

# **An exploration of small-scale vegetable tanning in South Africa**

## **Abstract**

**Purpose-** This paper explores small-scale vegetable tanning in South Africa based on the availability of resources. The research methodology that has been selected is benchmarking of two other countries for best practices in small-scale vegetable tanning.

**Findings-** based on the literature reviewed so far South Africa is one of the countries that produce high quantities of hides and skins and has high quantities of vegetable tannins. However, the hides or skins are currently semi-processed to the wet-blue stage or exported raw to various countries for further processing. 31 of the 32 tanneries that are available in the country produce chromium. The sector currently employ only 1% of the population despite the country being endowed with resources.

**Research limitations-** This paper is based on secondary data and forms part of an on going research.

**Research implications-**This study proposes to look back at traditional systems of production Labour intensive industries have been identified as key to employment creation in South Africa. The country wants to move from being a resource intensive country to a labour intensive and a knowledge based economy. The Industrial Policy Action Plan (IPAP), National Development Plan (NDP) which are currently the promoters of the labour intensive and knowledge based economic development place emphasis on job creation. The proposed methodology of this study will benchmark two countries that are

**Keywords:** National Development Plan, SMEs, sustainable development, vegetable tanning, Industrial Policy Action Plan,

## **Introduction**

Small-scale industries have transformative capabilities which allow them to convert global or existing knowledge and tacit knowledge to context-specific knowledge. Thus the transformative capabilities to combine general knowledge with practical knowledge about the specific locality and local materials (Hansen, 2010). This transformation does not necessarily result in completely new products or processes, but rather in local versions of products and or processes, the innovation aspect then result in the ability to create local solutions.

This study suggest that any form of development that government is planning should focus on local skills, resources and be about local empowerment in order to ensure sustainability and curb the over reliance on social welfare which result in the system being over burdened.

However, South Africa has been identified as having the lowest rate of survival start ups as entrepreneur start ups (Neneh & Vanzyl, 2012). The reason for the low rate

is due to SMEs facing numerous challenges, which includes access to finance, market access, skills and network and enabling environment. The application process for financial support is bureaucratic, lack of collateral and financial records which are required by the commercial banks (Morgan, 2012; Neneh & Vanzyl, 2012). According to Neneh (2011), in most instances entrepreneurs start businesses because of previous family experience in running a business.

Due to their contribution SMEs have been identified in some countries by policy makers as drivers of economic change and structural change (Hölzl, 2009). These usually range from low-tech self employed to high tech R&D based start-up in manufacturing driven by entrepreneurs with a team (Stam & Wennberg, 2009). This paper focuses on the low-tech manufacturing start-ups as they fit better with the South African context as a developing country.

In South Africa “Sustainable development is about enhancing human well-being and quality of life for all time, those most affected by poverty and inequality. Resource use efficiency and intergenerational equity are identified as core principles (DEAT, 2008). The thinking is that if this generation leaves the next generation with a degraded economic, social, and environmental assets and less wealth, that will lead to an unsustainable future. In essence the most fundamental to sustainable development is recognising the interdependence of our economic, social and environmental systems (ibid).

Leather tanning is one of the oldest practices (Romer et al., 2011). There are two widely used methods of tanning, vegetable tanning which remains indispensable in its applications and properties that up to date have not been matched. It also is less environmentally hazardous compared to mineral based tannins such as chromium and aluminum (Gujrathi & Babu, 2007; Mahdi, Palmina & Covington, 2009). However, chromium which offers less turn-around time compared to vegetable tanning which is labour intensive and time consuming (Rensberg, 1971; UNIDO, 2003; Munyai, 2011). As result many developing countries have seen the shift to chromium tanning, which led to less development and improvement of the vegetable tanning sector. However, there are developed countries such as Italy, which have kept the tradition of vegetable tanning and have developed production systems that still help them remain competitive, the global economy. The study wants to understand how the communities that are involved in the process have managed to remain resilient to globalization and its influences on local traditions and production

systems.

Many countries are taking measures by investing in research and development of alternatives to the current used method of chromium. More than 90% of the country's leather is produced using chromium tanning and 50% of the country's leather is produced up to the wet-blue stage for export. However, leather tanning is a practice that has been associated with environmental pollution. The leather tanning process use about 130 different chemicals and generates large quantities of wastewaters (Gujrathi & Babu, 2007).

The leather industry has always played a critical role in the economy due to large numbers of livestock and tanning resources. However, currently the industry only contributes a mere 1% to the agro processing economic activities and only employs a total of 6681 people that constitute 1.1% of the agro-process total employment by 2010 (Gebrehiwet, 2012). Nevertheless, South Africa is one of the top 10 hides and skins producing as well as leather producing countries in Africa.

South Africa is one of the countries that produce high volumes of hides and skins for the export market, while the hides and skins that are left in the country are semi-processed for the automotive industry (FAO, 2010; DAFF, 2011;Prakash & Stigler, 2012; Gebrehiwet, 2012). This essentially calls for research development, innovation, policies and strategies that will help in reducing or managing the waste problem in the leather industry.

Currently, waste from tannery activities in South Africa is classified as class 6 which refers to waste that is toxic or contains infectious substance due to presence of small cyanide (CN) and hexavalent chromium (Cr (VI) and therefore assigned the hazardous rating (extreme risk)(Hooghiemstra, 2005). Due to this rating the department of environmental affairs decided that the waste should be disposed of to permitted hazardous waste landfill sites. However, storing the waste in a designated landfill site does not seem to offer long term solution because the waste in the landfill site is highly water soluble at all pH values, particularly the physiological and environmental pH levels. Chromium waste is also very mobile in the environment and readily moves through soil contaminating groundwater supplies (Hooghiemstra, 2005; Munyai, 2011). With all the above-mentioned concerns the country continues to produce chromium tanned leather at a high rate without any contingency for

dealing with the waste from the activities either than dumping it on the designated landfill or with general waste.



Figure 1: Site of a mixed waste landfill in South Africa (Source: DEAT, 2013)

Globally, waste from chromium leather tanning activities have been rated as top 5 most toxic in the world (Black Smith Institute, 2010).

On the contrary vegetable tanning waste is considered to be beneficial in the agro-processing industry, particularly in the agriculture and food farming sector. The waste in powdered form can be used as fertilisers. This is essential since there is growing threat of food security as well as growing concerns over the use of carcinogenic fertilisers in the agricultural sector.

