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Mello, Madimetja Antony

2018
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Sustainable urban farming in Johannesburg, South Africa

Madimetja Antony Mello

0718211E

A research article submitted to the Faculty of Commerce, Law and Management, University of the Witwatersrand, in partial fulfilment of the requirements for the degree of Master of Business Administration

Johannesburg, 2018

Protocol number: WBS/BA0718211E/805

DECLARATION

I, Madimetja Antony Mello, declare that this research article is my own work except as indicated in the references and acknowledgements. It is submitted in partial fulfilment of the requirements for the degree of Master of Business Administration in the Graduate School of Business Administration, University of the Witwatersrand, Johannesburg. It has not been submitted before for any degree or examination in this or any other university.



Madimetja Antony Mello

Signed at Parktown

On the 06 day of February 2019

ACKNOWLEDGEMENTS

To my mother and siblings who provided me with moral and emotional support in my journey to writing this paper and completing my qualification.

I am grateful to my thesis supervisor Professor Michael Rudolph for his patience, guidance, insights and expertise throughout the process of compiling this paper.

SUPPLEMENTARY INFORMATION

Nominated journal: Journal of Social Entrepreneurship

Supervisor / Co-author: Professor Michael Rudolph

Word count †: 15 040

ABSTRACT

Food insecurity remains a major issue for many of the developing countries in the world including south Africa. This is evidenced by the number of United Nations Sustainable Development Goals (SDGs) that focus on improving global food security.

Johannesburg has seen a large influx of people from rural areas who flood to the city in search of work and other opportunities to improve their quality of life. Growing population numbers in the city have put the food system, and more specifically food security, under increased pressure. Johannesburg is highly urbanised with most of the land used for industrial and human settlement developments. With an increasing need to grow food close to where people live and work it is becoming very important for the development of alternative farming methods for the urban context.

Public and private entities have made efforts to establish urban farming initiatives in the city. However, many of these initiatives fail to deliver the desired outcomes because they do not take into consideration the complexities involved with setting up initiatives to address food insecurity. This study was conducted with the aim of developing a sustainable social entrepreneurship model for the establishment of urban farming initiatives in Johannesburg. A review of relevant literature and thereafter conducting interviews with subject matter experts several strategic and operational challenges to ensure the successful implementation of these initiatives were investigated.

The findings highlighted several key challenges which limited and hampered the ability of urban smallholder farmers to ensure the financial viability and sustainability of their farming initiatives. The results confirmed many of the conclusions of the literature studied. The main identified factors were; limited accessibility to farming land, markets, funding and most importantly knowledge and information regarding setting up and effectively and efficiently managing small agri-businesses.

One of the outcomes of this study is a proposed social entrepreneurship model that defines an alternative way of thinking about social initiatives. The focus is both on the social impact and the profitability of the business activities. Further work needs to be done to develop an enabling environment for these initiatives to flourish. This study is one of several which will trigger a much-needed shift in thinking and approach to urban agriculture to effectively benefit and transform society.

Keywords: Social entrepreneurship, urban farming, sustainable, food security

Introduction

The key outcome is a model for a collaborative urban farming initiative to drive social and economic transformation, specifically through increased food security, social cohesion and income generation. This entrepreneurship project aims to present a viable and sustainable business case for the widespread establishment of small-scale fresh produce farms in urban Johannesburg communities. This paper reviews current literature on social entrepreneurship and the relevant management theories. This is followed by the research methodology, results and discussion. Finally, it details recommendations for the development of a sustainable urban farming business model.

It is estimated that more than fifty percent of Africa's population will live in urban areas by the year 2030 (Crush, Hovorka, & Tevera, 2011). Johannesburg, in particular, has seen sharp increases in people migrating from rural South Africa, the southern African region and the rest of the African continent to the metropolitan area, with the region's population estimated to be in the top 15 in the world (De Wet, Patel, Korth, & Forrester, 2008; Rudolph, Kroll, Ruysenaar, & Dlamini, 2012). Most people make this transition because of the disparities in economic and employment opportunities between rural and urban areas of the country (Turok, 2012). Rogerson (1996) found that the accelerated speed of rural-urban migration, high population growth rates and drought were contributing factors to the shift in the geography of poverty from rural areas to the cities, putting pressure on urban areas to absorb and provide for more and more poor communities.

According to a Statistics South Africa (2017) report (2017) on poverty trends in the country, the number of people who experience poverty (measured by headcount), how far these people are from the poverty line (measured by the poverty gap) and the extent to which households experience poverty (measured by poverty severity) have all increased between 2011 and 2015. This observation is not surprising since most of the urban population rely heavily on purchasing food but with increases in food prices and unemployment this has led to reduced consumer buying power. As a result, food insecurity also increased which ultimately has a detrimental effect on nutrition and health (FAO, 2017b).

In the past agriculture was one of the distinguishing characteristics between urban and rural settlements. However, evidence dating back to the earliest times suggests urban agriculture has been a source of supply for food to city populations (Tambwe, Rudolph, & Greenstein, 2011). According to Crush et al. (2011), no significant food production happens in urban

communities in the Southern African Development Community (SADC) region with most households accessing food through supermarkets and the informal sector. The dominance of the agricultural supply chain by large commercial farms is one of the main reasons only a few small urban farmers are able to generate an income from the sale of produce (Crush & Frayne, 2010; Crush et al., 2011).

Countries around the world are gradually beginning to recognise the potential of urban agriculture as a policy strategy to address the issue of food insecurity affecting many poor households in urban areas (Magidimisha, Chipungu, & Awuorh-Hayangah, 2016). However, many of the current interventions implemented by the South African government to try curb urban food insecurity have been ineffective because they have focused on urban agriculture in isolation without due consideration of the role of urban agriculture as a part of the wider complex food system (Battersby, Haysom, Marshak, Kroll, & Tawodzera, 2015).

Using entrepreneurial concepts to address social issues and sustainability challenges has become increasingly popular (Hossain, Saleh, & Drennan, 2017). This notion of creating social and economic wealth is known as social entrepreneurship (Zahra, Gedajlovic, Neubaum, & Shulman, 2009). According to ZA ZEN Consulting (2016), entrepreneurship has become the focus of many countries worldwide to leverage economic growth. In the African context it has been proven that entrepreneurship can play a big role on employment and economic growth (ZA ZEN Consulting, 2016).

This research project will aim to build on previous assumptions on how to tackle the issue of urban food insecurity and examine several different factors necessary for the development of an alternative business enterprise model while simultaneously addressing a more environment friendly approach to urban agricultural growth to ensure the sustainability and efficacy of food production and productivity.

The Bill of Rights, as stated in the South African constitution, enshrines the right of every citizen to have access to healthcare, sufficient food, water and social security (Republic of South Africa, 1996). According to the United Nations Development Programme (2018), global extreme hunger and malnutrition has more than halved over the past two decades. However, malnutrition and hunger remain some of the biggest developmental barriers in many developing countries including South Africa (Battersby, 2011; FAO, 2017c; United Nations Development Programme, 2018). In line with the United Nations Sustainable Development Goals (SDGs) 2030 target to end all forms of hunger and malnutrition, the unmet social need that this project aims to address can be summarised as the increasing food insecurity within communities in Johannesburg.

The eradication of food insecurity in urban areas is a complex topic involving more than making food available (Grobler, 2016). Some of the critical factors necessary to achieve the goal of a sustainable urban farming business model will be investigated and supported by existing literature, specifically:

- adoption of new strategies such as climate-smart agriculture and the incorporation of technology to ensure resilience and consistent crop quality and yields,
- development of adequate funding models to allow for the successful implementation of the project and future project extensions,
- scalability of the project; ensuring fresh produce is made easily accessible to those households that need it the most while maintain profitability of the project,
- creation of meaningful employment to ensure long-term retention of skilled labour,
- coherent coordination of efforts between multiple stakeholder groups including national, provincial and local government, communities, the formal and informal business sector and other non-government institutions,
- systematic drivers of food insecurity, specifically looking at issues such as urban geography (socio-spatial issues), land tenure insecurity, perceptions of poverty, supply chain regulation and government policies,

The only delimitation considered for the purposes of this project urban farming only relates to fresh produce farming, mainly crops and herbs.

Definition of terms

Agroecology: The application of ecological concepts and principles to design and management of sustainable agroecosystems (Francis et al., 2003).

Co-operative: A business where a group of people get together voluntary to address their common needs (Companies and Intellectual Property Commission, 2018).

Food Security: A situation that exists when all people, at all times, have physical, social and economic access to sufficient, safe and nutritious food that meets their dietary needs and food preferences for an active and healthy life (FAO, 1996).

Permaculture: An integral system of design based on direct observation of nature, learning from traditional knowledge and the findings of modern science which simultaneously embodies a philosophy of positive action and grassroots education aiming to restructure society by returning control of resources for living: food, water, shelter and the means of livelihood, to ordinary people in their communities (Hathaway, 2016).

Social Enterprise: Any private activity conducted in the public interest, organised with an entrepreneurial strategy, but whose main purpose is not the maximisation of profit but the attainment of certain economic and social goals, and which has the capacity for bringing innovative solutions to the problems of social exclusion and unemployment (OECD Publishing, 1999).

Assumptions

- It is assumed that research done by global organisations such as the United Nations, World Bank, UNICEF etc. is applicable to the South African context.
- The theories and concepts of urban farming and social entrepreneurship investigated and presented in this paper are assumed to be adaptable to different contexts and replicable across different urban communities.

Literature Review

This section of the paper aims to critically review relevant local and international literature and prior research that currently exists and applying it to the topic being investigated in this paper. The state of food security in Johannesburg will be explored first as this is the basis for the unmet social need. This is followed by the examination of factors that have made previously implemented interventions to address the issue of food security ineffective. Then literature on building a sustainable urban farming business model is investigated. Finally, entrepreneurship is considered as a tool to build sustainable social enterprises.

