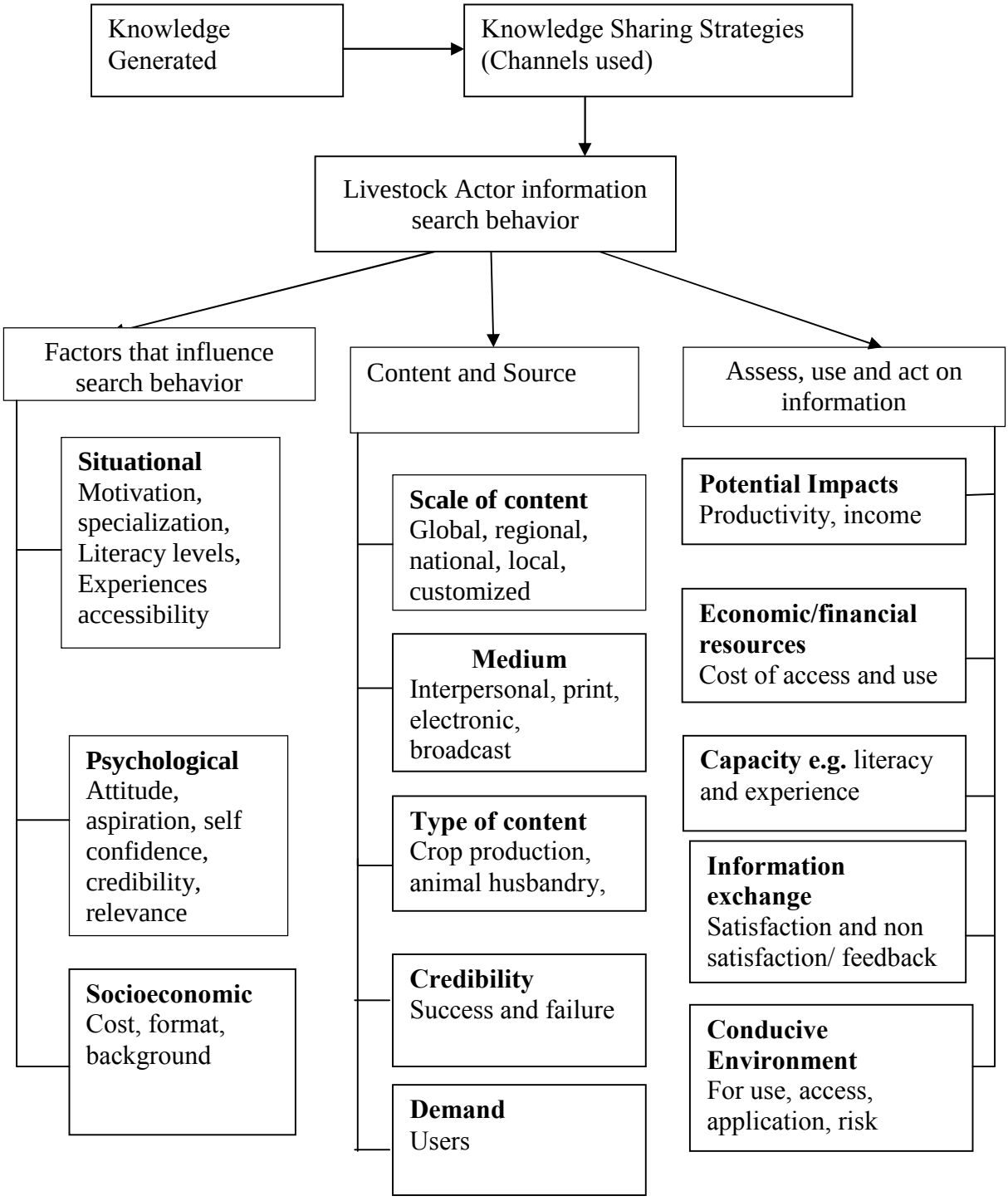

Figure 2.1: Information search strategy based on Wilson (2006) and Babu *et al*. (2012)

2.5 Theoretical Framework

Diffusion theory is one of the most commonly-used theories since the late 1950s. Over the years, it has emerged that different channels of communication play key roles at different points in the adoption process. The channel that can reach many people at the same time tend to play key roles in bringing about initial awareness and knowledge of new ideas and practices, as opposed to interpersonal sources (Abbot, 1999). Diffusion is concerned with the spread of ideas from originating sources to ultimate users. However, for researchers the main concern is how fast the target audiences become aware of the innovation and the factors that facilitate or impede its spread. More emphasis is continually put on peer-peer communication as it has led diffusion scholars to be interested in peer networks which are becoming increasingly popular as opinion leaders and/or well-connected individuals spread new ideas through their own social networks (Robinson, 2009).

Mieneke (1991) argued that at the different stages of diffusion, target individuals may become aware of the innovation and may pay attention to the information provided. If the innovation information has an impact on them, a process of persuasion starts. During this stage, the receivers of the information make a decision on whether to agree or disagree with the message and whether to adopt the advocated measures. Creation of awareness therefore precedes adoption. The relative advantage of awareness is that the degree to which an innovation is perceived as better than the idea it supersedes by a particular group of users, the greater the perceived relative advantage and the faster its rate of adoption is likely to be (Robinson, 2009).

Diffusion of innovations offers three valuable insights into the process of social change. These comprise of the qualities that make an innovation spread, importance of peer-peer conversations and peer networks and the understood needs of different user segments. A target group could comprise of individuals who are linked to each other by communication ties which together make a communication network. These communication ties may vary in strength resulting from many factors that include amount of time spent together and mutual trust. The strength of the ties refers to the quality of interactions in the network. Weak ties promote knowledge diffusion than strong ties because weak ties may serve as information bridges between cliques of strong ties (Mieneke, 1991; Swanson, 1997).

Diffusion is concerned with the spread of ideas from originating sources to ultimate users. The classic diffusion model includes five stages of the adoption process- awareness, interest, evaluation, trial and adoption The adoption process tracked through the diffusion curve is a decision-making process in which an individual passes from the initial knowledge of an innovation to forming an attitude toward the innovation, to a decision to adopt or reject it, then to its implementation and the use of the new idea, and finally to confirmation of this decision (Rogers, 1995; Ordonez and Serrat, 2010). The relevance and accessibility of the generated knowledge products to value chain actors in the livestock industry could be enhanced if they are known to primary target beneficiaries.

A global Knowledge Translation (KT) model proposed by CIHR (2005) and which was based on a research cycle that could be used as a conceptual guide for the overall KT process identified six opportunities within the research cycle at which the interactions, communications, and partnerships that help facilitate KT could occur (Figure 2.2). Those opportunities are: defining research questions and methodologies, conducting research, publishing research findings in plain language and accessible formats, placing research findings in the context of other knowledge and socio-cultural norms, making decisions and taking action informed by research findings and influencing subsequent rounds of research based on the impacts of knowledge use (Sudsawad, 2007).