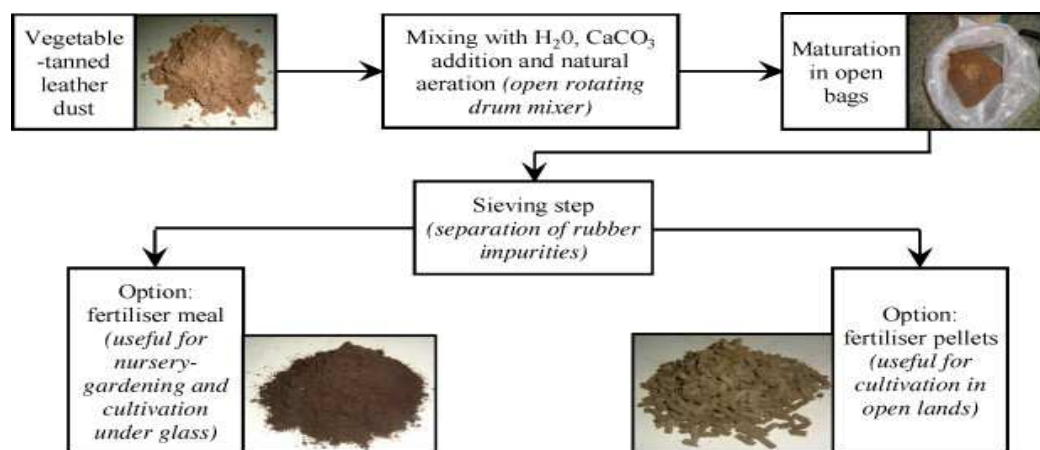


Figure 2: Flow chart for the production of organic-nitrogen fertilizer from vegetable-tanned leather dust (Source: Tatano, Acerbi, Monterubbiano, Pretelli, Tombari & Mangani, 2012).

One of these strategies is to look back at benefits of having a full manufacturing

process in the country, this will require proper planning and establishment of research and development centres locally that will focus on locally available resources and their potential.

South African is developing sectorial development strategies that recognises centrality of environment considerations in globally competitive industrial development (DEAT, 2005). However, the leather industry needs more attention from the government and policy makers. Currently, all the leather tanning activities in South Africa are centralised and takes place in the tanneries that are situated in the urban areas, due to the production system being large and highly industrialised this makes it difficult for the organisations to manage every process output properly.

### **Motivation for choosing this topic**

South Africa is one of the countries that are endowed with resources that could be locally further processed in order to add value so that local communities can benefit through employment opportunities. This paper explores the small-scale vegetable tanning of leather in South Africa and its potential to contribute towards the government's strategy through the IPAP policy and the National Development Plan (NDP) to place emphasis on job creation. Small-scale manufacturing has been receiving attention from the developed countries since the 1970 due to its ability to adapt to change and labour absorption (Loveman & Sengenberger, 1991).

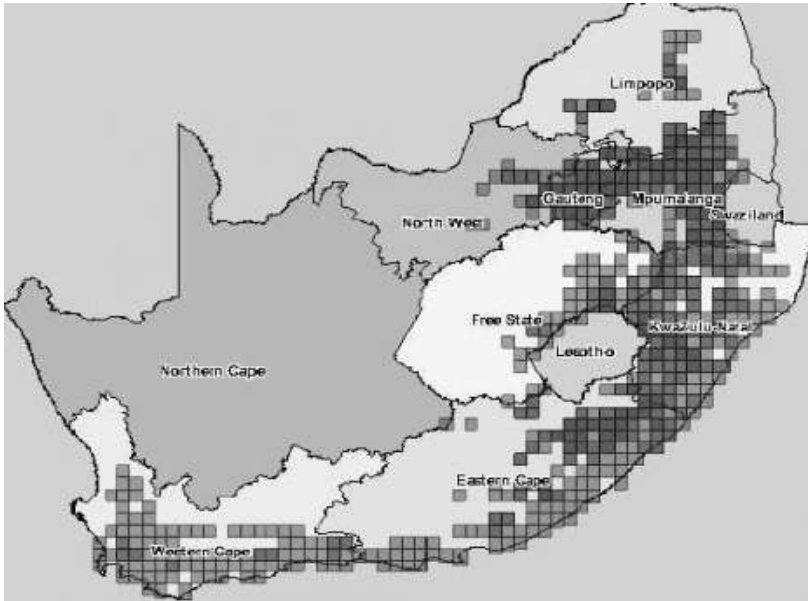
Agro-processing industry is among the sectors that have been identified by the IPAP, the New Growth Path (NGP) and the NDP for its potential to spur growth and create jobs because of its linkage with the primary agricultural sector (DAFF, 2012). However, none of the documents mention leather, which falls under the agro-processing sector. The South African department of agriculture, forestry and fisheries has established a directorate agro-processing support to complement the interventions undertaken by several governmental departments like the Department of Trade and Industry (DTI) by focusing on supporting the establishment and growth of Small and Medium Enterprises (SME's) for agro-processing (DAFF, 2012). In support of the above mentioned initiatives to help grow the agro-processing industry, this study will only focus on one aspect of the agro-processing value added divisions which is the leather tanning which essentially deals with waste from the other agro-processing activities.

The Agro-processing value added division plays an important role in the manufacturing sector as one of the top six in the manufacturing sector in South Africa the leather industry falls under the agro-processing sector which contributes 40% to the South African economy (Gebrehiwet, 2012).

The focus of this paper is on small scale-vegetable tanning practices that help improve the environmental performance through the use of materials that are locally available. However, in order for the process to be considered environmentally sustainable, its entire manufacturing value chain needs to be evaluated from the beginning of the process, which in the case of vegetable tanned leather would begin by the process of harvesting the plants, which are used in the tanning process to the final leather in South Africa. Small-scale manufacturing firms are seen to have the potential to maximise employment and raise local purchasing power with less capital (Munyai, 2011). Small-scale production is often linked to local knowledge which can be used as a fuel of the community (Nwadime, 1999 in Munyai, 2011).

South Africa is currently in need of better ways of exploiting the leather industry. Social entrepreneurship signals the imperative to drive social change and has the potential payoff with lasting, transformational benefits to society (Martin & Osberg, 2007).

The country is endowed with large quantities of the black wattle (*acacia mollissima* or *acacia meansii*) (see Figure, 4), which is a tree that is indigenous to Australia that is currently being extensively cultivated in South Africa and other parts of the world (McGrarry, Shackleton, Fourie, Gambiza, Shackleton & Fabricius, 2005). This plant is currently classified as Alien Invasive species (AIS) by the South African Department of Environmental Affairs (McGrarry et al., 2005; Shackleton et al., 2006). Developing a manufacturing sector based on the black wattle plant will not only contribute to many various sectors, but will help in absorbing the many unemployed young people into the agro-processing sector. It will also contribute towards dealing with environmental concerns about the plant being AIS. The plant has many other uses, it can be used in home construction,



**Figure 4: Distribution of black wattle in South Africa (Source: Aitken, Rangan & Kull, 2009)**

The practices that this study will focus on are linked to local knowledge systems, they manufacture using locally available resources, and use local skills in order to meet their goals. However, the question that arises is whether these processes can be used to contribute to economic growth as well as job opportunity creation in a country that is plagued by high unemployment rate which currently stands at 26% (StatsSA, 2012).

The purpose of this study is to explore how small-scale vegetable tanning as a process can be achieved using locally available resources and knowledge in line with the IPAP policy, NDP and NGP's goal to create opportunities that lead to economic growth and service the local market.