Status of food security

Several studies have been commissioned and done by South African public and private institutions to investigate the extent of poverty and food insecurity in the country. One such study conducted by the University of Witwatersrand's Health Promotion Unit between 2008 and 2009 on the urban household food security in Johannesburg reported that the overall 27% of households were severely food insecure, 15% were moderately food insecure and 44% were food secure (Rudolph et al., 2012). De Wet et al. (2008) produced a similar report which found 27% of households to be food secure while 41% and 26% of households were moderately or severely food insecure respectively. The City of Johannesburg 2017 Food Security Survey is the most recent of these studies and one of the key findings of 37% of the

wider Johannesburg population being severely food insecure is consistent with those of the previous studies (City of Johannesburg, 2017).

The 2017 Food and Agriculture Organization of the United Nations (FAO) report on food security and nutrition in the world highlights that the world hunger and food insecurity numbers are on the rise after a prolonged period of decline (FAO, IFAD, UNICEF, WFP, & WHO, 2017). Increasing urban population numbers are often reported to be one of the key factors that have a direct influence on food security which in turn has a knock on effect on nutrition (Fan, Cho, & Rue, 2017). Urban lifestyles, that are focused on convenience, give rise to a greater demand for energy dense food sources in the form of processed and prepared foods which has seen an increase in the intake of salt, fats, oil and sugars resulting in an increase in the prevalence of heart disease, diabetes and other diet related diseases (Fan et al., 2017).

This shift in diet is linked with the rise in the triple burden of malnutrition (hunger, undernutrition and overnutrition), creating a cascade of individual and societal problems (International Food Policy Research Institute, 2016). One of the gravest effects of malnutrition is childhood stunting which is known to have long-term ramifications for the health, attainment of schooling, economic development, prosperity and possibilities to escape poverty of stunted children as adults (Shekar, Kakletek, Eberwein, & Walters, 2017).

Why current interventions have not been effective

The internationally recognised definition of food security as referred to in this study alludes to four distinct dimensions of food security, namely “food availability, economic and physical access to food, food utilisation and stability over time” (FAO, 1996). It is important to have a broad view of food security that looks beyond the availability of food, specifically in the South African context where a large portion of the population is either unemployed, lives in poverty or both and households are under severe pressure to meet their basic needs (Labadarios et al., 2011).

Despite the increased recognition that urban agriculture can be used as a strategic policy tool to address food insecurity in urban areas, extensive research, spanning several decades, on the potential of urban agriculture as a food production source for households in African cities has produced varied conclusions (Crush et al., 2011; Magidimisha et al., 2016). This can largely be attributed to the way in which countries such as South Africa have implement strategies to try curb urban food insecurity in isolation without due consideration of the role of urban agriculture as a part of the wider complex food system (Battersby et al., 2015). Brown, Nuberg, and Llewellyn (2017) note that efforts to bring about changes to the African

smallholder farmer landscape have been met with negative evaluations about the feasibility of interventions aiming to address household resources because access to the necessary resources (financial, physical, human and information) is restricted at community and institutional level.

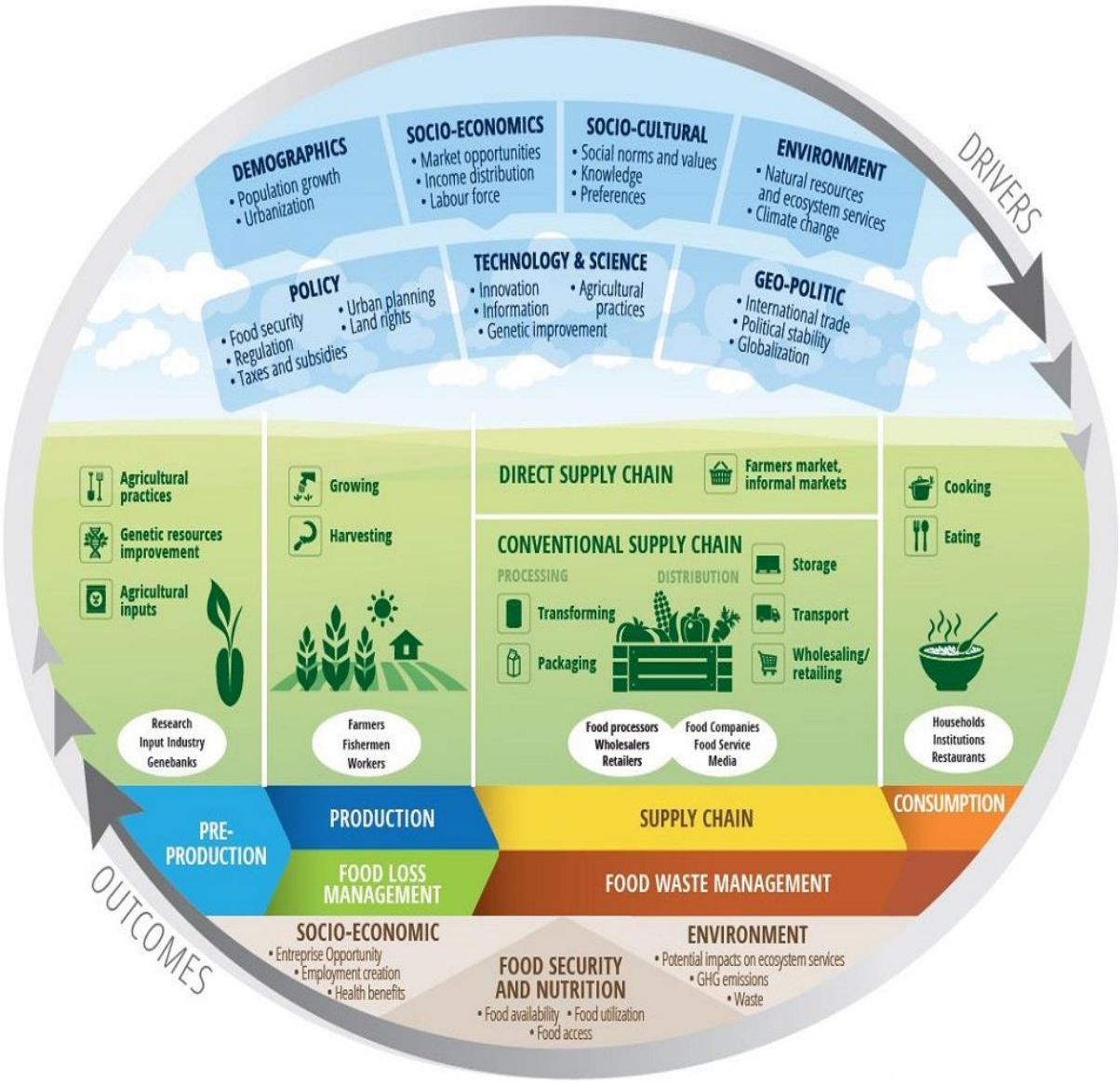
Achieving transformation of existing food systems towards triple-bottom-line sustainability in all three aspects (economic, social and environmental) requires a comprehensive understanding of the essential relationship between culture and the environment that was the cornerstone of establishing agricultural systems (Gliessman, 2013).

Sustainable Urban Agriculture

The World Wide Fund for Nature (WWF) recognises that climate change is becoming an increasingly inevitable phenomenon that will have adverse effects on the supply of food, energy and water (Carter & Gulati, 2014). Global food and agricultural systems already under pressure as a result of climate change, environmental degradation and diversion of land and other natural resources to non-agricultural activities have come under increased pressure as a result of rapid urbanisation and population growth (Fan et al., 2017). To ensure food security and effectively support human development, increased investment and adoption of new strategies are necessary. Such strategies that include climate-smart agriculture are necessary to transform current agricultural systems. Thus, making them more sustainable and able to withstand the significant effects of increased agricultural production on the natural environment and climate change (FAO, 2017a). Figure 1 below illustrates the global food system with all its related to activities, actors, drivers, and outcomes, and their interactions (International Center for Tropical Agriculture, 2018).

In their study Carter and Gulati (2014) highlight that as a water scarce, arable land deprived and oil imports dependant country, South Africa could find itself in crisis should any one of the three systems collapse. This makes it more important that increases in food production not only by focusing on the current status but also on more sustainable ways to increase production to meet future demand (Yu & You, 2013). Francis et al. (2003) propose using agroecology as an innovative way to improve food systems through an interdisciplinary approach that encompasses ecological, economic and social dimensions. Agroecology integrates science, technology and social movements for social change and helps reconnect those who grow the food and those who consume it in a mutually beneficial relationship (Gliessman, 2013).

Figure 1. Representation of the global food system (International Center for Tropical Agriculture, 2018)



Permaculture is probably the most common form of agroecology practised today and extensive implementation of this method together with other agroecological principles has the potential to drastically reduce energy, pesticide, and freshwater utilisation while at the same time reversing soil degradation, capturing large amounts of carbon, promoting the biodiversity of agricultural systems, and sustaining human needs for healthy, nutritious food (Hathaway, 2016). Three broad ethics of permaculture provide a framework by which human behaviour can be driven to a culture of less energy and resource consumption. These are summarised as care for the earth (nurturing the soil, forests and water), care for people (looking after self, kin and the community) and fair share (limited consumption and reproduction, and redistribution of access) (Holmgren, 2007). Table 1 captures the twelve principles that

constitute a framework for permaculture design that may be implemented in varying ways according to the given context and also illustrates the diversity of permaculture thinking (Hathaway, 2016).

The concepts and principles of permaculture are the primary base upon which the urban farming initiative proposed in this project will be built. However, due consideration will be made for the potential use of other concepts and technological advances in the next phase of building a sustainable business model. One such concepts is vertical farming hydroponics, which according to Lowry (2015) has the potential to contribute to the development of urban agriculture in Johannesburg.