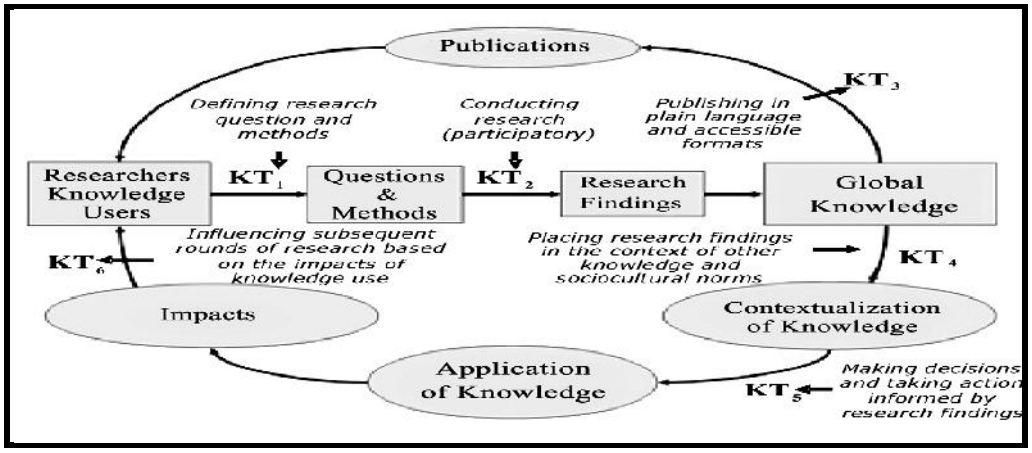

Figure 2.2: CIHR research cycle superimposed by the six opportunities to facilitate KT

Source: Sudsawad (2007).

The actors' expressed needs and appropriateness of the knowledge sharing strategies is likely to differ between them.The way the targeted value chain actors perceive accessibility and relevance of the knowledge sharing strategies could be a reflection of specific needs of the diverse actors targeted, which should inform the University in designing information communication strategies. One of the indicators of the effectiveness of any generated knowledge product is the impact it has on the primary target beneficiaries. For Egerton University, these are actors within proximity of the University where the knowledge is generated. The hypothesised associations for testing in this study are illustrated in the conceptual model (Figure 2.3).

2.6 Conceptual Framework

The conceptual framework in Figure 3 presents the specific research questions represented by an arrow which the research is designed to answer and the measured variables. It conceptualises that knowledge products generated may be shared using different strategies through which actors in the livestock value chain may access the knowledge products. These actors are the primary target beneficiaries who are likely to use knowledge products in their enterprises and institutions to increase productivity and value. Through their experiences and exposure, they express perceptions and preferences about the relevance and accessibility of the generated knowledge products and the sharing strategies used. This concept will be applied to study the success of knowledge sharing strategies at Egerton University to represent research output generation.

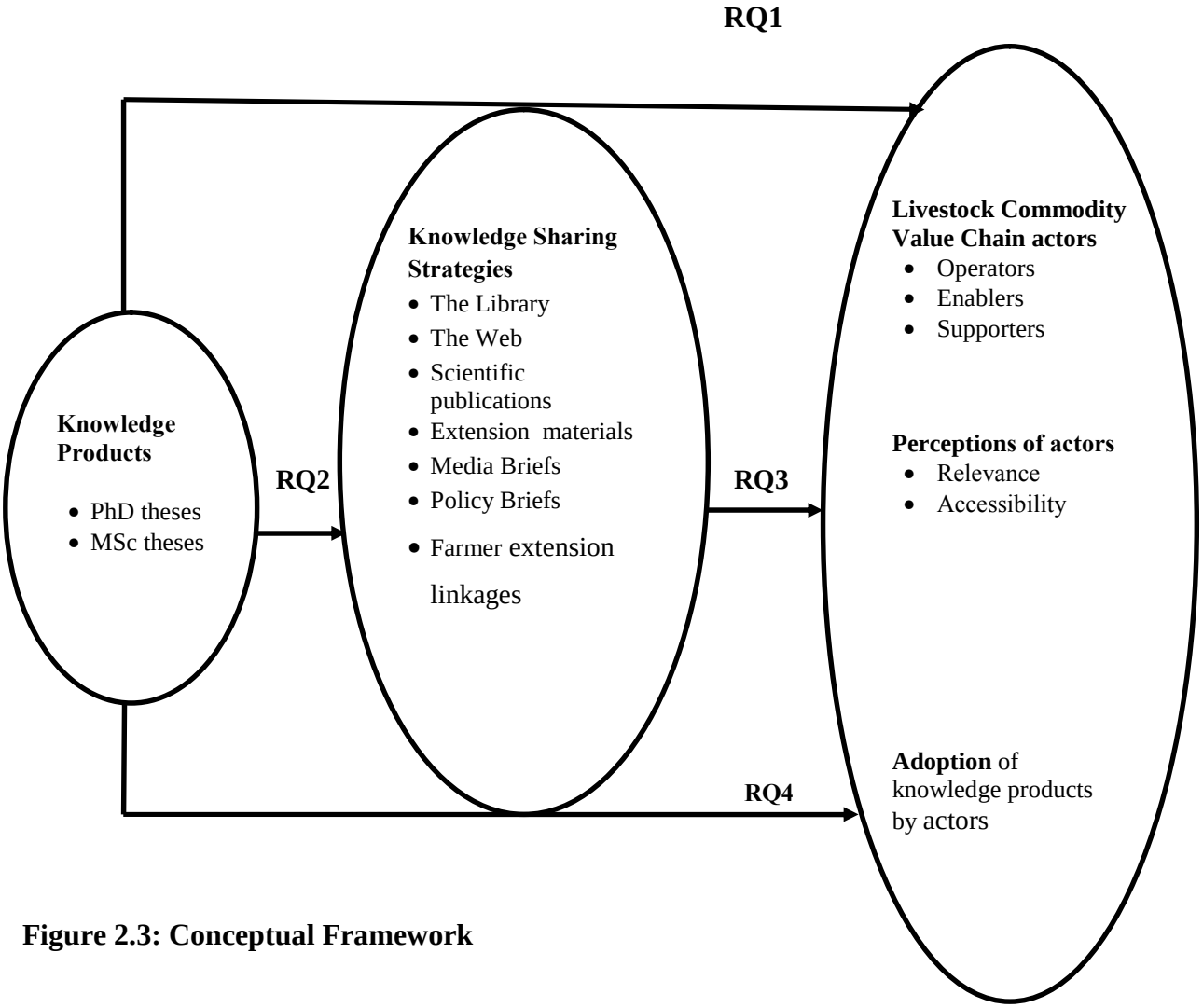

Figure 2.3: Conceptual Framework

CHAPTER THREE
MATERIALS AND METHODS

3.1 Study Design and Data Collection

The study was conducted in two stages. The first stage was a desktop analysis of Masters and Doctoral theses defended between January 2005 and December 2011 at Egerton University that targeted livestock value chain actors. The second stage was a stratified random cross-sectional survey sampling of actors in the livestock value chains within Nakuru town and Njoro district. These areas were selected because of the presence of rural, peri-urban and urban livestock enterprises within the environs of Egerton University and are expected to have had interactions in knowledge sharing.