### **Current status of the research area**

Vegetable tanning has been used for hundreds, possibly thousands of years to produce leather. The use of vegetable tanning was the widely used process before the discovery of chrome tanning in the 1880s (Hooghiemstra, 2005). However, since gaining independence and opening up of the local market to global trade in South Africa vegetable tanning has been almost neglected as a form of leather tanning. Currently, there is one tannery that specialises in vegetable tanning. Loveman and Sengenberger (1991:1-14) suggest that small-scale regained recognition in developed countries in the 1970s. They suggest that research into the contribution of small-scale industries into employment creation began in the United States in 1979.

The growth was identified to be based on the *in situ* growth and greater growth creation through the creation of small firms based on local knowledge which in turn help in creating jobs in declining industries.

### **South African leather industry in context**

Currently, South Africa has 32 tanneries, and 31 of those produce chromium-tanned leather, particularly wet-blue leather for export (DAFF, 2011). The industry employed 5859 people by 2010 which is down from 12500 in 2000 (Gebrehiwet, 2012). Since gaining independence and opening up the country to international trade the local leather industry has been experiencing a down ward turn in the employment figures (ibid).

Moreover, there has been a shift from being linked to other local value-chain industries such as footwear to focus mainly on producing for export and the automotive industry (Mowat, 1996). From the mid 1980s the industry shifted its focus to upholstery and the automotive industry resulting in tanneries expanding to focus on the automotive and trims sector which government has offered tax rebates. According to the DAFF report of (2010), exports of semi-processed hides and skins to the EU countries and to the United States of America, Singapore and Hong Kong are duty free. As a result most of the local hides and skins are exported to various parts of the world.

Kucera, Roncolato and Von Uexkull, (2012:1133) note the importance of trade as a transmission channel for developing countries such as India and South Africa which have recently opened up to international trade. They also note international trade as arguable a necessity for developing countries aiming to narrow the technology gap with developed countries, it enables them to earn foreign currency and purchase foreign technology. Conversely, it seems as though most developing countries are getting the foreign technology in exchange for their natural resources and economic development.

Moreover, the 2008 global crisis also revealed how greater trade openness is a source of vulnerability for developing countries in a volatile global economy and pose a challenge to policy-makers and calls for governments to deliver timely and effect responses to external shocks in open economies (Kucera, Roncolato & Von Uexkull, 2012).



The South African government identified under invoicing of leather imports as one of the biggest challenges faced by the local government in trying to curb the influx of cheap leather imports (DAC, 2011; DTI, 2013). The real export value of South African leather and leather products has been estimated at 1365 million ZAR. While, the real imports is estimated at 1584 million ZAR. This can be attributed to the local tanneries establishing links with European tanneries to produce wet-blue leather in order to meet the stringent automotive industry's specifications (Mowat, 1996).

This has proven to be a challenge for local leather goods manufacturers to find competitively priced leather. Most tanneries operate under the Foreign Direct Investment (FDI). However, the composition of domestic fixed investment in the leather agro-processing sector is only 0.5% and this resulted in only 54 million ZAR value in 2010 which is equivalent to 0.3% (see Figure 5). While the total composition of total export is equal to 4% of leather and leather products (Gebrehiwet, 2012).

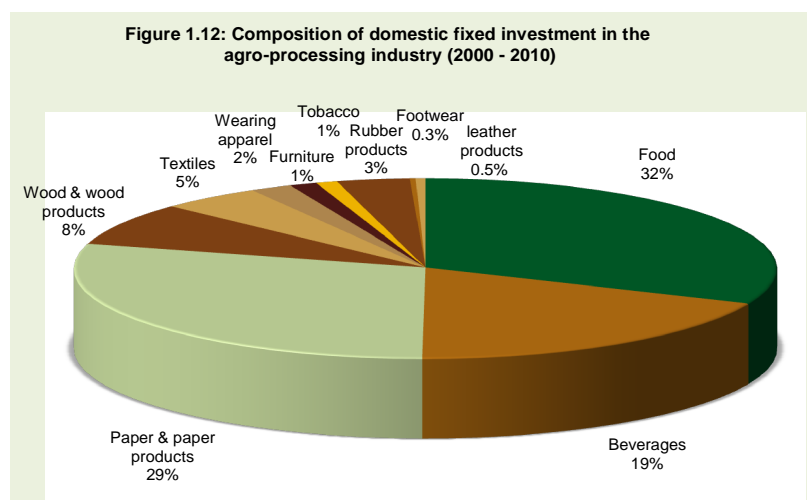


Figure 5: Composition of domestic agro-processing industry (Source: Gebrehiwet, 2012)

Through the NDP the government is trying to recapture domestic market share by improving competitiveness by focusing on product, process and delivery efficiencies and harnessing proximity to local retailers (DAC, 2011;DTI, 2013). The NDP proposes national skills fund as an intervention. However, as it stands now the NDP is not explicit in the exact process that will be followed to meet its goals. How it will ensure sustainability of its new manufacturing systems, and how it will ensure environmental sustainability of the new manufacturing systems and finally which parts of the society are going to benefit from the process and how long the process will be?

Small manufacturing was established through decentralisation of production system by breaking big manufacturing companies into smaller companies which was used as a strategy to avoid trade union power in Great Britain and Italy in the 1970s to enlarge opportunities to adjust production capacity more easily (ibid). Stam and Wennberg (2009: 77) suggest that “innovative start-up are an important driver of economic growth”. SMEs have been identified as the most important drivers of employment gain.

Due to their contribution SMEs have been identified in some countries by policy makers as drivers of economic change and structural change (Hölzl, 2009). These usually range from low-tech self employed to high tech R&D based start-up in manufacturing driven by entrepreneurs with a team (Stam & Wennberg, 2009). This paper will focus on the low-tech manufacturing start-ups as they fit better with the South African context as a developing country.

R&D drives growth in the high-tech firms, while growth in the low-tech SMEs is driven mainly by ambitions of the entrepreneur or founder. Their growth ambitions act as a substitute of R&D for growth in low-tech SMEs. Helping stimulate growth of new firms was identified as a key element of entrepreneurship policy whose aim is to improve the conditions for high-growth start-ups in order to spur structural economic change and job creation (Stam & Wennberg, 2009; Hölzl, 2009).

Innovativeness in the low-tech industries is crucial for economic development — especially in the presence of knowledge economy (Hansen, 2010). Knowledge on innovation process is of importance, innovation in low-tech, medium-tech industries rarely happens as a result of firm’s investment in scientific research. Innovations in these industries are primarily based on a synthetic knowledge base that utilises existing local knowledge rather than on the creation of completely new knowledge (ibid). Naturally LMT firms combine two ideal types of knowledge bases, which are local knowledge and western forms of knowledge. Local knowledge in this regard is in reference to the understanding of materials, available resources as well as the ability to add-value to the materials for human benefit.

What is of interest to note is that many EU countries have started to develop, a series of policy intervention to support Young Innovative Companies (YIC) to help them improve their innovative and growth capacity (Schneider & Reinhold, 2010).