Table 1. Permaculture design principles (Hathaway, 2016)

Observe and interact: Design begins with prolonged and thoughtful observation of place.	**Design from patterns to details:** Use nature's patterns as templates for effective design.
Produce no waste: Recycle all waste as useful resources.	**Integrate rather than segregate:** Design with synergetic relationship in mind.
Obtain a yield: Ensure that the system can produce necessities in the most self-reliant manner possible.	**Catch and store energy, nutrients and water:** Collect energy and water while they are abundant and store them for times of need.
Apply self-regulation and accept feedback: Create appropriate negative feedback loops to maintain a healthy system balance.	**Use and value diversity:** Diversity increases resilience, making the system less vulnerable to failures.
Use and value renewable energy resources: Employ processes that regenerate soil; avoid external inputs.	**Use edges and value the marginal:** Harness the creativity from the interface of different zones.
Use small and slow solutions: Start small, experiment and use local resources. Smaller simpler solutions are easier to maintain than larger, more complex ones.	**Creatively use and respond to change:** Observe changes to ecological systems and intervene carefully at the right time and place.

Vertical farming

Vertical farms which are essentially greenhouses stacked on top of each other require a far smaller agricultural footprint than conventional farming, allowing the concept to be implemented just about anywhere including urban centres (Despommier, 2011). Other advantages of vertical farming include reduced effects of seasonality, protection of crops from extreme weather conditions, limited or no use of pesticides and herbicides, less water demand,

reduction in transport and refrigeration costs and job creation (Despommier, 2011; Knudsen et al., 2008; Molden, 2013).

Soilless systems

Hydroponics, aquaponics and aeroponics are the more commonly applied soil-less crop techniques in growth-controlled vertical farming environments. A hydroponic system allows crops to grow in a nutrient-rich media or solution without using soil (AlShrouf, 2017). Aquaponics is a subset of hydroponics, and it combines aquaculture and hydroponics in an integrated system that grows both fish and plants (AlShrouf, 2017). Aeroponics refers to the process of growing crops with their roots suspended in an air or mist nutrient rich environment (Chiipanthenga, Maliro, Demo, & Njoloma, 2012).

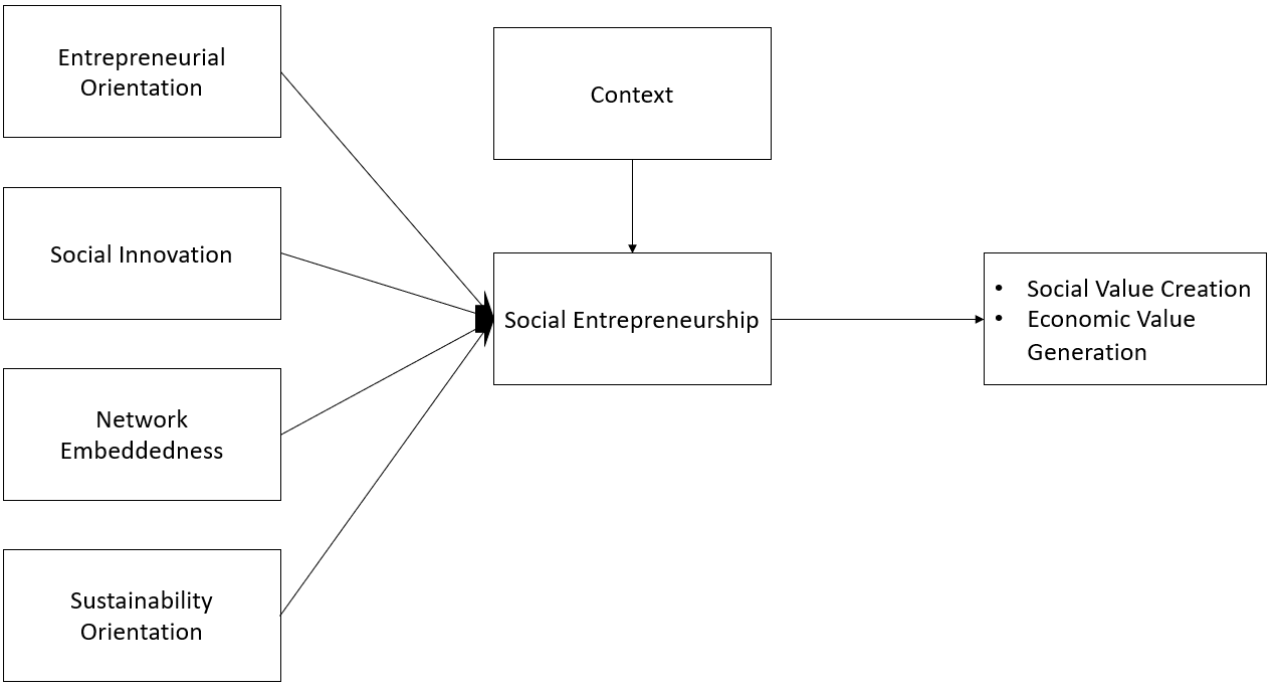
Given the advances in technology, there are no real technological difficulties standing in the way of developing an urban environment where local inhabitants produce the majority of their food (Despommier, 2011).

Entrepreneurship as a tool to build sustainable social enterprises

In the absence of adequate initiatives by the South African government to deal with social challenges, there has been a rise in the adoption of social entrepreneurship driven by political (social functions moving from public to private level), economic (reduction of public funding) and social forces (increasingly complex and sizeable problems) (Urban, 2008). Although social entrepreneurship has become an active concept in academic research, government policy and practice, there are still many varying definitions and conceptualisations with no coherent theoretical framework (Choi & Majumdar, 2014; Weerawardena & Mort, 2006). Hossain et al. (2017) provide a conceptual framework, as shown in

, which considers social entrepreneurship as the overall abstraction of key antecedents (i.e. entrepreneurial orientation, social innovation, network embeddedness and sustainability orientation) within a mediating environment (context) to achieve social and economic value.

Figure 2. Conceptual framework for social entrepreneurship (Hossain et al., 2017)



The business model canvas, developed by Osterwalder and Pigneur (2010), conceptualises how an organisation's business model creates, delivers and captures value. It consists of nine interconnected components (i.e. customer segments, customer relationships, value proposition, channels, key resources, key activities, partners, costs and revenues) and abstracts how these components are integrated to deliver value for customers and the organisation, and the relationships between them in the organisation and supply chain and stakeholder networks (Chesbrough, 2010).

Joyce and Paquin (2016) built on the existing economic business canvas model to develop a triple layered approach by adding the social layer, which considers the social stakeholders, and the environmental layer, which considers the lifecycle of the organisation. This multi-layered business model approach explicitly addresses the triple-bottom-line perspective of organisational sustainability through the integration of economic, environmental and social value creation (Joyce & Paquin, 2016).

Each of the components and functions of the multi-layered business model canvas will be further explored, unpacked and examined in the next phase of this project to gain critical insights and act as a bridge between high level strategies and the actions that need to be taken by the organisation to arrive at a suitable organisational business model for this project.

Founded in 2002, Little Green Number is an example of an example of a successful social enterprise set-up in Johannesburg. The company uses a community based micro manufacturing franchise ownership model to convert used advertising billboard posters, that otherwise would pose an environment risk, to create quality handbag products. Little Green Number have leveraged their business skills to positively impact the environment and achieve sustainable job creation (Little Green Number, 2018).

Resource-Based View Theory

The resource-based view (RBV) takes the position that an organisation derives its sustainable competitive advantage from the unique resources and capabilities in the organisation's control (Barney, Wright, & Ketchen Jr, 2001). This theory has been very influential in many of the existing strategic management literature and it posits that organisational growth is a function of the resource-based view of the organisation theory (Day & Jean-Denis, 2016). Assessing social entrepreneurship initiatives from this perspective acknowledges that resources and capabilities are crucial to scaling social innovation (Bloom & Smith, 2010). This approach is appropriate for the evaluation of social entrepreneurship initiatives in that it focuses on the entrepreneurial processes and resources within such initiatives, as opposed to quantifying the output from these processes (Meyskens, Robb–Post, Stamp, Carsrud, & Reynolds, 2010). Day and Jean-Denis (2016) present a theoretical framework that argues for a more integrated conception of social entrepreneurship that combines financial, social, human and political capital.

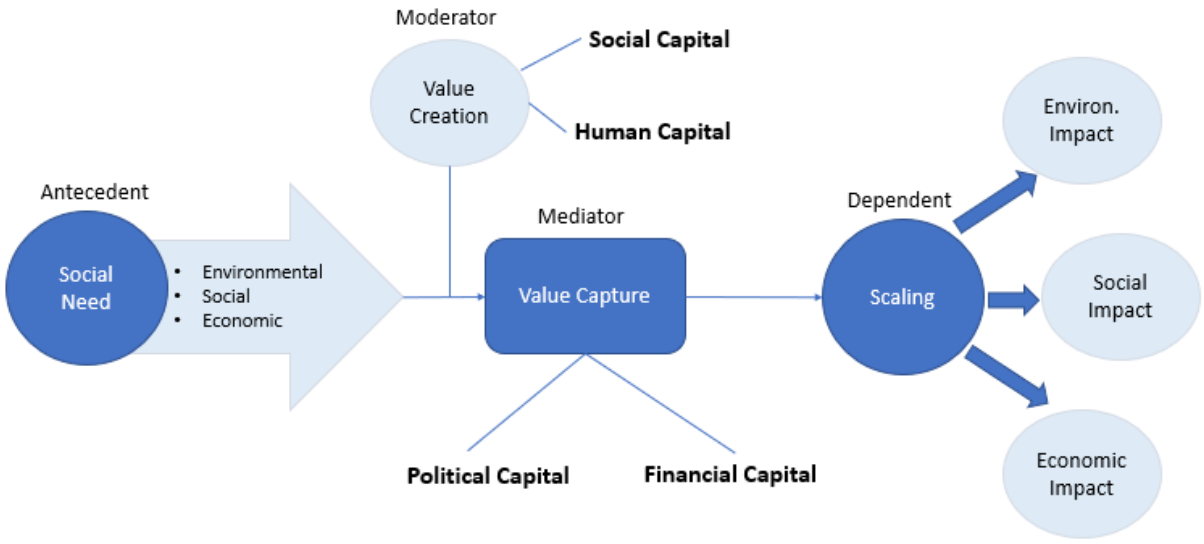


Figure 3: Relationship between Social Issues and Scaling of Social Entrepreneurship Initiatives (Day & Jean-Denis, 2016)

Stakeholder Theory

The underpinning ideology in stakeholder theory is that people voluntarily collaborate to create economic value to benefit all stakeholders (Harrison, Freeman, & Abreu, 2015). Stakeholders are defined as “any group or individual who can affect or are affected by the achievement of the organisation’s objectives” (Freeman, 2010). The ultimate objective of the organisation according to the stakeholder view, is to simultaneously create economic and social value (Minoja, 2012). The concept of social entrepreneurship continues to gain prominence, worldwide. Bearing this in mind, there needs to be an appreciation of the existing management theories, such as the resource-based view and stakeholder theory. Both these theories provide good theoretical frameworks that are applicable to this new way of doing business.