Theses defended between January 2005 and December 2011 were selected because the period had a marked large number of students graduating. The Master and Doctoral Theses obtainable from the library were examined to identify the problems addressed within the livestock value chain and to identify the primary targeted actors. Search was conducted in the library catalogue and in the web electronically to identify knowledge sharing strategies used to disseminate the knowledge generated. The theses were identified from seven selected Departments that had knowledge products of relevance to the livestock value chain actors. The Departments included Dairy and Food Science and Technology; Animal Sciences; Agricultural Economics and Agribusiness Management; Environmental Science; Agricultural Education and Extension; Commerce; Biochemistry, and Food Nutrition and Dietetics.

The identified group of primary target beneficiaries specified in the theses was then followed in the cross-sectional survey of the actors in the livestock commodity value chains stratified into operators, supporters and enablers. The operators included livestock producers, traders, butchers and consumers. The supporters are providers of extension service, credit, research and include the non-governmental organizations. The enablers are the policy and regulating bodies charged with policy formulation and enforcement of standards. Value chain enablers were not available in the rural and peri-urban areas and also in Njoro town where only National Environmental Management Authority (NEMA)

and the Department of Veterinary services were found. The sample actors of 198 obtained is summarized in Table 3.1

Table 3.1: Sample size of actors by category and location of enterprise or office

Location	Site	Actors in Livestock Value			
		Operators	Supporters	Enablers	Total
Rural	Njoro	16	16		32
	Nakuru	16	16		32
Peri-urban	Njoro	16	16		32
	Nakuru	16	16		32
Urban	Njoro	16	16	4	34
	Nakuru	16	16	2	36
TOTAL		96	96	6	198

Data collection was guided by checklist in the library and by keywords in the web in the desktop analysis and questionnaire in the sampling survey. Before use, these instruments were validated for high reliability of response. The questionnaire had a mixture of closed and open ended questions. The use of check-list focused on collecting data on the knowledge products, the actors in the livestock commodity value chain who were targeted. The use of keywords was tailored to capturing the knowledge sharing strategies used by the theses authors and their supervisors in disseminating the knowledge.

The questionnaire was used to collect data on actors' perceptions and preferences in which they rated on a five-point scale (1=low to 5=high) for the knowledge sharing strategies and the use of these knowledge products generated. The respondents identified the skills or knowledge they had acquired which they could associate the origin to Egerton University.

The data collected using checklist in the library and keywords in the web were measured in counts while data collected with questionnaire were both counts and ordinal data Likert scale for preferences and perceptions.

3.2 Data Analysis

3.2.1 Identifying Knowledge Sharing Strategies Used and Actors Targeted Most

The use of knowledge sharing strategies and actors were count data measures. The Chi square test statistics and Generalised Logit model were fitted in SPSS version 17.1 software to identify the most frequently used knowledge sharing strategy and the most targeted actors. In Logit model, the dependent variable was knowledge product. Independent variables were the actors in the livestock value chain (operators, enablers and supporters) and knowledge sharing strategies (web, library, conference proceedings, extension materials, journal articles, policy briefs and media briefs).

3.2.2 Determining the Preferences and Perceptions of Actors

The preferences and perceptions of actors were ordinal Likert scale measures on a scale of 1 (low) to 5 (high). This data was subjected to non parametric statistical procedures of Mann-Whitney and Kruskal-Wallis test statistics to detect rating differences among knowledge products and sharing strategies for the actors. The dependent variables were rating for accessibility and relevance, while independent variables were knowledge product and knowledge sharing strategies.

3.2.3 Skills Used by Actors Associated With the Generated Knowledge Products

The skills used by the actors that they associate with the knowledge products generated at Egerton University. The descriptive statistics was used on the data. The dependent variable was the generated knowledge products, while the independent variable was skills used by the actors.

Table 3.2: Summary of data analysis

Objective	Dependent Variable	Independent variable	Statistics
Identify the livestock value chain actors most targeted by the knowledge products generated at Egerton University	Generated knowledge products	Actors in the livestock value chain.	Descriptive statistics. e.g. percentages, mean, standard deviation.
Identify the most frequently used knowledge sharing strategies for disseminating knowledge products generated at Egerton University	Generated knowledge products	Knowledge sharing strategies	Descriptive statistics. e.g. percentages, mean, standard deviation. Chi-square
Determine the perception that actors have about the relevance and accessibility of the generated knowledge products and sharing strategies at Egerton university	Knowledge products Knowledge sharing strategies	Perception of relevance Perceptions of accessibility	Descriptive statistics. e.g. percentages, mean, standard deviation. Mann-Whitney and Kruskal-Wallis test
Determine the skills used by actors that they can associate origin with the knowledge products generated at Egerton University	Knowledge products generated	Skills used by actors	Descriptive statistics. i.e. Percentages, mean, standard deviation.

CHAPTER FOUR

RESULTS AND DISCUSSIONS

4.1 Description of the Sampled Knowledge Products

The knowledge products sampled from various Departments between 2005 and 2011 (Figure 4.1) show that a larger proportion were generated from the Department of Animal Sciences (39 %) and Agricultural Economics (26%).

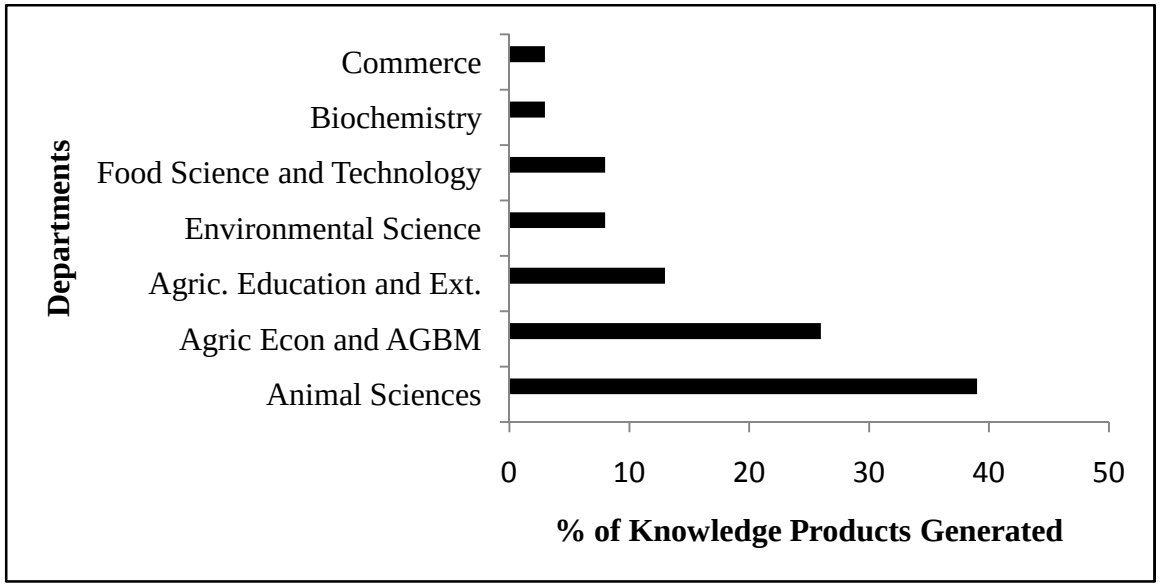

Figure 4.1: Knowledge Products Targeting Livestock Value Chain Actors Generated From Different Departments at Egerton University in the Period 2005-2011