According to Stam and Wennberg, (2009), in order to spur structural economic change and job creation from a policy perspective, policies need to foster high-growth SMEs need to take into account the comparative advantage of the economic environment of the firms and locally available resources. This consideration in the long run might make it possible for the goal of sustainable development to be attainable.

Of importance to note is that South Africa in 2010 was ranked no 35th out of 54 profiled countries in terms of entrepreneurial activity and was below average for all participating countries (Morgan, 2012). With the new NDP and the IPAP the government is trying to improve the situation. Perhaps to encourage the establishment of SMEs based on their potential contribution to job creation and development, any form of development that government is planning should focus on local skills, resources and be about local empowerment in order to ensure sustainability and curb the over reliance on social welfare which result in the system being over burdened.

### **SMEs contribution to the economy**

Small-scale industries are seen as having transformative capabilities, which allow them to convert global or existing knowledge and tacit knowledge to context specific knowledge. Thus the transformative capabilities to combine general knowledge with practical knowledge about the specific locality and local materials (Hansen, 2010). This transformation does not necessarily result in completely new products or processes, but rather in local versions of products and or processes, the innovation aspect then result in the ability to create local solutions.

This study suggest that any form of development that government is planning should focus on local skills, resources and be about local empowerment in order to ensure sustainability and curb the over reliance on social welfare which result in the system being over burdened.

However, South Africa has been identified as having the lowest rate of survival start ups as entrepreneur start ups (Neneh & Vanzyi, 2012). In South Africa SMEs face numerous challenges, which includes access to finance, market access, skills and network and enabling environment. The application process for financial support is bureaucratic, lack of collateral and financial records which are required by the

commercial banks (Morgan, 2012; Neneh & Vanzyl, 2012). According to Neneh, (2011), in most instances entrepreneurs start businesses because of previous family experience in running a business.

According to SBP (2013:3) it is as if South Africa recognises that it needs small business, but it has not yet realised fully that small businesses have needs. It seems as if the development of small business economy is something that is assumed rather than encouraged. Manufacturing SMEs in particular according to the SBP report 81% of them suggest that it has become more difficult to run small businesses in South Africa (SBP, 2013).

Small manufacturing was established through decentralisation of production system by breaking big manufacturing companies into smaller companies which was used as a strategy to avoid trade union power in Great Britain and Italy in the 1970s to enlarge opportunities to adjust production capacity more easily (ibid). Stam and Wennberg (2009: 77) suggest “innovative start-up are an important driver of economic growth”. SMEs have been identified as the most important drivers of employment gain.

Due to their contribution SMEs have been identified in some countries by policy makers as drivers of economic change and structural change (Hölzl, 2009). These usually range from low-tech self employed to high tech R&D based start-up in manufacturing driven by entrepreneurs with a team (Stam & Wennberg, 2009). This paper will focus on the low-tech manufacturing start-ups as they fit better with the South African context as a developing country.

Growth the high-tech firms are driven by R&D, while growth in the low-tech SMEs is driven mainly by ambitions of the entrepreneur or founder. Their growth ambitions act as a substitute of R&D for growth in low-tech SMEs. Helping stimulate growth of new firms was identified as a key element of entrepreneurship policy whose aim is to improve the conditions for high-growth start-ups in order to spur structural economic change and job creation (Stam & Wennberg, 2009; Hölzl, 2009).

Innovativeness in the low-tech industries is crucial for economic development — especially in the presence of knowledge economy (Hansen, 2010). Knowledge on innovation process is of importance, innovation in low-tech, medium-tech industries rarely happens as a result of firm’s investment in scientific research. Innovations in

these industries are primarily based on a synthetic knowledge base that utilises existing local knowledge rather than on the creation of completely new knowledge (ibid). Naturally LMT firms combine two ideal types of knowledge bases, which are local knowledge and western forms of knowledge. Local knowledge in this regard is in reference to the understanding of materials, available resources as well as the ability to add-value to the materials for human benefit.

Incorporating the local knowledge into production process to promote sustainability since local knowledge is place based (Gruenewald, 2003; DST, 2008). Integrating IKS which is concerned with the environment and culture to leather tanning processes in South Africa to promote sustainability of small-scale production which is mainly influenced by internal economies.

### **SMEs South African context**

According to Morgan (2012:3) South African SMEs are classified as enterprises that are micro or very small by the National Small Business Act, and are often survivalist or lifestyle businesses. Two in three of these businesses are operated and run by the owner and do not have any employees. While, medium-sized firms may not produce bulk of output or production they generally hire most people in any economy. However, this has not been found to be the case in South Africa according to the J.P. Morgan report.

What is interesting to note in the South African context from an entrepreneurial perspective is that the community is ageing and 43% of those studied by SBP in their 2011 report were older than 50years of age in the manufacturing sector (SBP, 2013).

According to Stam and Wennberg, (2009), in order to spur structural economic change and job creation from a policy perspective, policies need to foster high-growth, with the support of government SMEs need to take into account the comparative advantage of the economic environment of the firms and locally available resources. In the South African context the comparative advantage is the availability of natural resources, labour and skills.

Since 2003 there has been talks of South Africa having a 'second economy' this was realised after noticing that there were problems with the Growth, Employment and Redistribution Strategy (GEAR) which was introduced in 1996 to try and redress the

injustices of apartheid (Toit & Neves, 2007). South Africa's informal sector grew partly due to urbanisation and easing of policing behaviour which treated black informal operators as illegal (Devey et al., 2006). Informal economy captures a broader range of economic activities and shows integral link between the two economies (Petersen, 2011).

The informal or second economy is characterised by: ease of entry, reliance on indigenous resource, family ownership of enterprises, small-scale operation, labour intensive and adapted technology, skills acquired outside of the formal school systems and unregulated and competitive markets (Devey et al., 2006; Petersen, 2011). Policy makers need to strengthen existing measures to reduce vulnerability, and to consider ways of counteracting disadvantageous power relations within which they are caught and support livelihood strategies that takes place at the margins of the formal economy (Toit & Neves, 2007).

Informal SME activities are often low cumulatively, but contribute significantly to gross domestic profit (GDP). In 2002 it was estimated that informal enterprises contributed between 8-10% to the GDP. While in 2006 the total expenditure of the informal sector was estimated at ZAR 51 billion which was equivalent to two chain store groups which had turnovers of ZAR 32 billion and ZAR 27 billion (Devey et. al., 2006). Most of the informal SMEs entrepreneurship is prompted by economic necessity and business opportunity by the enduring facet of African business landscape. In South Africa as elsewhere in Africa, small-scale entrepreneurship is virtually synonymous with self-employment (Moore et. al., 2010; Petersen, 2011).

### **Statement of the research problem**

Available research shows that small-scale industries are the driver of economic development for many developed and developing economies. Vegetable leather tanning is one of the labour intensive processes that are less environmentally polluting and has the potential to absorb the surplus labour that South Africa has, while at the same time contributing towards sustainable development.

### **The guiding research questions, which the study will be attempting to answer, are as follows:**

The question driving this study is: how can small-scale vegetable tanning methods contribute to sustainable production, economic empowerment and environmental sustainability

How can vegetable tanning be appropriated using locally available resource to enhance economic growth through small-scale production systems?