Conclusion of Literature Review

The literature reviewed above has given the background on the state of food security in Johannesburg as well as an indication of how the concept of permaculture and vertical farming technology can be used to achieve sustainable urban farming initiatives. The literature also highlights the potential for urban farmers to play a role in the alleviation of food insecurity and bring about social transformation in the city.

A conceptual framework for social entrepreneurship projects and other key entrepreneurial concepts provide the primary base upon which successful enterprises can be built. The resource-based view and stakeholder theories are also considered as key management theories that are applicable to the development of social enterprises.

Overall the literature provides some positive evidence that the widespread implementation of collaborative urban farming initiatives presents an ideal opportunity to have a direct impact on the marginalised urban populations. However, there are some strategic and operational challenges identified through the review of literature, that hinder the successful implementation of current urban farming initiatives. These factors and the lack of well-documented case studies of successful urban farming enterprises validates the need to investigate these issues further and attempt to develop a comprehensive urban farming business model.

Addressing the strategic and operational challenges

It was noted in the first section of this paper that the eradication of food insecurity in urban areas is a complex topic involving more than making food available (Grobler, 2016). Some of

the critical factors necessary to achieve the goal of a sustainable urban farming business model were investigated and addressed through the critical review of existing literature in the previous section. However, there are still aspects of the strategic and operational challenges that would need to be investigated and better understood to ensure the successful implementation of the project. These challenges, mentioned in the first section of this paper, are repeated here for completeness:

- adoption of new strategies such as climate-smart agriculture and the incorporation of technology to ensure resilience and consistent crop quality and yields,
- development of adequate funding models to allow for the successful implementation of the project and future project extensions,
- scalability of the project; ensuring fresh produce is made easily accessible to those households that need it the most while maintain profitability of the project,
- creation of meaningful employment to ensure long-term retention of skilled labour,
- coherent coordination of efforts between multiple stakeholder groups including national, provincial and local government, communities, the formal and informal business sector and other non-government institutions,
- systematic drivers of food insecurity, specifically looking at issues such as urban geography (socio-spatial issues), land tenure insecurity, perceptions of poverty, supply chain regulation and government policies.

No other study has been carried out in South Africa to explore the strategic and operational challenges regarding a sustainable social entrepreneurship model for urban farming in Johannesburg, South Africa. The aim of this study was to explore and examine factors necessary for an alternative business enterprise model while simultaneously addressing a more environment friendly and social development approach to urban agricultural growth to ensure the sustainability of food production and food security.

The objectives of the study were;

- To critically assess the strategic and operational challenges regarding a sustainable social enterprise model for urban farming in Johannesburg.
- To understand the current roles of all the relevant stakeholders and the functions/tasks they can potentially play in the social enterprise.
- To make recommendations, including detailed financial and operational considerations, for the development of a sustainable urban farming initiative.

Research methodology

For the purposes of this project the researcher assumed the position of the pragmatists. Pragmatism considers the philosophy adopted in a particular study as a continuum rather than a fixed positions (Saunders, Lewis, & Thornhill, 2009).

Merriam (1998) describes qualitative research as an all-encompassing term for several types of techniques that can be used to help researcher understand and explain social phenomena in its natural setting. Qualitative research is able to offer far deeper understanding of issues compared to quantitative studies conducted via variable-based correlations (Silverman, 2001). This is because the data collection for the qualitative methodology focuses on words instead of statistical analyses or quantification (Bryman, 2015). To develop a sustainable social enterprise business model, the complexity and interconnectedness of the issues that must be addressed needs to be understood. A qualitative approach is therefore best suited to this research study. This approach is expected to allow for a full investigation of the strategic and operational challenges of urban faming and to understand the current roles of all the relevant stakeholders and the functions they can play in establishing sustainable urban farming social enterprises in Johannesburg.

Primary Data Collection

The data for this project was primarily collected via unstructured individual face-to-face interviews. Interviews were conducted by asking probing open-ended questions with the aim of getting in-depth responses from interviewees based on their perceptions, experiences, feelings, opinions and knowledge (Patton, 2002). The discussions were steered towards a few pre-determined topics identified during the review of literature.

Purposive sampling was used to identify the most suitable interview candidates based on their knowledge relevant to the project (Bryman, 2015). To fully explore the critical issues identified for this study, a diverse group of interview candidates were selected from industry, academia, business and the public sector. This also presented an opportunity to explore the gaps in perceptions and opinions that exist between the different stakeholders. An initial list of twenty potential interview candidate profiles was drawn up. Individuals were contacted via email or telephonically to set up the interviews. Ten participants were interviewed. The main reasons the other ten candidates were not interviewed included the lack of responses to the requests for an interview, time limitations and lack of accessibility to suitable interview candidates. The list was modified depending on the response rate from potential respondents. Interviews were

conducted with ten respondents who availed themselves within the time framework for the study.

The interviewer explained the reasons for the research to the respondents before any of the interviews were conducted. Each candidate was informed that their participation in the study was entirely at their discretion and they would have the power to not answer questions that made them feel uncomfortable or even end the interview. The interviews were only conducted once consent had been received from the interviewee and a mutually suitable date, time and setting were decided, preferable in their natural work setting. The interview results were reported anonymously. Ethical clearance was received from the University of Witwatersrand Ethics Committee to ensure the research would be conducted in an ethical manner.

Table 2. List of Interview Respondents

Respondent Profile	Assigned number
Entrepreneurial development Specialist	1
Urban farm Manager	2
Farming training academy Chief Operating Officer	3
Strategic solutions consultancy Director	4
University Professor – Anthropology and Development Studies	5
Gauteng Department of Agriculture and Rural Development (GDARD)	6
Commercial bank agribusiness Business Development Manager	7
Agriculture expert with economic background	8
Agricultural Social Entrepreneur	9
Process energy and environmental technology Researcher	10

Limitations

- The number of interviews conducted was limited to ten, based on positive responses from the potential respondents invited to participate in the study. This presented the greatest limitation to this research study.
- Although the individuals interviewed were selected based on their knowledge on the research topic, the responses gathered were limited to the depth of knowledge of each individual respondent.

The credibility of any research study is underpinned by two central concepts: validity and reliability (Silverman, 2001). These two concepts were carefully evaluated during the research design process (Saunders et al., 2009).

Reliability is a measure of the repeatability of the research findings based on the data collection and analysis techniques used for the study (Bryman, 2015). Silverman (2001) emphasises the use of low-inference descriptors when reporting interview findings, which can be satisfied by recording all interviews and transcribing them accordingly. The interviews conducted for this study were all recorded and transcribed by the researcher to ensure the issue of reliability is adequately addressed.

The validity of the research refers to whether the findings are as they appear to be (Saunders et al., 2009). Traditional theory suggests validity can be established through techniques such as triangulation to determine the precise answer to the research question (Waller, Farquharson, & Dempsey, 2015). Waller et al. (2015) also note that for qualitative social research, contradictions and conflicts do not negate the validity of the findings but rather highlight the need for further investigations. Therefore, an important consideration in the research design for this study was allowing the participants to speak honestly and openly. Because the interviews were conducted individually, participants were able to make contributions without the fear of one participant contradicting another.

Results

The data collected from the individuals interviewed, is presented in the sections that follow. The findings are representative of the different perceptions and opinions that exist between the different stakeholder groups interviewed.

Challenges with the current business models

Respondent 1, the entrepreneurial development specialist, and Respondent 4, the strategic solutions consultancy's director, agreed that the conventional way of designing and structuring business models needs to change. Respondent 1 went on to comment that all African business models should have aspects of socio-economic development entrenched in them, and this way it is possible to achieve more than one outcome viz. profit through a single intervention. This point was further supported by Respondent 4 who mentioned that in the South African and African context, it is essential for business models to address social aspects, because businesses that attempt to operate without including social aspects may not survive. During the interview with Respondent 5, a university Professor in Anthropology and Development Studies, he mentioned that urban farming specifically has far more comprehensive benefits including nutrition, local economic development, social cohesion, water management and ecological services.

However, most of the key elements of the traditional business model are still required when setting up urban farming social enterprises. Respondent 2, the Manager of an urban farming initiative, noted that like any other business the main requirements for setting up a successful project included urban farming skills, the right location, funding and resources (such as water) and other inputs as well. According to Respondent 3, a farming training academy's Chief Operating Officer, the most important thing that any farm needs to be sustainable is for it to be run as a business. Respondent 1 added to this point by stating that all businesses need to be competitive and in order to achieve this they need to have strong business models. The businesses' first need is to develop products or services in response to the needs of the customers and their products and services must have excellence and relevance.