The findings can be attributed to the fact that the Department of Animal Sciences is the primary department in Egerton University that would address most issues faced by the different categories of actors in the livestock value chain. Universities have the mandate and resources to carry out research capable of making significant contribution to national economic development. The general objective of carrying out research on livestock value chain in the University, therefore, is to improve production through technical interventions and innovations that enhance understanding and implementation of agricultural development initiatives in the country. Given the contribution of the livestock sector to the economy of the country, the research carried out in the University through the relevant

Departments should therefore stimulate the flow of information among the actors which in turn contributes to increased production outputs thereby boosting investment and marketing opportunities in the chain. The knowledge products generated would therefore be of relevance in increasing productivity and value in the livestock value chain.

In order for research knowledge to be effectively generated and its output be set to meet the needs of the intended audience, it is important to understand the client needs and knowledge background. The universal roles of teaching and academic research in the Universities are increasingly expected to respond to the specific knowledge needs of the community and to be more accountable to local stakeholders. By carrying out research that is relevant to the needs of the community, the University should contribute in a variety of ways to supporting livestock value chain actors as well as supporting other related development initiatives (Atchoarena and Holmes, 2005)

Of the sampled knowledge products, their generation was highest between 2006 and 2007 and there after declined from 2008, especially for PhD (Figure 4.2).

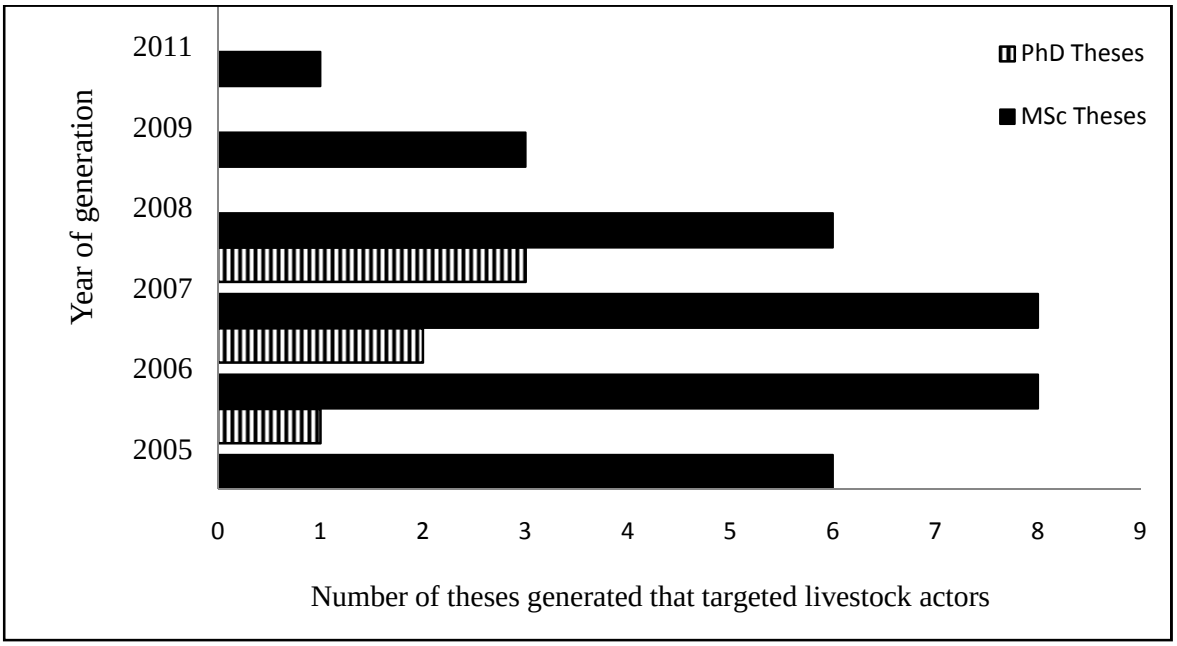

Figure 4.2: Knowledge products generated at Egerton University between 2005 to 2011 targeting Livestock Value Chain Actors

Generation of knowledge products ideally, is motivated by the perceived needs of the target audience. These cause the stakeholders to take initial lead or share control in efforts undertaken to address the needs, as the researchers initiate interactions and create communication channels essential for the generation of relevant knowledge products. The decline in the number of generated knowledge products that targeted livestock value chain actors could be attributed to slow growth in the livestock sector and the local economies. The findings are consistent with those of Kibue (2002) and Muthee (2006) who noted that livestock production and productivity had stagnated in the country due to a number of production and productivity constraints identified among others as poor governance in key agricultural institutions, as well as the liberalization of agricultural economy

4.2 Actors Most Targeted by the Generated Knowledge Products

The research sought to find out which actors in the livestock value chain were most targeted by the knowledge products generated at Egerton University. Results show that operators were 3 to 4 times more frequently targeted ($P<0.0001$) than the other actors in the value chain (Table 4.1).

Table 4.1: Target actors of the knowledge products generated at Egerton University

Value chain actor	Estimate	Standard error	Significance
Intercept	1.49	0.42	<0.0004
Supporters	-4.38	0.84	<0.0001
Enablers	-3.38	0.64	<0.0001
Operators	Ref		
Actor effect : DF=2; chi square value = 63.56			0.0001
Log likelihood	-40.78		

In the livestock value chain, the operators were found to be more than the enablers and the supporters. The findings also showed that the actors mostly targeted were operators who are mainly producers and traders. Because of the nature of their activities, they are most likely to have complex need for production technologies to increase productivity as well as worth of the livestock value chain (Reinchart, 2006). By targeting the operators with the generated

knowledge products, therefore, the University through the knowledge generated acts as a window for creating research and innovation that is relevant to the operators. The findings however, indicated a decline over the years in the number of knowledge products generated at Egerton University that address the needs of livestock value chain actors. This is despite the fact that livestock farming has been identified to play a vital role in realizing Kenya Vision 2030. The observed decline in the number of knowledge products generated at Egerton University that address the needs of livestock value chain actors could be attributed to decline in research funding and increase in the cost of research. This decline stands as a policy challenge calls for the policy makers to provide a platform that clearly stipulates the socio-economic and cultural conditions that should be considered for funding.This may also act as a guiding factor to researchers who need to continually assess the information needs of livestock value chain actors as they carry out research that targets them. Nderitu *et al.* (2012) found that increased growth in the livestock sector has a great potential of motivating many local economies to increase food security and impact on social stability.