Why is there a need for small-scale production systems for vegetable leather tanning in South Africa?

How can small-scale vegetable tanning processes contribute to the government's national development plan whose main focus is on job creation?

### **Aims and objectives**

- To conduct research in the field that has been neglected and therefore less written about of vegetable tanning.
- To explore the possible establishment of leather manufacturing SMEs in South Africa.
- Explore the possible contribution of leather SMEs towards the government's IPAP, NGP and the NDP policies to create sustainable employment opportunities.
- To explore the contribution of local knowledge in the establishment of small-scale agro-processing value added manufacturing low-tech entrepreneurial ventures.

### **Qualitative Research Design**

This study will benchmark Italy and Botswana's process of small-scale vegetable tanning using activity theory as a lens to understand the best practice in contemporary small-scale vegetable tanning process and how the activities contribute to national economic development. The two cases of Italy and Botswana were selected on the based of their long-standing tradition of small-scale leather production systems. The benchmarking will be used to identify opportunities for the leather sector in South Africa, identify internal paradigms on what is possible, create an understanding of methods for improved processes, identify strengths within the local sector, learning from the leader's experience (Kendal, 1999).

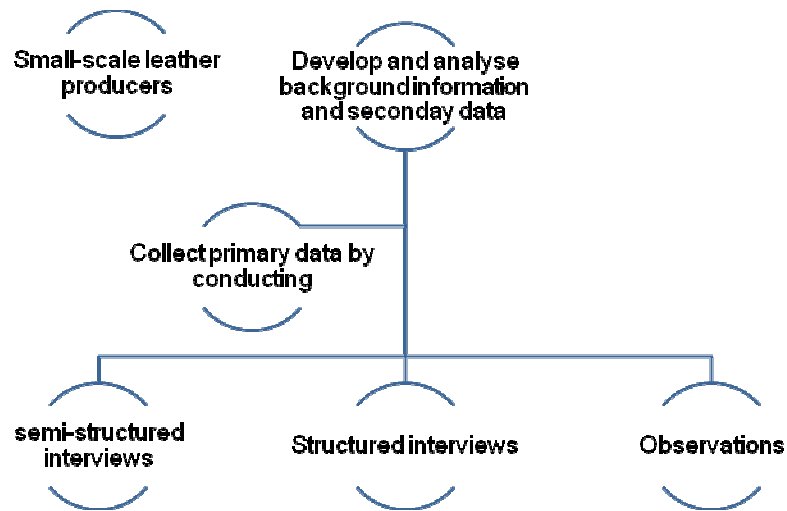


Figure 6: Benchmarking methodology adapted from (Raymond & St-Pierre, 2010).

The above figure indicates the process that will be followed in this study in terms of preparing for data collection process as well as the tools that will be used for data collection. While the figure below indicates the entire process of benchmarking which will also be used in this study.

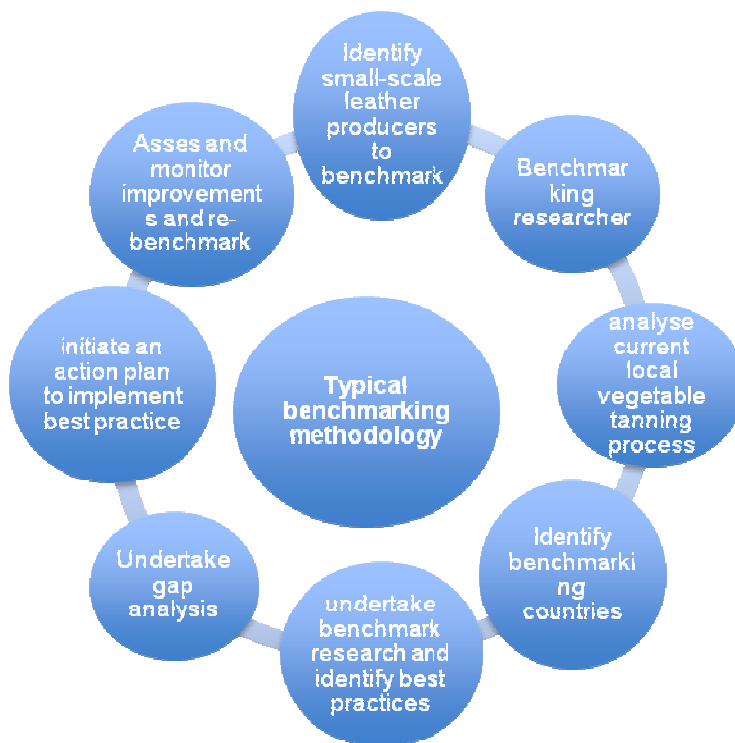


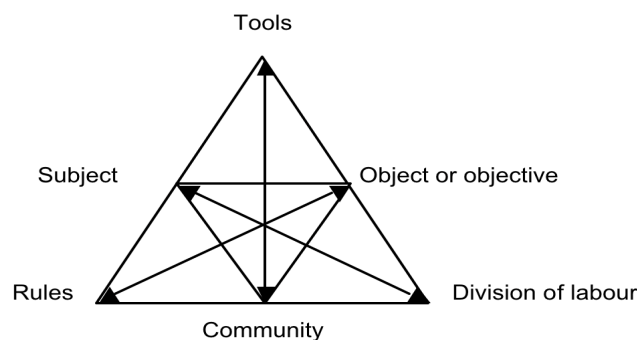
Figure 7: Benchmarking methodology (Churchward, 2009)



## Cultural Historical Activity Theory

Cultural Historical Activity Theory (CHAT) is based on establishing how systems, principles based on the collective activity within a social-historical context work (Koszalka, & Wu, 2004). Activity theory is a philosophical and cross-disciplinary framework for studying different forms of human practices as development process both at individual and social level (Kuutti, 1991). In this study CHAT will be used as a lens to analyse the process of vegetable tanning. CHAT allows an opportunity to distinguish between goals of the action and durability, and object oriented activity system, It looks at the historically evolving collective activity seen in its networks relations to other activity systems and will be used as a prime unit of analysis to help interpret the goal directed actions which are driven by communal motives (Engeström, 2000).

CHAT has hierarchical levels of activity and consists of linked operations (Leon'ev, 1978 in Foot, 2001). CHAT is also described as a descriptive tool that focuses on understanding human activity, practices that incorporate nations, history, interventions, collaboration and development (Foot, 2001; Nardi,1996). Through examining the production process, new innovations can be revealed by studying current methods in real situations.



**Figure 5: Basic structure of activity theory adapted from Engestrom et.al.,1990)**

### Activity Theory in Context

- Tools in this study refers to all the materials and equipment that make the tanning process possible
- Subject is the Vegetable tanners
- Rules that govern how small-scale tanners work
- Object is vegetable leather tanning
- Community refers to the members involved in the activity from a small-scale production point of view
- Division of labour refers to how work is allocated to the various participants

The six necessary steps that describe how CHAT works will be used:

- First to clarify the purpose of the activity system, understand the relevant context to which vegetable tanning takes place and its relevance contribution

into modern context (Jonassen & Rohrer-Murphy, 1999).