Respondent 8 provided insights into how their organisation has started to rethink their business models. They have, over the past two years, split everything they do into Agronomic and Economic activities. Respondent 8 also shared some other specific details about how their organisation has changed their business model which can be applied to other farmers:

- The area most urban farms have for farming is small and the investment per square meter is minimal. Therefore, the return per square meter is small. Because of this, they must become more conscientious to maximise yield. This can be done using inorganic techniques, such as using fertilisers or containment techniques.
- Farmers need to start carefully considering their overhead costs and calculate their inputs versus outputs per square meter as a standard. This has not been quantified yet, because up to nowadays farms have only operated at a basic level without the detailed business operating systems
- Respondent 8's organisation has started the process of accurate record keeping of finances, methodology of planting and labour. In this way everything can be quantified per square meter because the farm is small (only one hectare).
- The organisation has drafted a business plan that they use for projecting income and expenditure.
- Dependence on donor donations for the farm have been reduced to 10%. This is an indication that the farm is slowly moving to a production system that can sustain it as a business. This is particularly important considering the farm has a high human resources base, so most of the sales go towards paying salaries.

Systemic Challenges

Respondent 5 explained that the bigger picture is a system that accumulates gains in the retail sector because that is where the money goes. He further mentioned that this is a good reason

why small-scale farmers don't succeed because the small farmers are not selling into the retail sector, but they operate under the same conditions as large farmers. To support the last point, Respondent 1 suggested that one of the challenges in the South African context is that we operate all enterprises under the similar compliance framework and we need to start thinking how we create an enabling environment for small enterprises to establish themselves as viable businesses. The only way to get small farmers into the system, according to Respondent 5, is through systemic change. Thus, there is a need for different models of entry into the economy.

The difficulties of gaining entry to the market are highlighted by Respondents 8 and 9. They both noted that there is no real recognition of the differentiation in production methodologies for organic produce and the need to sell at a higher price. Respondent 8 further noted that because their space is not big enough to push volumes, their farms had to identify different complimentary systems that can ensure there is consistent production. Respondent 9 echoed these thoughts and suggested that a lot of support is required to ensure smallholder farmers grow consistent quality and quantity of produce. They also noted that there is also a large oversupply of certain varieties of produce in the market which limits profits and thus hinders the progress for smallholder farmers, especially when they try to enter the centralised markets.

Respondent 9 commented that the local distribution market needs to be developed and tailored more specifically for the townships where most people eat genetically modified food which can have health implications. Considering the direct link between health and organic agriculture it would be in national government’s best interest to support organic agriculture. Making organic food readily available for the township market at prices lower than retail but higher than wholesale price would make such produce more available and affordable.

Therefore, the community benefits because they get food at lower prices, but the farmer also benefits from the higher than wholesale prices. So, besides the benefit of human development and better health from the fresh food but in addition the money starts to circulate locally, networks and community capacity are built in the local area and production occurs locally which can then capture added value. Respondent 5 further explained how this addresses the sustainability issue because of the circular business model, Figure 1. Respondent 8 emphasised that by having local suppliers also helps reduce the carbon footprint because there will be fewer trucks coming into the city to deliver produce.

Respondent 4 and Respondent 5 noted that other elements of the agricultural system that need systemic change are the inefficiencies of the long value chains and a greater focus on the primary supply chain. The former issue can be addressed through ICT or word of mouth to

shorten the supply chain, while the latter needs more attention to be paid to the opportunities in the secondary supply chain.

According to Respondent 4, in the same way that the overall ecosystem is fragmented, so too the urban agriculture ecosystem in Johannesburg is fragmented. Respondent 1 also added that another challenge is that entrepreneurs are not linked to ecosystems and hence they are isolated to some degree. Results from a study on entrepreneurship in the City of Johannesburg conducted by Respondent 4, found that entrepreneurs are keen and eager to learn but there is a lack of knowledge as to where they can access the necessary information. Respondent 4 therefore, recommended that entrepreneurs create their own ecosystems and find ways to assist each other.

The manager of an urban farm, Respondent 2, made the comment that to run successful urban farms, people need to understand the whole value chain. Respondent 9 commented on the lack of a value chain for organic produce in South Africa and that there are plenty of business opportunities for job creation in the entire value chain from farm to fork.

Respondent 9 said that technology (water systems, supply chain management, renewable energy etc.) is integral to maximise production and reduce costs on small sections of land. The cold chain is also crucial to extending the life of produce for smallholder farmers. Respondent 10 mentioned that they are implementing modular bio-digestion systems for smallholder farmers. These systems provide a great innovative way to generate a substantial amount of gas that can be used for energy. The organic sludge (digested waste) can be used as liquid fertiliser on the farms as it is rich in microbes and nutrients which will help grow crops and in the long run the farmers will be able to market the liquid fertiliser to other farms.

Access to farming land

One of the biggest challenges with urban farming is the limited farming land. (Respondent 3), who went on to suggest that the best way to make farming successful in urban areas is through intensive farming such as hydroponics and broiler layers, where small piece of land can be used to generate enough profit to sustain the business. Respondent 5 also acknowledged that food gardens in the city are structurally too small, and therefore appropriate technology is important to maximise the limited space. Respondent 9 provided an alternative view by suggesting that there are large tracts of land in the peri-urban areas which are privately owned and underproductive which would be ideal for cooperative structures to exploit and use.

Respondent 5, who has vast experience working with urban farmers in Johannesburg, noted that farmers can increase their production and revenue considerably with only three small tunnels and simple hydroponics systems, using black bags and river sand. The respondent noted however, there is data that shows that most irrigated fields are within a 30-kilometre radius of major city centres which highlights the necessity to upgrade food gardens to small farms close to the city. These farms can be viable because most of the future food production will be from smaller technological units and integrated complex indoor systems. Respondent 8 however, cautioned against technology being the first step when deciding to set up an urban farming system. Technology should be carefully selected to suit the needs of the farm. Alternative methods to farming come at a cost, the more technology the higher the marginal input costs. Respondent 9 also argued that South African farms should not convert rapidly to soilless systems because the country has fertile soil and enough sun and rainfall. Both respondents qualify their remarks is by mentioning that conventional farming can create millions of jobs and technological production can be used to bolster this but should by no means become the sole method of production.

Respondent 7, the Agribusiness Business Development Manager for one of South Africa's big four commercial banks, commented that there is a need to get smallholder farmers more productive, but they struggle to attain the required economies of scale which cannot be ignored. So, viable business models must be developed, but there is uncertainty as to what is the ideal or a viable model. Urban farmers must certainly utilise more technology such as vertical farming because the urban land available for farming will decrease steadily over time. Respondent 8 countered this by suggesting that there are plenty of open spaces, but the issue is more about land use rights. The local government may be willing to give access to the land but there are legislative hurdles that slow down the processes.

This sentiment is echoed by Respondent 9 who mentioned that the City of Joburg Property Company (JPC) has access to a lot of vacant land but there are bureaucratic processes that stop farmers from gaining access to land even for five years. One of the reasons is that there is currently no business plan attached to one-hectare smallholder farms. The organic sector needs to prove that these one-hectare business opportunities are possible by providing data to prove this. There are 250 prime sites that can be made available to communities on a ninety-nine-year lease, with a business plan.

Operational challenges

The interview with Respondent 2, the manager of an urban farm in Johannesburg, yielded some key insights into the different operational challenges faced by different projects.

Speaking to issues that are specific to their project, he mentioned that the soil in the area is not very good and that much attention and effort had to be invested to enhance and rectify the soil problem. Another challenge was water; the area is a very dry area. The other major challenge was that the staff weren't skilled. Respondent 8 emphasised the need to have a period of training and learning before the setting up of a food garden. There also needs to be a realisation that it's a collaborative effort where people appreciate and understand that just because they were successful in the past does not mean the same things will work again; every garden is unique and provides an opportunity to learn.

The major challenges that Respondent 2 had to overcome on the farm that they manage are listed below:

- Skills transfer was the key focus. This was not easy to address because people have different strengths and weaknesses resulting in different levels of understanding. Training then becomes labour intensive because there needs to be one-on-one interactions with the staff to identify their capabilities. The workers needed to get to a stage where they can transfer what they have been taught to the next person. Some of the workers do not have any formal education but as noted by Respondent 3, farming is skills based and skills are learned by practice. According to Respondent 2, the best way to change someone's mindset is to focus on the person. Getting to understand the person and connect with who they are and what their aspirations are in the world, that way it is easy to find connecting points where the message is internalised for them on an individual level.
- The issue of poor soil quality had to be tackled. The aim was to build up the soil using the cheapest and least destructive methods of soil enhancement. These included using compost and soil enhancers, having a proper rotation system and planting crops that benefit the soil. A soil management system was put in place and the soil has been getting better and better each year. Similarly, a lot of mechanisms and technology that help manage water have been developed as part of the water management system.
- Some of the other key challenges faced by the farm are funding, environmental factors such as the changing climate and lack of a proper seedling propagation tunnel. Respondent 2 added that although these problems exist, it's all about managing the situation. What has helped on the farm is the implementation of short-term turnaround strategies so that people can see the results now while working on a long-term solution.

Respondent 8, who has conducted research on and worked in urban farming initiatives cited the lack of agreed farming standards as a one of the major operational challenges for urban farms. Respondent 9 suggested that the establishment of credibility in the organic produce

value chain through certification through vehicles such as the Participatory Guarantee System (PGS), which can be used to organise farmers into collaborative groups, so they can get involved in knowledge exchange and sharing practice. PGS can be used as second-party certification, but then there also needs to be third party certification by a local third-party body which is tailored to an effective value proposition for the market.

Organisational structure

Most of the urban farming initiatives in Johannesburg have been set up as Co-operatives., According to Respondent 1 these have a lesser success rate than small businesses. Respondent 8 mentioned that most of the small farms in Johannesburg are more inclined to be NGOs or government initiatives, and they do the bare minimum and simply tick the required boxes on the basic government forms. Respondent 5 adds that the problem is that the co-operatives are established as producer (primary) co-operatives, which are administratively the most complex co-operatives, and it is almost impossible to measure how much time or how hard people work to produce the required crops. Respondent 4 commented that co-operatives do not work effectively nor efficiently because they do not fully understand the cooperative model and thus are not profit driven and the motivation behind co-operatives is too weak to make them sustainable in the long-term. This point is further substantiated by Respondent 8 who commented that cooperatives are tricky to get to work because there'll always be inequalities in effort, resources and motivation.