4.3 Knowledge Sharing Strategies Used at Egerton University

Egerton University uses several knowledge sharing strategies to disseminate knowledge products emanating from postgraduate research. The results of this study indicated that knowledge products were mostly disseminated through the library, about 25 to 29 times more ($P<0.0001$) than any other knowledge sharing strategies examined (Table 4.2).

Table 4.2: Knowledge sharing strategies used for the knowledge products generated

Sharing strategies	Estimate	Standard error	Significance
Intercept	26.94	0.33	<0.0001
Web	-25.27	0.56	<0.0001
Proceedings	-26.73	0.46	<0.0001
Extension manual	-29.02	0.63	<0.0001
Journal	-27.37	0.37	<0.0001
Library	Ref		
Sharing strategy effect : DF=4; chi square value = 93.65			**0.0001**
Log likelihood	-80.75		

The University uses the institutional repository, the web, research week and the library to disseminate information contained in the generated knowledge products. However, the University has no official document or policy that stipulates the preferred knowledge sharing strategies that the University has adopted. However, the University holds annual research week, but the postgraduate students are not compelled to share their researches in the conference. The University also participates in the Agricultural Show of Kenya (A.S.K). Copies of theses submitted to graduate school are provided to the library, making the library a major platform for sharing the generated knowledge products. According to Opara (2008), for knowledge sharing strategy to be considered a true instrument of social change, it must be based on already established system of the community as well as upon already built-in familiar and trusted knowledge dissemination channels. The source of information is an important factor when it comes to dissemination since it largely touches on the information with potential users and their perception of its credibility.

The study further established that the knowledge sharing strategy that had wider reach to actors was the library (19%) followed by the web (15%). The actors, however, experienced limited access to knowledge products through scientific publications (5%), extension materials (2%) and the media briefs (2%). More than half of the actors (57%) indicated that they use none of the knowledge sharing strategies. This should be a cause for concern

Table 4.3: Use of the knowledge sharing strategies by actors in different locations

Location	Actors	Library (%)	Web (%)	Scientific publications (%)	Extension materials (%)	Media briefs (%)	None (%)
Rural	Operators	2	4				13
	Supporters	2	1	1			9
Peri-urban	Operators	4	2	1			10
	Enablers	2	2	1			7
Urban	Operators	5	3	2	1	1	9
	Supporters	3	2		1	1	7
	Enablers	1	1				2
Total		19	15	5	2	2	57

An effective strategy for implementation of knowledge sharing strategy to dramatically improve dissemination and utilization of research results is to integrate the targeted potential users in the planning, implementing, and evaluating of the strategy. The findings indicate that the livestock value chain actors in all locations were not aware or not fully utilizing the knowledge sharing strategies that have been used to disseminate the knowledge products to them. For instance, the extension materials and media briefs were not used by any actors in the rural and peri-urban locations, despite their general potential to reach the rural people more than all other knowledge sharing strategies. This lack of use of the knowledge sharing strategies may be because the barriers between the actors and the strategies are not well known and addressed by the University (Riege,2005).

The library and the web were used by all categories of actors in all locations. The use of the library could be attributed to the fact that it has traditionally been relied on to disseminate research findings more than any other knowledge sharing strategy, and it is also more visible to majority of the actors. However, the use of the library may be affected by factors like literacy levels, restricted access and poor library marketing strategies. The use of the web on the other hand could be attributed to the growth of digital technologies that have opened the door to an additional and broader range of dissemination possibilities. With the emergence of new technology and globalization, the Web provides major advantages for knowledge sharing and learning by providing opportunities for actors to access information from anywhere without the constraints of time and space. However, they have to be information literate and be able to connect to the Internet. This could also be affected by social and economic factors (Tsui, 2006).

Huff (2000) has categorized the knowledge produced by Universities into two. The first involves the pursuit of scientific truth by scientists, while the second one characterizes knowledge in an application approach. The output of the former work could be applied later or never used at all, while the later is said to be group based and critical of response time. Many universities emphasize this type of knowledge production where recruitment and promotions are based on published research outputs. The generation of new knowledge products through research remains one of the core functions of the University and it

therefore remains committed to transferring the generated knowledge products to the target audience (Age *et al.,* 2012).

The findings of this study indicate that the use of knowledge products vary greatly and this could depend on convenience, social and economic factors, proximity to the users, the content of the knowledge being shared, the level of personal preference and familiarity with the knowledge sharing strategies, literacy levels and the extent that one can read and digest information. The findings corroborate with that of (Kaino *et al.,* 2014) who found that there existed discrepancy in perspectives on the issue of accessibility between researchers and community members who are targeted with the knowledge products. This discrepancy may be explained by the observation that the research products may have come to the target community in forms that may have required specific skills like literacy that the beneficiaries may not have possessed to enable them to interact with the products.

The findings imply that the level of literacy and modalities of accessibility are likely to affect the extent the actors use the knowledge sharing strategies. The onus is therefore upon the University to remain proactive in ensuring dissemination of the knowledge product it generates and overcome strategies that restrict access. The University's policies on research should embrace knowledge transfer by introducing structures and values that link the research efforts to their eventual applications, while developing feedback mechanisms on the sharing strategies used (Creative Commons Attribution, 2009). This can be achieved by creating awareness of the research findings to potential user groups and partnering with enterprises, organizations and donors to develop diverse dissemination channels tailored to reach the targeted actors The perceived appropriateness of the channel used to share the generated knowledge products is affected by the channel's disposition information and demand characteristics which are crucial for agricultural information delivery since they affect the desire to use or not to use a particular information channel (Chaudry and Low, 2009).

4.4 Actors' Preferences and Perceptions of the Relevance and Accessibility of the Knowledge Products and Sharing Strategies

Hypothesis was tested whether there were differences in the nature of preferences and perceptions that actors had about the relevance and accessibility of the knowledge products and sharing strategies in use at Egerton University. Mean ranking indicated that for the accessibility of the knowledge sharing strategies, media briefs was ranked highest while scientific publications was ranked lowest. The accessibility of MSc theses was ranked higher than the PhD theses (Table 4.4).