- Secondly analyse the tanning system and its components.
- Thirdly analyse the tanning structure and its types of operations.
- Fourthly analyse the tools that have direct or indirect connections to the tanning process, tanners and the community.
- Fifth to look at internal dynamics that exist and essential to the VT process.
- Finally the researcher will analyse the interrelationships of the activity dynamics and how they affect each other (Zurita & Nussbaum, 2007:215-216).

The research activity will be broken down into three different phases. Phase one will focus on the leather tanners in the selected cases where small-scale vegetable tanning activities are taking place, since the study is looking at cases from a developed world and developing world to find commonalities, and patterns that emerge.

Phase two will speak to policy makers and industry role players in South Africa in order to understand why vegetable tanning has remained underdeveloped in the country, as well as their understand of the role the sector plays or can play towards the environment, economy and society. While phase three will involve interviewing the designers who use the leather to create various leather goods.

### Theoretical Paradigm

A paradigm provides a tool for making sense of the social world and helps view the world in a particular way (Burrell & Morgan, 1979:24) (see Figure 5). The study is situated within two paradigms an interpretive and constructivist (Denzin & Lincoln, 1998; Hantrais, 2009:57-59).

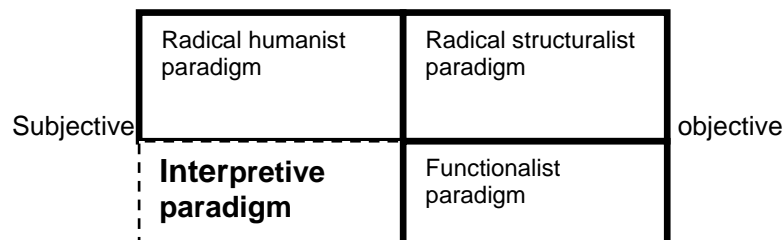


Figure 6: Burrell and Morgan's four social paradigms on organisation theory (Burrell and Morgan, 1979).

The interpretive aspect of the study will focus on understanding and interpreting the process of small-scale vegetable tanning process and how it can contribute to sustainable economic development. The patterns and meaning of the actions will weave human experience into a coherent whole. Logic will be used to capture the patterns which will be interpreted with great diligence for meaning (Geertz, 1973; Mlitwa & van Belle, 2010). The interpretivist approach makes observations of subjects, and seldom give a full explanation of actions but, can give account of what the researcher has done and why they have done it through seeking better ways of making the experience understandable (Denzin & Lincoln, 1998:21).

The researcher will use substantive form of theory to formal theory through comparison of data from different areas and literature in order to develop logical-deductive thinking. This means the researcher has a firm basis in reality that is important and meaningful to the study, which is the one of the importance of local experiences and practices to promote economic development (Glaser & Strauss, 1967).

### **Ontological Standpoint**

Small-scale manufacturing systems make reference to local knowledge and use tacit knowledge for the development of communities in which they operate. The communities that the study will focus on are the forerunners for small-scale agro-processing value adding manufacturing systems that have been employed for generations. These are the systems that are currently not being explored by the South African policy makers.

### **Epistemological Standpoint**

The researcher will use ethnographic qualitative method based on assumptions that small-scale production systems is based on the connectivity of the system to local knowledge of materials and availability of resources. The ethnographical aspect will look at the links to the social unit, individual unit, production methods, social structure, meaning making, cybernetics looks at units that are interconnected as beings of a larger whole (Hoffman, 1981; Keeny,1983; Marshall, 1996:523). The collective responsively made out social unit, individual unit, LK, culture, social structure and meaning (Dei, 2002). In order to utilize African IK, it is important to interrogate the know-how in relation to their application to contemporary living.

Additionally, peoples' engagement with local knowledge in relation to the context (Dei, 1993).

## **PROPOSED DATA COLLECTION TECHNIQUES**

The methodological process of inquiry for this study hopes to increase knowledge in the area where less earlier studies have left a gap with regard to the production of vegetable tanned leather in South Africa and small-scale vegetable tanning; as well the contribution of local knowledge to economic development activities that foster environmental awareness and create opportunities within the community, hence the use of exploratory method of the enquiry (Cresswell, Ebersohn, Eloff, Ferreira, ivankova, Jansen, Nieuwenhuis, Pietersen, Plano Clark, & van der Westhuizen, 2007). The researcher hopes to gain insights and familiarity and to synthesise existing knowledge and investigate existing situation to investigate, analyse issues related to sustainable production processes to construct a new system and generate new knowledge (Sekeran, 1992:4).

### **Structured interview**

Interviews will be used as the primary tool of data collection. Structured interviews will allow the researcher to examine the level of understanding the respondents have about the sustainable development of vegetable tanning and its potential contribution to the local economy (Yates, 1994). The interview method will also be used to gauge how respondents feel about CE through in-depth interviews (Campion, Campion & Hudson, 1994). At the same time the method will be used to identify respondent's whose views might be explored in more detail (Curzon, 1995; Eder & Harris, 1999).

### **Semi-structured interviews**

Semi-structured interviews will be used to interview small-scale leather tanners involved in the vegetable tanning in the three countries being researched (Denzin & Lincoln, 1998). The semi-structured method is flexible and uses loose framework so as to accommodate any circumstances and therefore will be suitable for interviewing leather tanners in rural areas who work in an informal environment. The line of enquiry for the interviews is semi-structure, the process allows for probing and clarification of answers and requires the researcher to attentive to the responses of the respondents (Cresswell et al., 2007).

## **Observations**

Observations will be used as secondary method of data collection. Observations will allow the researcher to absorb and note details, action and subtleties of the field environment (Pretzik, 1994; Campell et al., 1966). Unstructured observations will be used to understand and interpret the small-scale vegetable tanning processing and will provide insight into interactions between the individual leather producers with other producers and the community. The observations will also help illustrate the whole production process and capture the context and finally, to find out what informs the influence of the physical environment (Mulhall, 2003; Cresswell, Ebersohn, Eloff, Ferreira, Ivankova, Jansen, Nieuwenhuis, Pietersen, Plano Clark, & van der Westhuizen, 2007).

## **Population**

The population consists of rural vegetable tanner's who have been producing leather to supply local footwear and fashion industry in Botswana, and Italy. The researcher will also consult policy development bodies such as the Department of Trade and Industry (DTI), and the Department of Science and Technology (DST) as the bodies that are driving the knowledge-based economic development. The study will consist of three different crafters from each country.

## **Sampling techniques**

Purposive sampling will be used because there is a set criterion for the study which is to find and record sustainable small-scale vegetable tanning process to see how local knowledge is applied and how the process can contribute to the knowledge based economic development in the case of South Africa (Creswell et al., 2007).