The group dynamics were also noted by Respondent 8 as a challenge in a cooperative with issues such as dealing with situations where everyone benefits even though they didn't put in the same effort and this often leads to quarrels. According to Respondent 1, the focus is too often on the quantity and compliance issues around enterprise development and there is not enough attention being paid to innovation, cultural diversity, context, communication and conflict resolution. People are grouped together to form co-operatives, but they are not given the soft skills to work with groups.

Respondents 4, 5 and 8 concurred that secondary co-operatives, that bring together a few different individual farmers with complementary skills and produce, are the possible solution. These can be in the form of marketing or buying co-operatives where farmers can either sell or buy inputs at a better deal but still produce on their own. This is a strategy that can be implemented on the local government level and will create critical mass and allow comparative analyses to be done so farmers can specialise.

Measuring impact

The impact of businesses should be beyond socio-economic development (GDP and job creation) because if we include social impact the many social issues can be mitigated. This is according to Respondent 1 who went on to comment that just because something is not an economic activity, doesn't mean it's not adding value.

Respondent 3 mentioned that most farmers do not have the patience to wait to see the results of their farming activities. There needs to be a more holistic human development understanding when measuring the impact of social enterprises. Respondent 1 suggested that one way to measure the impact of the business, is to develop a Theory of Change, where assumptions are made that by developing social enterprise models it will impact people in a certain way. Respondent 9, however, highlighted that there have been instances where people from the community have sabotaged smallholder farmers that are starting to do well. This is an issue that will require a social work around the emancipation of people and social entrepreneurship is mooted to have a key role to play in empowering people to a point where they believe in themselves again.

Some of the practical examples of the social impact of having farms in urban communities cited by Respondent 8, include people from the community coming to the farm for extension support when they need advice about farming, people buy the produce to resell it at a margin and social cohesion from the activities that happen around the farm.

Funding

Most urban farms receive some form of government funding to start up. Respondent 5 suggested that although government grant funding is an enabler, it also precludes an opportunity for the farmers to exercise some form of entrepreneurial thinking. The funding must be bundled up with an entrepreneurial development programme and this must be informed by the latest thinking and 'cutting edge' agricultural theory, which is moving towards sustainable agriculture and agroecology that is much more profitable than the mainstream production. Respondent 7 commented on how the key to success once farmers receive the funding is to stick to the original plan as laid out in the application for the finance.

Respondent 5 went on to say that knowledge and technology are very important. This according to Respondent 4, includes entrepreneurs educating themselves because there is a lot more information that is available for free than what people think. Entrepreneurs need to develop their own networks of who has information because usually those who have the information also have access to finance.

Respondent 1 expressed that they felt money, in terms of capital or equity, is not the only constraint to small business development. The challenge, according to them, is professionalisation of small business services and taking products to different markets. Respondent 1 also commented that there's a need to develop sustainable funding models for social enterprises, which is about applying business principles to address social issues. To achieve this, one needs to develop a business model canvas and use that to ensure there's both social and business (profit) outcomes. Respondent 1 added that this will never be a perfect model, but it needs to be one which optimises both impact and profit.

The need for developing sustainable funding models for urban farms is highlighted by the manager of an urban farm, Respondent 2, who mentioned that their farm is still reliant on donor funding, albeit their mission is to be self-sustainable. Respondent 2 noted that their farm cannot however, be self-sustainable, until they have proper systems that address all the problems mentioned during the interview. Building and implementing those systems takes time. Respondent 5 raised the point that small farmers need for heavy investment into agricultural technology is linked to the sustainability of urban farms. Respondent 7 cited global production statistics that indicate food production is on the rise while profit margins are becoming smaller which necessitates investment into technology to lower production costs.

Respondent 7 explained that because most of the urban farmers do not own the land on which they farm, the approval of funding wouldn't follow the conventional route. There would be a heavy reliance on offtake agreements which meant looking at what the farmer is producing and what will they earn from what will be produced and financing is then provided on the strength of that produce. Respondent 7 further mentioned that the banks have been mostly unsuccessful in implementing this option with small farmers and this illustrates the need for farmers to collaborate which would make it easier for the bank to lend to the aggregator who would then distribute the funds to the individual farmers. Other challenges that hinder the provision of funding to small urban farmers is the lack of any historical production data and poor record keeping of financial documents, which makes it difficult to determine their credit worthiness.

Role of different stakeholder groups

Respondent 4 made comments about the lack of collaboration between the different stakeholders because businesses currently operate in silos. There needs to be a conscience effort to break down the silos. Respondent 4 made a point that the ecosystem won't evolve on its own but rather it needs a constant hub or centre (e.g. government) to make it happen. The expectation should be for government to create a framework that caters for the different ways

businesses need to evolve. What government needs to do is create the ecosystem and foster the strategic partnerships to allow business growth to evolve develop and flourish. This proposed ecosystem can be developed when different government departments can create structures and policies around which they work together, how they work with the private sector, how they bring those parties into what they are doing and bring those resources together to make it happen. Respondent 9 suggested that breaking down the silos between government and private organisations will help streamline the communication and cooperation so that it can roll out programmes at a national level effectively.

During the interview with the Gauteng Department of Agriculture and Rural Development (GDARD) officials, Respondent 6, it was established that the department is split into three units in relation to urban farming. The one unit is focused on food security through the establishment of small food gardens, the second unit looks at farmer support development which assists large commercial farmers and the third unit manages the Agri-parks established by government. These are the three key GDARD roles.

- The government aims to set up one Agri-park per district in Gauteng and farmers within a 20-kilometer radius of the Agri-parks can supply their produce to the Agri-parks. This allows for the aggregation of produce from all the farmers and for scheduling of supply which improves shelf life and productivity. Buying of agricultural inputs are bought in bulk by the Agri-parks. Therefore, there is the benefit of discounts from the suppliers. This model is still being tested. However, preliminary results seem to be positive. Local municipalities provide land and services (water, electricity and security) to the farmers, then the provincial government provides the infrastructure and technical expertise. The municipalities ultimately own the infrastructure while the farmer owns the production. This is done with the view that over time the farmer will upscale to become a large commercial farmer, but they remain part of the Agri-park and can still supply produce to the Agri-park.
- The Gauteng Department of Agriculture and Rural development aims to be the leader when it comes to technology implementation. There are number of examples of this such as the first vertical farming unit to be launched by any municipality in the West Rand, automated tunnels that can be operated by remote control and mobile feed lots that can grow feed in three days.
- There are plans to develop the Agri-parks into Mega-parks which will also be involved in the secondary means of production.

In addressing the role of government, Respondent 5 commented that the role of the state should be more focused on stakeholder engagement. Small farmers need to be promoted in conjunction with outside stakeholders and this needs cross fertilisation and social innovation.

Innovation is about building new societal alliances and breaking the old vested interests. Respondent 8 sees government playing a three-pronged role in assisting small urban famers:

(1) Land: promote land use rights to secure tenure for local communities looking to establish food gardens. Farmers should be able to apply for funding using their land user rights.
(2) Social Support: there needs to be consolidated specialised extension support which goes beyond just training but also involves farmer profiling and finding out farmers individual needs.
(3) Economic Support: there needs to be some form of agrarian reform that can promote economic activity. Government also needs to create private public partnerships to help farmers gain access to the market that currently exists.

Respondent 9 had a very clear view on the role of national government, in the form of the Department of Agriculture, which according to them needs to take on a more strategic role, specifically looking at the recent amendments to the seed bill which is geared towards the corporate takeover of the seed market. There need to be provision for sovereign seed to establish a sovereign food system.

There is a disconnect between government and entrepreneurs, where entrepreneurs place blame on government and say government doesn't serve its purpose but government cannot teach people to be entrepreneurs. This is according to Respondent 4, who also suggested that either entrepreneurs teach themselves or they must learn from others. Comments that social entrepreneurs can teach traditional entrepreneurs about social impact and traditional entrepreneurs can teach social entrepreneurs about innovation, compliance and execution, made by Respondent 2 supported Respondent 4's comments. Respondent 4 added that the models of business for today and tomorrow is about collaboration, networks, and partnerships. There needs to be an environment for collaboration, a model for partnerships and the creation of capabilities to build those kinds of partnerships and networks.

Respondent 5 added that another dynamic is that the developed part of the economy is extractive, and the underdeveloped or informal sector is making a loss and that's why we have inequality in our society.

According to Respondent 9, the universities and researchers have a role to play in advising government on how to implement agricultural projects, because the policy is there but the challenge is the implementation of policy.

Summary of results

The data presented was collected from ten respondents through a process of semi-structured face-to-face interviews. Although each of the respondents has a different area of expertise and knowledge on the topics of urban agriculture and entrepreneurship, the collective comments and responses presented could be grouped into high level themes despite the differences in opinion on the topics and subjects that were discussed during interview processes.

Most of the respondents agreed that there are challenges with the current approach to urban agriculture initiatives in Johannesburg. There was a general opinion that some of the greatest challenges hindering the ability of smallholder farmers to ensure the sustainability of their farming initiatives were limited accessibility to farming land, markets, funding and most importantly knowledge and information. Some of the good work being done by individual farmers and government was highlighted. However, it was also noted that these efforts are currently fragmented and that there needs to be a greater integration of all these initiatives.

Discussion of results

This section will collate all the learnings from literature and the research interviews conducted during this study.

Alternative business models

The literature highlighted the importance of having a broad view of food security that looks beyond the availability of food and starts on the journey towards transformation of existing food systems to triple-bottom-line sustainability in all three aspects; economic, social and environmental (Gliessman, 2013; Labadarios et al., 2011). Respondents 1 and 4 both felt strongly that South African and African business models should have aspects of socio-economic development entrenched in them. Respondent 5 commented that the outcomes of urban farming extend beyond those of traditional business (profits) and include social benefits such as nutrition, local economic development, social cohesion, water management and ecological services.