Table 4.4: Preference and perceptions rating about the relevance and accessibility of knowledge products and sharing strategies

	Relevance		Accessibility	
	Mean	Std. Dev.	Mean	Std. Dev.
Knowledge Products				
MSc	4.07	2.072	4.04	2.050
PhD	3.82	2.181	3.81	2.050
Knowledge sharing strategies				
Library	4.16	1.999	4.14	1.948
Extension materials	4.08	2.075	4.07	2.048
Media briefs	4.42	1.746	4.26	1.861
Policy briefs	4.12	1.928	3.91	2.106
Scientific Publications	3.79	2.138	3.70	2.196
Web	4.13	1.960	4.13	1.955

There seem to be no close relationship between the disseminators and the users of the generated knowledge. The researchers need to be aware of the values, expectations and assumptions they bring through their research as they provide the opportunity to interpret and use results in ways that make the most sense to users. The above research findings could be attributed to the fact that scientific publications are mainly used by researchers to share knowledge among them, and they often use technical language to present the content. This limits access to audiences without research backgrounds, as well as those who are

unable to pay for the high journal subscription fees. The findings conform to Brown (2004) who posits that though scientific publications are 'traditionally' a strategy most conspicuously used by academics to communicate their research findings, they are the knowledge adoption strategy least favored by policy-makers and other stakeholders who do not consider these types of outputs accessible.

The high ranking of the accessibility and relevance of MSc theses on the other hand could be attributed to the fact that the MSc theses are more than the PhD theses, while at the same time the content of PhD theses are considered to be more technical. These findings are in agreement those of Aguolu and Aguolu (2002) who reported that the availability of information sources or knowledge sharing strategies does not necessarily imply its accessibility because of various impeding factors like lack of knowledge of their existence by the users, users who cannot clearly articulate and other physical administrative barriers. Users of information products use sources that require least efforts to access and are less complex. The decision to adopt a new technology is related to the amount of knowledge one has regarding how to use that technology properly Rogers (1995). The early adopters of new technology tend to have higher educational levels, reflecting their ability to understand a new technology more quickly and, as a consequence, understand its potential value as well as its comparative advantage to current or other technology already in use(Porter and Donthu, 2006; Ugah, 2007),.

The findings further infer that the perceptions of the actors on the knowledge sharing strategies and the knowledge products generated largely rests on the steps taken to make research results easily accessible, comprehensible and the awareness by the users. The knowledge products generated make up important knowledge base that should be accessible to the actors through sources whose features are acceptable to them. Thus, identification of the different sources of information by the users is needed to bring out their relevance as well as the preference given to the different types of sources (Opara, 2008).

4.5 Association of the Skills Used by Actors with the Knowledge Products Generated at Egerton University

Actors along the livestock value chain use diverse skills to increase production and value in their livestock enterprises. The actors were asked to identify the skills that they were using and they perceived as originating from Egerton University research outputs. Milk production was the skill actors mostly associated with the knowledge products generated at Egerton University (17%), followed by animal nutrition (15%). Majority of the actors (61%) indicated that they did not have any skills that they could associate the source to be the knowledge products generated at Egerton University. However, there were other actors who had skills they used but they could not associate their source with the knowledge products generated at Egerton University. Skills that were ranked highest were A.I services and milk preservation (22%) each, followed by credit facilities (19%). The results are summarized in Figure 4.3.

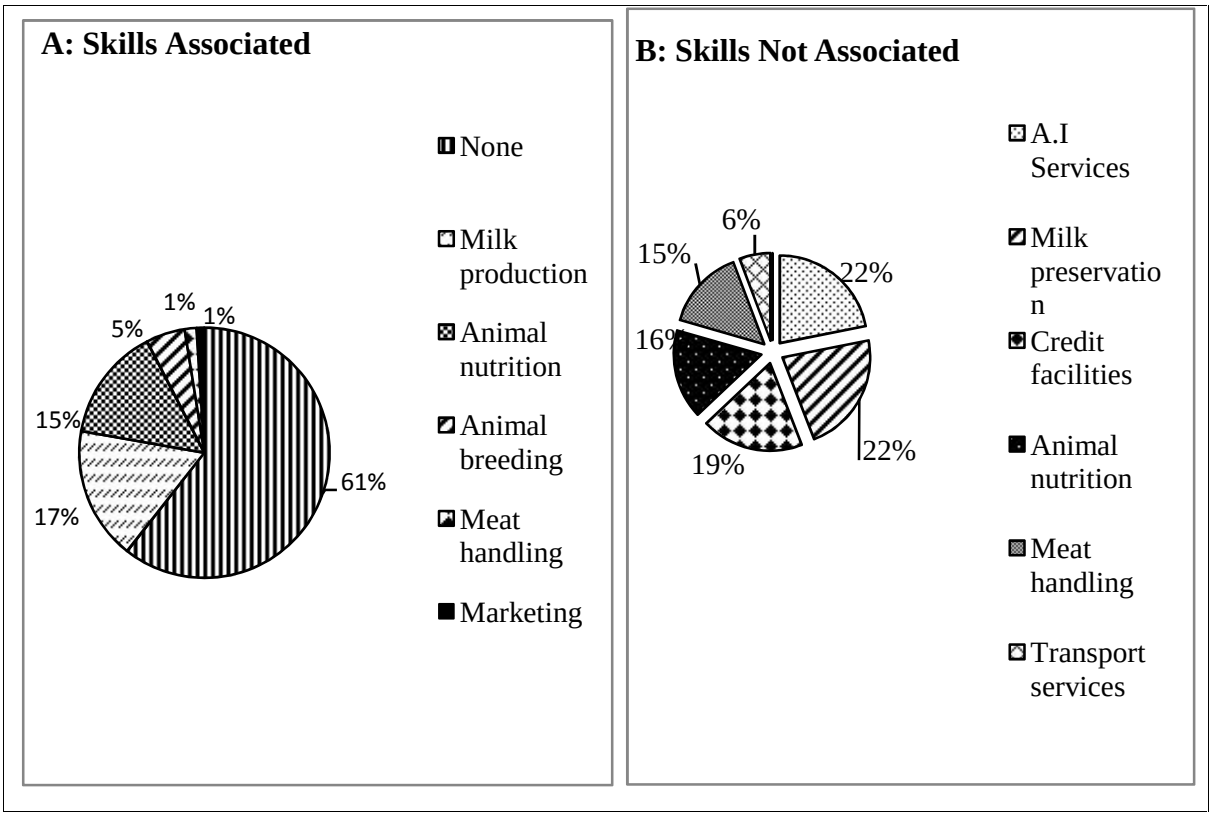

Figure 4.3: Skills associated and not associated with the generated knowledge products

The level of the skills associated with the knowledge products generated at Egerton University, as indicated in the findings, is generally low. The reality of knowledge transfer among the actors in the livestock value chain shows that there is still a large gap between research and practice, despite the large amount of knowledge products generated by researchers.