## **Units of analysis sampling design**

Tanning process, Small-scale vegetable tanning industry, Equipment and available resources, Leather producers and their social dynamics. The constructivist thinking through the coding process to identify emerging characteristics and themes will be used to analyse the large quantities of data that will be collected (Leedy & Armrod, 2005). The themes will be used to stimulate interpretations for the creation of pattern of interpretation of data (Alvesson & Skoldberg, 2000). This strategy is more than

simple demographic stratification of epidemiological studies hence, a broad range of subject will be covered to achieve maximum variation of underlying basic actions and cognitions (Miles & Hubberman, 1994).

### **DELINEATION OF THE RESEARCH**

This study will only focus on best practice in vegetable tanning process in Italy. These are communities that have been involved in the production of vegetable tanned leather for generations. Because of the long standing tradition of leather production using local knowledge and expertise, this makes them the apparent case for this study. This paper is based on secondary data from literature sources such as books, journal articles and other publications.

### **THE POTENTIAL CONTRIBUTION OF THE RESEARCH**

Very little research is being done on vegetable tanning in developing countries like South Africa as a possible form of economic participation based on locally available resources. This study wants to contribute towards promoting local small-scale vegetable tanning with the possibility of contribution to sustainable production systems, environmental sustainability, economic development, human development and innovation to achieve the goal of knowledge based economy as stipulated in the Industrial Policy IPAP. Sustainability is about finding locally relevant solutions by incorporation local knowledge and expertise, which is more in line with the ecological concept. The study will possibly contribute towards Sustainable Development of local communities including those in rural areas, open opportunities to promote societal influences embedded in IKS for sustainable development to influence diversity of community relevant innovations.

### **References**

- Burrell, G. & Morgan, G. 1979. Sociological paradigms and organisational analysis: Elements of the sociology of corporate life. London: Heinemann.
- Campell, T., Schwart, R.D., & Sechrest L. 1966. Unobstrusive measure: nonreactive research in social sciences. American educational research association. 3(4): 17-319
- Campion, M.A., Campion, J.E. & Hudson, J.P. 1994. Structured interviewing: a note on incremental validity and alternation question types. *Journal of applied psychology*. 79: 998-1002

Churchward, P.J. 2009. Benchmarking methodology 8 steps to successful benchmarking. E-service expert.com [http://www.e-service-expert.com/e-service\\_Computers\\_and\\_Internet.html](http://www.e-service-expert.com/e-service_Computers_and_Internet.html) [Accessed July 21 2013].

Cresswell, J.W., Ebersohn, L., Eloff, I., Ferreira, R., Ivankova, N.V., Jansen, J.D., Niewnhuis, J. Pietersen, J., Plano Clark, V.L. & van der Westhuizen, C. 2007. First steps in research. Mareer, K. ed. Pretoria: van Schalk.

Department of Arts and Culture, 2011. Mzantsi's golden economy: contribution of the arts, culture and heritage sector to the new growth path. Pretoria. <http://www.info.gov.za/view/DownloadFileAction?id=146493> [Accessed July 18 2013]

Curzon, S.C. 1995. Managing interview: a how-to-manual for hiring staff. New York: Neal-Schuman publishers, Inc.

Department of Agriculture, Forestry & Fisheries, 2010. A profile of the South African hides, skins, and leather market value chain. Pretoria

Department of Agriculture, Forestry, & Fisheries. 2011. A profile of the South African hides, skins and leather market value chain 2011. Pretoria.

Department of Agriculture, Forestry, & Fisheries, 2012. Quarterly economic review of the agro-processing industry in South Africa January –March 2012. Department of Agriculture Forestry and Fisheries, 1 (1):1-38

Department of Environmental Affairs and Tourism, 2005. South Africa country report fourth session of the United Nations Commission on Sustainable Development. Johannesburg

Department of Environmental Affairs and Tourism, 2008. People – planet – prosperity: A national framework for sustainable development in South Africa. Johannesburg.

Dei, G. 1993. Sustainable development in the African context: revisiting some theoretical and methodological issues. *African Development*. 18 (2): 97-110

Dei, G, J.S. 2002. Rethinking the role Indigenous Knowledge in the academy. *International Journal of Inclusive Education*, 4 (2): 111-132

Denzin, N.K. & Lincoln, Y. S. 1998. Collecting and interpreting qualitative materials. California: Thousand Oaks: Sage publications.

Devey, R. Skinner, C. & Valodia, I. 2006. Second best? Trends and linkages in the informal economy in South Africa. In the Development Policy Research Unit and Trade and Industrial Policy Strategies annual conference on accelerated and shared growth in South Africa. Johannesburg: Development Policy Research Unit & TIPS. 1-22

Department of Science & Technology, 2008. Innovation towards a knowledge-based economy, ten –year plan for South Africa 2008-2018. Pretoria

The Department of Trade and Industry, 2013. Industrial Policy Action Plan. Pretoria

Eder, R.W. & Harris, M.M. 1999. Employment interview research, historical update and introduction: The employment interview handbook . eds Eder, R.W., CA : Sage publications, Thousand Oaks.

Engestrom, Y. 2000. Activity theory as a framework for analysing and redesigning work. *Ergonomics*, 43(7): 960-74

- Foot, K.A. 2001. Cultural- Historical theory as practical theory illuminating the development of a conflict monitoring network. *Organisation*, 11(1): 56-83
- Gebrehiwet, Y. 2012. Economic profile of the agro-processing industry in South Africa: 1970-2010. Pretoria.
- Geertz, C. 1973. Interpretation of cultures. New York: Basic books.
- Glaser, B.G. & Strauss, A.L. 1967. The discovery of grounded theory: strategies for qualitative research. Chicago: Aldine
- Gruenewald, D. A. 2003. The best of both world: a critical pedagogy of place. *Educational researcher*. 32(4): 3-12. Available at: <http://edr.sagepub.com/cji/10.3102/002/0013189X032004003>. [Accessed March 13, 2012]
- Gujirathi, A.M. & Babu, B.V. 2007. Environmentally friendly products from black wattle. 19(1):37-44
- Hansen, T. 2010. The Danish fabricated metal industry: A competitive medium-low-tech industry in a high-wage country. *Danish journal of geography*. 110(1): 65-80
- Hantrais, L. 2009. International comparative research : theory, methods, and practice. Basingstoke and New York: Palgrave MacMillan and St Martins press.
- Hoffman, L. 1981. Foundations of family therapy. New York: Basic books
- Hözl, W. 2009. Is the Research & Development behaviour of fast-growing SMEs different. Evidence from CIA III data for 16 countries. *Small Business Economics*. 33(1): 59-75. Available at: <http://link.springer.com/10.1007/s11187-009-9182-x> [Accessed June 30, 2013].
- Hooghiemstra, C. 2005. Delisting hazardous waste produced in a tannery. Masters thesis: University of Johannesburg.
- Jonassen, D.H. & Rohrer-Murphy, L. 1999. Activity theory as a framework for designing constructivist learning environment. *Educational technology, Research and Development*. 47(1):61-79.
- Keeny, B.P. 1983. Aesthetics of change. New York: The Guilford press
- Koszalka, T.A. & Wu, C.P. 2004. A cultural historical activity theory (CHAT) analysis of technology integration: Case study of two teachers. Chicago. Available at: <http://www.tlu.ee/~kpata/haridustehnnoogiaTLU/technologyintegration.pdf> [Accessed June 19, 2013].
- Kucera, D. Roncolato, L. & Von Uexkull, E. 2012. Trade contraction and employment in India and South Africa during the global crisis. *World development*. 40(6): 1122-1134. Available at: [http://ac.els-cdn.com/S030570X11002877/1-s2.0-S030570X11002877-main.pdf?\\_tid=25111b9e-dc04-11e2-a78d-00000aab0f27&acdnat=1371992293\\_5ef6c80f66537df2dee94df945ed2735](http://ac.els-cdn.com/S030570X11002877/1-s2.0-S030570X11002877-main.pdf?_tid=25111b9e-dc04-11e2-a78d-00000aab0f27&acdnat=1371992293_5ef6c80f66537df2dee94df945ed2735)
- Kuutti, K. 1991. Computer interaction research. *English*. P9-22
- Loveman, G. & Sengenberger, W. 1991. The re-emergence of small-scale production: An international comparison. *Small business economics*. 3: 1-37