In the absence of proven and tested theoretical framework, Hossain et al. (2017) provides a conceptual framework, which considers key antecedents (i.e. entrepreneurial orientation, social innovation, network embeddedness and sustainability orientation) within a mediating environment (context) to achieve social and economic value. Day and Jean-Denis (2016) also present a framework based on the resource-based view perspective to social

entrepreneurship. None of the assessed urban farming initiatives in Johannesburg have been able to successfully adopt these or similar frameworks. This inability to adopt such frameworks could be a combination of lack of awareness, understanding and or knowledge and ability to apply such models in their specific operation. Respondents 1 and 3 hypothesised that these initiatives fail mainly because of a lack of entrepreneurial orientation. A supporting argument came from Respondent 8 who mentioned that his farm had seen drastic improvements in economic activity and a reduction in donor dependency since they adopted a more entrepreneurial approach.

The respondents agreed that the businesses of the future, including farming, would need to focus more actively on sustainability, social impact and rely on collaborative efforts (networks) to succeed. Respondents 4, 5 and 8 concurred that although primary co-operatives have not been successful, secondary (marketing or buying) co-operatives can bring farmers with complementary skills and produce together to create critical mass and allow farmers to specialise.

Taking a holistic view of the urban farming system

As cited in the literature review, the implementation of urban agriculture as a strategic policy tool to address food insecurity has been done in isolation without due consideration of the wider complex food system (Battersby et al., 2015; Crush et al., 2011). Several of the respondents commented that the current value chain is fragmented with different stakeholders running the different segments of the value chain. Respondent 2 suggested that to operate successful urban farms, people need to understand the whole value chain. The lack of incorporation of the whole value chain results in inefficiencies within the various stages in the value chain. There is clearly a lack of application of stakeholder theory to create both economic and social value.

Another key observation made from the interview data is that inefficiencies are created by unnecessarily long value chains. This leaves the farmer in a vulnerable position because they are then unable to reach the end user (customer) directly and still maintain competitive pricing models.

In addition, the respondents agreed the current focus of many of the private and public urban farming initiatives is on further developing the primary activities within the agricultural value chain. The farmer is thus only limited to the primary production processes which are in most cases the least profitable and highest risk activities in the value chain. According to Respondent 7, this severely hinders the farmers' ability to obtain funding from any of the

established commercial banks in the country. She acknowledged the dilemma farmers are faced with in that they require funding to invest in their farms to increase production outputs, but without proven records it becomes very difficult to obtain the necessary funding.

Innovative production methods

Rapid urbanisation and population growth are cited as among the main reasons current food and agricultural systems have come under increasing pressure and necessitate increased investment and adoption of new strategies (Fan et al., 2017). Such strategies include climate-smart agriculture which will limit the effects of increased agricultural production on the natural environment and climate change (FAO, 2017a). The review of literature and data from the interviews presented agroecology, and more specifically the concepts and principles of permaculture as one of the most effective urban farming techniques to ensure long-term sustainable crop production.

Permaculture can drastically reduce input requirements, improve productivity and promote the supply of healthy, nutritious food (Hathaway, 2016). Respondent 10 felt that implementing modular bio-digestion systems is an effective way to generate energy and organic fertiliser that can be used back in the farms or sold to the market. This is a rudimentary technology that can reduce input costs, improve productivity and generate additional income for farmers.

The lack of available land for farming in urban areas was confirmed by the respondents during the interview process and literature reviewed as one of the biggest challenges standing in the way of urban farming. However, this pertains to conventional thinking about land requirements for farming. There are alternative opportunities to be innovative in the way that fresh food is produced. A review of literature suggested an alternative to this issue as the incorporation of intensive farming techniques such as hydroponics, aquaponics and aeroponics, where small sections of land can be used to generate enough profit to sustain the farmer's business (Despommier, 2011). Several of the interviewees agreed that farmers can increase their production and revenue considerably by incorporating agricultural technology to their farming systems. However, the respondents also cautioned against thinking that technology will be the panacea for urban farming systems and that technology should be carefully selected to suit individual needs and which will require much training and support systems.

Respondent 8 explained that many of smallholder farmers have had to develop and trial innovative techniques and methods based on their individual constraints. However, these are in most instances not well documented so there cannot be replicated elsewhere. These need to be documented and vetted as standards of production. Improved standards will improve the

production quality and quantity from each of the individual farmers and will also create a level of credibility in the processes. A two-tier certification process to establish credibility throughout the value chain in addition was suggested from the interviews. This touches on an important factor mentioned by both Respondents 5 and 9; that it is important to create trusted and reputable brands for organic produce from small urban farms.

Access to markets

Respondent 1 mentioned that a major challenge in the South African context is that all enterprises operate under the same compliance framework. This together with the fact that there is no real recognition of the differentiation in production methodologies for organic produce and the need to sell at a higher price has made it extremely difficult for urban farmers to gain access to markets. Herein lies another case for agroecology which integrates science, technology and social movements for social change and helps reconnect those who grow the food and those who consume it in a mutually beneficial relationship (Gliessman, 2013). This supports the argument made by respondents that distribution markets need to be developed for the townships and organic food be made readily available for the township market at prices lower than retail price but higher than wholesale price.

Enabling environment

The findings from the research affirm what is highlighted from the literature review, that strategies to try curb urban food insecurity remain unsuccessful because of poor implementation of urban farming initiatives even though the right policies have been drafted (Crush et al., 2011; Magidimisha et al., 2016). The finding from the interviews emphasised the lack of collaboration between different stakeholder groups and the government's inability to take up a pivotal role at the centre of the agricultural ecosystem.

Respondent 9 expressed the direct link between health and organic agriculture and added that it would be in national government's best interest to work closely with the Department of Social Services and Department of Health. There is a disconnect between the private sector, entrepreneurs and the government. The Gauteng Department of Agriculture and Rural Development highlighted some of the key initiatives, both successful and unsuccessful, that they had implemented to support urban farming. However, the other interviewees unanimously felt that government was not doing enough to aid small farmers. This further emphasises the need for collaboration between the different stakeholder groups.

A key observation from the interview with Respondent 8 was the role he proposed government plays in supporting small urban farmers. These were securing land tenure for farmers, specialised extension support and economic support through public private partnerships.

Entrepreneurial orientation and social innovation are elements of the social entrepreneurship framework proposed by (Hossain et al., 2017). Respondent 5 explained government grant funding is an enabler, but it also precludes an opportunity for the farmers to exercise entrepreneurial thinking. He suggested that grant funding be provided together with an entrepreneurial development programme for sustainable agricultural development.

A sustainable urban farming business model

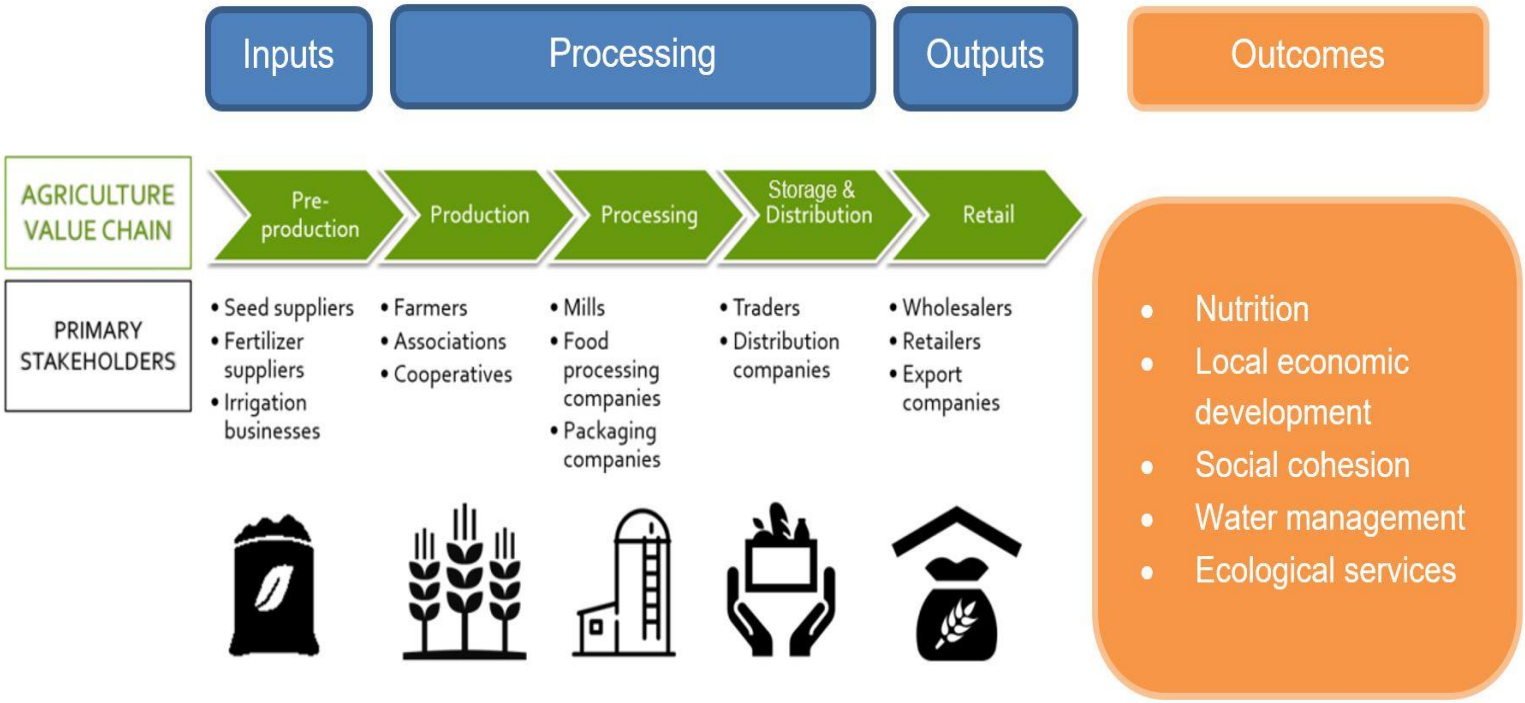
In this section the different elements of a proposed sustainable social entrepreneurship model for an urban farming initiative in Johannesburg is presented. The primary data was strengthened by reviewing relevant literature on the subject when deciding on viable solutions for the business model presented in this section.