The findings are consistent with those of Marquart *et al.*, (1995)who stated that potential users need to be made aware of the generated knowledge products they doubt their credibility. Since users are of diverse social, ethnic, and/or cultural backgrounds they need assurance from linkage agents that are trusted and perceived to have expertise and trustworthiness regarding the generators of the knowledge products. When research results fail to be effectively disseminated, their utilization is low, unless linkage agents (also known as knowledge brokers) act as intermediaries between researchers and users (Tsui, 2006). There should exist clear ways to link dissemination and utilization of research output in order to improve uptake of research findings by the actors, who are the primary beneficiaries.

Another way to enhance the level of uptake is to ensure generators of knowledge products put efforts to deliberately make their reports more appealing, readable and easier to understand, with more specific and operational conclusions and recommendations (Landry *et al.,* 2001).This implies that the Universities have to avail more funds and resources for researchers to train and acquire skills and expertise that will ensure the utilization of their research results by focusing on the need to promote research results and customize the knowledge products to the targeted users. This ought to be a paradigm shift and an institutional commitment, with significant investments of resources devoted to facilitate and sustain effective knowledge sharing. Egerton University has responded to this by providing competitive research grants to its postgraduate students.

The study further sought to determine the reasons the actors had for not associating the skills they possessed with knowledge products generated at Egerton University. A majority of respondents (27%) indicated that the skills they possessed were learnt on their own

through trial and error before they adopted what worked well for them. A similar percentage indicated that they had acquired the skills from their peers. Other respondents (21%) gave

their reason for not associating Egerton University with the skills they possessed as not being aware of the existence of the knowledge products (Figure 4.4).

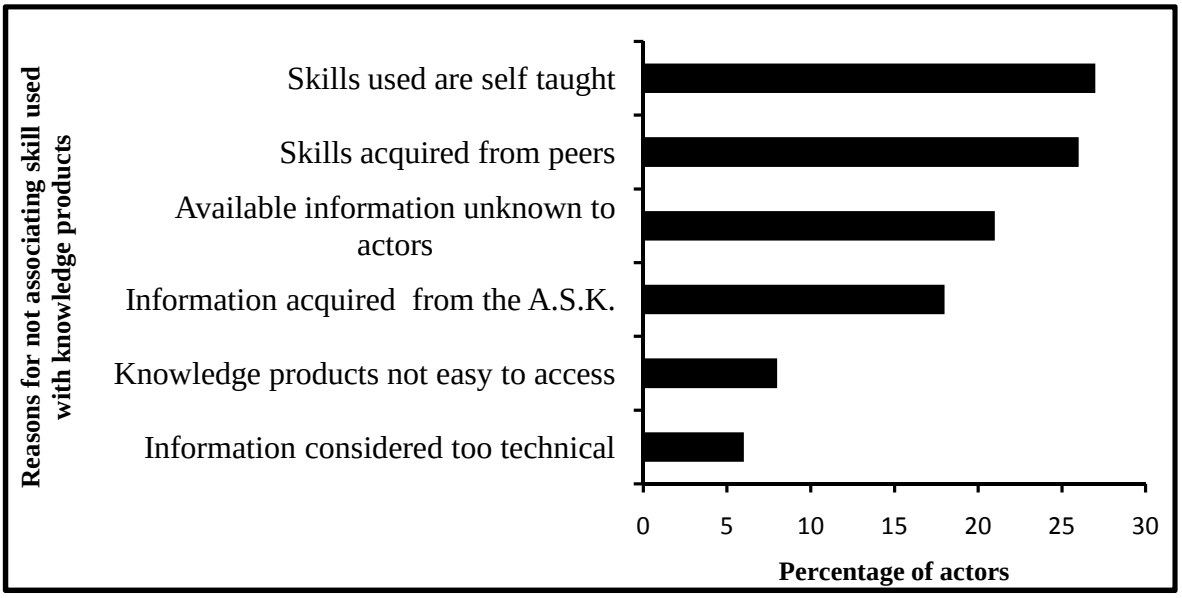

Figure 4.4: Reasons for not associating skills with the generated knowledge products

The decision to adopt new knowledge generated may be determined by various factors that motivate the receiver to use or not use the new knowledge, as well as the compatibility of the new knowledge with the existing policies and practices. For the actors who gave the reason for not using the knowledge products generated at Egerton as self taught or learnt from peers, they may have relied mainly on their existing networks or trusted individuals and groups in the community who provided them with information and advice about development issues in the past. This could also be due to their levels of knowledge, literacy and other social and economic factors.

The findings are consistent with those of Meena and Meena (2012) who carried out a study to assess the information sources used by Livestock farmers in India and established that majority of the sources used and considered more trustworthy were those communicated by those perceived as credible. Influence of information is affected by what the recipient believes about the source. Most farmers got information from fellow farmers, friends, neighbours and local leaders as local channels which were found to play an important role of advising on matters regarding scientific information and innovation. The importance of

interpersonal sources in agricultural information transfer has also been noted by who posited that information about a new idea is often actively sought by individuals who were aware of the idea and know the sources or channels that provide the information. However, at the decision making stage and adoption, the near peer-network were the major channels or sources of communication (Rogers, 1995). Groups in the community and outside with strong influence on the behaviour, or the awareness, knowledge, attitude and practices of members of target group act as the best information sources and dissemination channels (Opara, 2008).

Another reason given by the actors for not using the knowledge products generated at Egerton University was the fact that the actors were not aware of the knowledge products generated. Ideally, when developing agricultural research, the primary aim is to transfer the output to the intended audience which is crucial if the emerging technologies are to be adopted and improve lives. It is therefore imperative for any institution generating research to make the targeted users aware of new findings and encouraging them to adopt innovations. For actors in the livestock value chains the use of agricultural extension programmes should be applied at all levels using various appropriate knowledge sharing strategies. The decisions to adopt the innovations are likely to be based on the awareness levels of the actors and this will positively reflect on the worthiness of the research.

CHAPTER 5

CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study aimed to contribute to increased uptake of research outputs from Universities for enhanced productivity and value of livestock enterprises. The ultimate goal was to enhance utilization of the knowledge products from research carried out in Universities by the intended users. Egerton University and livestock value chain actors were used as case study. The extent to the generated knowledge products are put into use is clearly mediated in part by the dissemination process and the knowledge sharing strategies put in place. The results summarized above from the analysis of the data gathered indicated that the knowledge products generated have target audience that they aim to reach in livestock value chain. Since the operators are more than the supporters and enablers, most of the knowledge products targeted them. The University has shown the desire to reach the target audience with the generated knowledge through use of the various knowledge sharing strategies. These were predominantly the Library, the web, scientific publications, media briefs extension materials and policy briefs. However, there are a number of challenges associated with dissemination, access and utilization of the knowledge products studied by the livestock value chain actors surveyed. The level of technicality, limited access to the web, limited use of media briefs, limited access to library, level of literacy and over reliance on peers all affect the way the relevance and accessibility of the knowledge products and the sharing strategies were perceived by the various actors. This explains why the actors in livestock value chain perceived media briefs to be the most accessible and scientific publications the least accessible. Consequently, University generated knowledge is having limited impact in providing solutions to challenges faced by actors as majority of the actors surveyed did not associate much knowledge and skills they were using to knowledge products generated at Egerton University. Many actors were instead applying knowledge and skills that they had learnt on their own or from peers. This provides an opportunity for Universities to take greater participation roles in extension and outreach programmes to directly transfer their knowledge products to primary beneficiaries if universities are to impact on agricultural productivity and value of agricultural households.