- Mahdi, H. Palmina, K. & Covington, D. 2009. Potential of vegetable tanning materials and basic aluminium sulphate in the Sudanese industry. *Journal of engineering science and technology*. 4(1):20-31
- Marshall, M.N. 1996. Sampling for qualitative research. *Family practices*. 13(6): 522-5. Available at: <http://www.ncbi.nlm.nih.gov/pubmed/9023528> [Accessed June 21, 2013].
- Martin, B.R.L. & Osberg, S. 2007. Social entrepreneurship: the case for definition. *Stanford social innovation review*. Spring (2007):27-39.
- Miles, M.B & Huberman, M. 1994. Qualitative data analysis: An expanded sourcebook. 2<sup>nd</sup> edition. United Kingdom: Sage publications, Thousand Oaks.
- McGray, D., Shackleton, C.M., Fourie, S., Gambiza, J., Shackleton, S.E. & Fabricius, C.F. 2005. A rapid assessment of the effects of invasive species on human livelihoods, especially on the rural. Grahamstown. Available at: <http://www.gisp.org/publications/reports/Rhodesreport.pdf>
- Mlitwa, N. & van Belle, J.B. 2010. A proposed interpretivist framework to research the adoption of learning management systems in universities. *Communications of the IBIMA* 2010(2010): 1-11. Available at: <http://www.ibimapublishing.com/journals/CIBIMA/2010/574872/574872.html> [Accessed May 20, 2012].
- Moore, D. Carolina, S. 2010. The availability of informal micro-enterprises in South Africa. *In conference on entrepreneurship*. New York: Whiteman school of management, Syracuse university. 1-34
- Morgan, J.P. 2012. The small and medium enterprise (SME) sector. –catalyst for growth in South Africa. Johannesburg.
- Mowat, S.P. 1996. In controlling pollution in the South African leather industry. Masters thesis. Rhodes University.
- Mulhall, A. 2003. In the field: Notes, on observation in qualitative research. *Advanced journal of nursing*. 41(3): 306-313 [http://www.angelfire.com/force/shu\\_cohort\\_viii/images/UnstrucObservationpaper.pdf](http://www.angelfire.com/force/shu_cohort_viii/images/UnstrucObservationpaper.pdf) [Accessed March 21, 2012].
- Munyai, K. 2011. Sustainable indigenous leather production process: a case of Lukanji home-based producers. Masters thesis. Faculty of Informatics and Design. Cape Peninsula University of Technology
- Nardi, B. 1996. Context and consciousness: activity theory and human computer interaction. Eds Nardi, B.A. Cambridge, MIT Press: England
- United Nations, 2010. Food and agriculture organisation statistics year books.
- Neneh, B.N. 2011. The impact of entrepreneurial characteristics and business practices on the long term survival of small and medium enterprises (SMEs). Masters thesis. University of Free State.
- Neneh, B.N. & van Zyl, J. 2012. Towards establishing long term surviving small and medium enterprises (SMEs) in South Africa: an entrepreneurial approach. *African journal of business management*. 6(28):8327-8343

- Petersen, M.M. 2011. Informal employment in South Africa: a critical assessment of its definition. Masters thesis. Department of economics. University of the Western Cape
- Prakash, A. & Stigler, M. 2012. Food and agriculture organisational statistical year book 2012 year world food and agriculture. In FAO statistics year book. Rome. United Nations Food and Agriculture Organisation. 198-213
- Pretzik, U. 1994. Observational methods and strategies. *Nurse researcher*. 2(2): 23-21
- Raymond, L. & St Pierre, J. 2010. Technovation R& D as a determinant of innovation in manufacturing SMEs: An attempt at empirical clarification. *Elsevier, innovation*.30(2010):48-56
- Romer, F.H. Underwood, N. Senekal, N. D. Bonet, S.L., Dier, M.J., Reid, D.G. & Van der Westhuizen, J.H. 2011. Tannin fingerprinting in vegetable tanned leather by solid state NMR spectroscopy and comparison with leathers tanned by other processes. *Molecules*. Basel, Switzerland.16(2):1240-52
- Statistics South Africa. 2012. Statistic release. Pretoria. Available at: <http://www.statssa.gov.za/Publications/P03014/P030142011.pdf> [Accessed August 19, 2013].
- SBP. 2013. Headline report of SBPs SMEs growth index TM easier, harder for small business in South Africa. Johannesburg. South Africa.
- Schneider, C. & Reinilde, V. 2010. On young innovation companies: why they matter and how (not) to policy support them. *Industrial corporate change*. 19(4): 969-1007
- Sekeran, U. 1992. *Research methods for business*. 2<sup>nd</sup> edition. Wiley
- Shackleton, C.M., McGarry, D., Fourie, S., Gambiza, J., Shackleton, S. E. & Fabricius, C. 2006. Assessing the Effects of Invasive Alien Species on Rural Livelihoods: Case Examples and a Framework from South Africa. *Human ecology*. 35(1): 113-127.
- Stam, E. & Wennberg, K. 2009. The roles of R & D in new firm growth. *Small Business Economics*. 33(1): 77-89
- Toit, A. & Neves, D. 2007. In search of South Africa's second economy: chronic poverty, economic marginalisation and adverse incorporation in Mt Frere and Khayelitsha. Chronic poverty research centre. Programme for Land and Agrarian Studies, University of the Western Cape. 1-43
- United Nations Industrial Development Organisations. 2003. A blue print for the African leather industry. Tunisia.
- Van Rensberg, P. 1971. A new approach to rural development. *Society*. 3(1971): 201-215
- Yates, M. 1994. Hiring the best: a manager's guide to effective interviewing. Maastricht, Netherlands: Holbrook.
- Zurita, G. Nussbaum, M. 2007. Framework mobile CSCL 1 a conceptual framework based on activity theory for mobile CSCL. *British journal of educational technology*. 38(2): 211-235