5.2 Recommendations

a. University should further diversify knowledge sharing strategies for disseminating their knowledge products to reach the actors at the grass root levels and such strategies include the use of mass media like the 'Seeds of Gold', the University's radio station, audio visual materials, posters and field demonstrations.
b. The University's Research and Extension division should identify research link agents to ensure dissemination and utilization of research outputs comprising faculty members, information communication experts and agriculture extension experts.
c. The generated knowledge products should be repackaged to a format and language that can easily be understood by the target audience.
d. Efforts should be made to allocate resources for knowledge creation, linkage mechanisms, transmission, utilization, adaptation and feedback on research findings emanating from Egerton University.
e. The Faculty of Agriculture should come up with ways of collaborating with the local community and extension agents to create awareness of the knowledge products generated by the Faculty that can directly benefit livestock value chain actors in the community.

5.3 Further Research

It will be informative conducting:

(i) Impact study of how knowledge sharing strategies by universities has impacted on the agricultural productivity of the targeted primary beneficiaries;

(ii) Evaluating knowledge products generated by Universities to assess their level of applicability in addressing constraints and challenges facing actors in the livestock value chain.

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APPENDICES

APPENDIX 1: QUESTIONNAIRE

SECTION A: Desktop Study of MSc and PhD Theses

Collection of data from the selected knowledge products generated at Egerton University.

Q.A1 **Knowledge Products**

1.1 **Degree Level** […….....…] 1. M.Sc. 2. PhD

1.2 **Department** […….] 1.3 **Year of Publication** […….]

1. Animal Science 2. Dairy and Food Technology 3. Crops, Horticulture and Soils 4.Agricultural Economics and Agribusiness Management 5. Agricultural Education and Extension 6. Applied Community Development Studies
7. Environmental Science 8. Food Science and Technology

Q.A2 **Knowledge Sharing Strategies**

Q.A2.1Which of the following knowledge sharing strategies have been used to reach the livestock value chain actors with the generated knowledge products?

Knowledge sharing strategies 1 =yes 2=no
Theses in the Library […....…..]
Theses in the web […….]
Thesis is shared in scientific proceedings [.....]
Thesis is shared in peer reviewed journals […….]
Thesis is shared in technical reports [.....]
Thesis is shared in extension materials […….]
Thesis is shared in media Briefs […….]
Thesis is shared in Policy Briefs […….]

Q.A3 Target Actors in the Livestock Value Chain

Q.A3.1 Who are the targeted actors in the livestock commodity value chain?

1=Operators 2=Enablers 3=Supporters

	Primary target beneficiaries	**Secondary target beneficiaries**
First		
Second		
Third		

SECTION B

Value Chain Actors Survey

Collection of data from actors on relevance and accessibility use and adoption of knowledge products and sharing strategies

Q.B1 Which role is the respondent playing in the livestock value chain? […….]

1= An operator; 2=An enabler; 3= A supporter

Q. B1.1. What is the specific role played by the respondent? […….]

A. Operators: 1. Livestock producer; 2. Livestock processor;
3. Livestock Retailer; 4. Consumer;

B. **Enablers:** 1.Finance and Credit; 2. Researcher;
3. Transport provider; 4. Vet and A.I Service providers;
5. Extension service worker;

C. **Supporters:** 1. Legal service provider; 2. Administrative service provider;
3.Policy maker;

Q.B1.2. Location of the actor's farm, firm, office [.....]

1. = Rural; 2. = Peri-urban 3. = Urban

Q.B2 Name any three knowledge/skills/service/regulations you are currently applying or using in livestock enterprise that you can associate source or generation to be Egerton University:

1. [.....]
2. [.....]
3. [.....]

Q.B2.1 Specify the knowledge strategy through which you accessed / acquired/ received each of the knowledge/skills/service/regulations you named in Q.B2

	Q.B2: **Knowledge / skills/ service/ regulations**	**Q.B2.l** **Sharing strategy through which you acquired/ accessed/ received it**
1		
2		
3		

Q.B2.2 Name any three knowledge/skills/service/regulations you are currently applying or using in livestock enterprise that you CANNOT associate source or generation to be Egerton University:

1. [.....]

2. [.....]

3. [.....]

Q.B2.3 Would you kindly give possible reason(s) for each knowledge/skills/service/regulations you named in Q.B2.2 why you CANNOT associate source to be Egerton University:

QB2.2: Knowledge/skills/service/regulations		**QB2.3: Your possible reasons**
1		
2		
3		

Q. B3 Rate on a scale of 1-5 (low to high, zero if not sure) the accessibility, relevance and your preference of the knowledge sharing strategies used by Egerton university.

Knowledge sharing	**Accessibility**		**Relevance**		**Preference**
The Library					
The web					
Scientific publication					
Extension materials					
Media briefs					
Policy briefs					
Others, specify					

Knowledge products	Accessibility		Relevance		Preference
MSc Thesis output					
PhD Thesis output					
Others, specify					

Q.B4 Suggest the improvements you would like to be made in the knowledge sharing strategies from universities to be more relevant and accessible to your needs

Knowledge sharing strategy		Your suggested improvements
The Library		
The web		
Scientific publication		
Extension materials		
Media briefs		
Policy briefs		
Others, specify		

APPENDIX II: SAMPLE SIZE TABLE

T**able 1.** Sample size for ±3%, ±5%, ±7% and ±10% Precision Levels Where Confidence Level is 95% and P=0.5(you mean 0.05?)				
Size of population	**Sample Size (n) for Precision (e) of:**			
	±3%	**±5%**	**±7%**	**±10%**
500	A	222	145	83
600	A	240	152	86
700	A	255	158	88
800	A	267	163	89
900	A	277	166	90
1,000	A	286	169	91
2,000	714	333	185	95
3,000	811	353	191	97
4,000	870	364	194	98
5,000	909	370	196	98
6,000	938	375	197	98
7,000	959	378	198	99
8,000	976	381	199	99
9,000	989	383	200	99
10,000	1,000	385	200	99
15,000	1,034	390	201	99
20,000	1,053	392	204	100
25,000	1,064	394	204	100
50,000	**1,087**	**397**	**204**	**100**
100,000	**1,099**	**398**	**204**	**100**
>100,000	**1,111**	**400**	**204**	**100**
Aora? = Assumption of normal population is poor (Yamane, 1967). The entire population should be sampled				

Source: Israel D.G (2009).