Integrated Value Chain

According to Johnson, Whittington, Angwin, Regnèr, and Scholes (2014), strategy is the long term direction of any organisation. The strategic direction the organisation choses to follow is largely influenced by the objectives the organisation wants to achieve. Hence, it is critical that the urban farming initiative takes a view of the entire food production system and develop strategies, at a corporate, business and operational level, that align with achieving the intended outcomes. This is the key underpinning of stakeholder theory which extends beyond the creation and distribution of economic value to all relevant stakeholders, but also incorporates the societal impact of the organisation's activities.

This is a holistic systems approach which is not only focused on outputs but also on the outcomes including nutrition, local economic development, social cohesion, water management and ecological services. What this means is the success of the initiative should not only be measured on the outputs, but due consideration should be made of the outcomes that are achieved as well. This is important from a strategic point of view when setting up the key performance indicators (KPIs) for the urban farming initiative. The recommended approach is represented graphically in Figure 4.

Figure 4. Agricultural Value Chain (iixfoundation, 2016)



Operational considerations

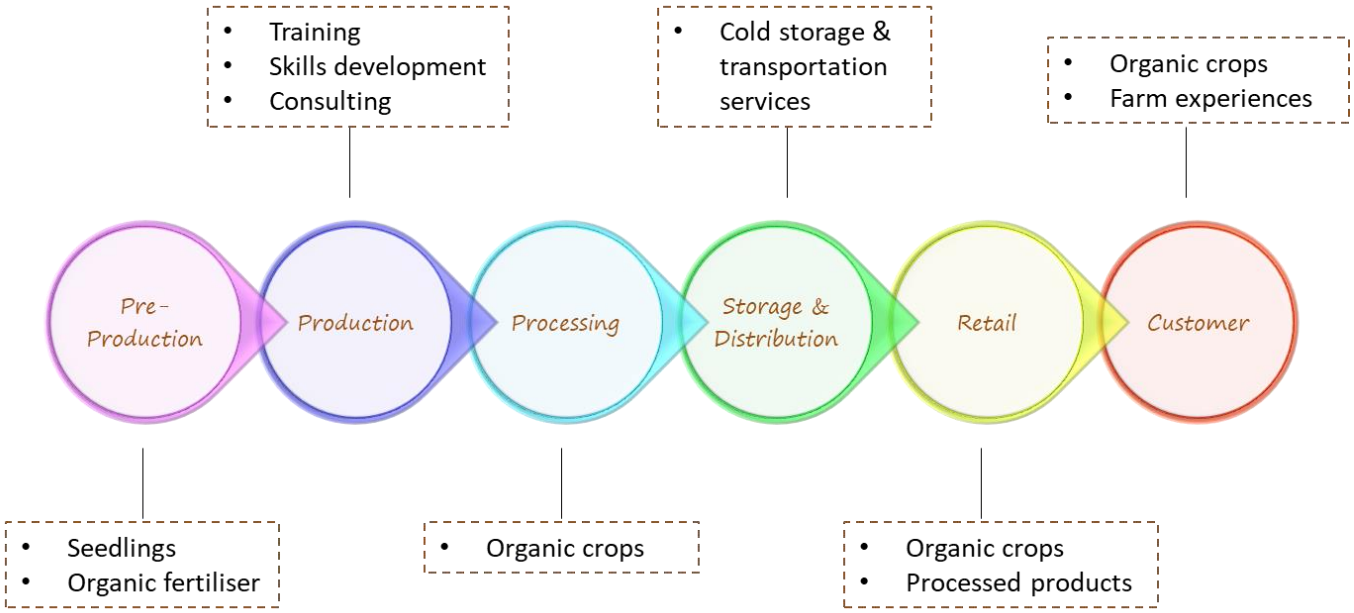
As noted in the interview data, each urban farming initiative will present its own unique set of operational challenges. The concepts and principles of permaculture provide a diversity of thought on overcoming many of these challenges and establishing a sustainable urban farming initiative. Some of the other operational considerations that need to be made to achieve the desired outcomes are discussed below.

Skills development will be one of the key focus areas when setting up any urban farming initiative because the success of the farm is highly dependent on the workers that are involved in the daily productive activities. Practical experiential learning techniques will be the primary approach to training and skills development. The focus of the training needs to go beyond technical ability but should also incorporate soft skills and business training. It is for this reason that it is suggested comprehensive training programmes be developed, addressing a range of disciplines that will enable adequate skills transfer.

There is a genuine business case to be made for smallholder urban farming initiatives to develop multiple revenue streams along the value chain other than primary production.

This approach of getting farmers more involved in the downstream activities of the value chain ties in with other government backed initiatives such as the black industrialist programme to develop manufacturing capabilities among previously disadvantaged individuals.

Figure 5. Suggested revenue streams across farming value chain



The suggested approach entails the establishment of easily accessible platforms, physical and digital, that farmers can use to collaborate and share market information. These should act as a marketplace where farmers can interact on issues of supply and demand. The platforms will also be used as a multi-stakeholder engagement vehicle to drive collaboration and the sharing of ideas. Lastly, this is where farmers can harness their complementary skills and assist one another to help improve the collective rather than a few individuals.

The rising levels of cell phone adoption and penetration should make it viable to roll out the digital platform in the form of a user-friendly mobile application and web service. Although technology makes it easier to communicate with others, there is still a need for physical interactions to allow people to fully express themselves.

Platforms such as these will allow farmers that produce the food to directly connect with those who consume it in a mutually beneficial relationship. This direct interaction will help shorten the value chain and create additional value for the farmers and the end consumer, because:

i. Farmers gain an alternative entry to the market.
ii. Farmers increase their margins because they can supply their goods at a price that is less than the retail price but higher than what they can currently sell to wholesalers.

iii. Consumers benefit by having access to good quality organic food at a lower price than the current market price.

The farm will be managed using some of the fundamental principles of a traditional corporate enterprise. One of the key pillars that has made many organisations successful is having proper management structures in place. The urban farming initiative needs to have management systems that cover the following critical aspects:

- Clearly defined roles and responsibilities for all the employees within the organisation.
- Daily work processes and routines.
- Well defined communication and reporting protocols.
- Standards and internal controls.

As mentioned in the interview data, access to market and farming land are two of the major constraints for smallholder farmers' profitability and productivity. The latter issue can be to a large extend be addressed through the adoption and incorporation of technology. Agricultural technology has changed conventional farming processes, giving farmers more control over production, increased yields, improved sustainability and flexibility against changing weather patterns (AlShrouf, 2017). Due to the limited arable land available to potential farmers, technological production will be used to bolster conventional farming methods.

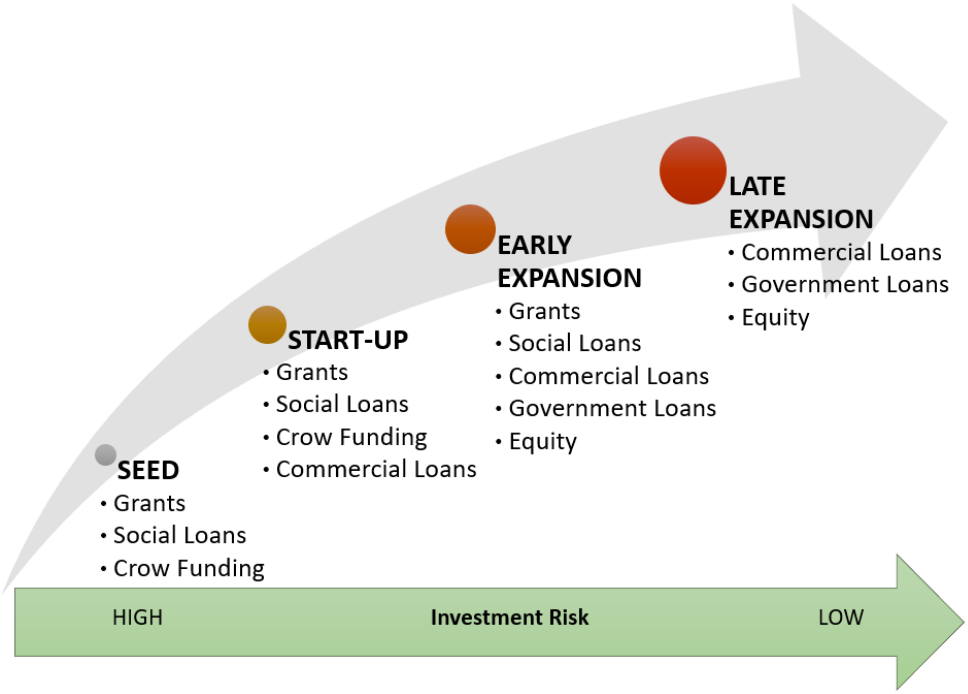
Although urban farmers are adopting innovative farming techniques to counter the challenges they face, little use is being made of technology available. The main reason cited for the lack of develop is the lack of funding for the implementation of new initiatives. Investment into technological solutions will be done in a phased approach and increased proportionally as the farm's outputs and profitability improve.

Financial Considerations

Funding social entrepreneurship projects is challenging because social ventures are not solely profit driven. Other hinderances to the provision of funding to is the lack of any historical production data and poor record keeping of financial documents, which makes it difficult to determine their credit worthiness. This makes it difficult to obtain funding via conventional business funding mechanism.

In addition to the traditional sources of funds, the proposed urban farming model will explore alternative funding mechanisms. This hybrid investment funding strategy allows for greater flexibility and gives organisations access to a wider spectrum of financing streams.

Figure 6. Hybrid funding model (adapted from Venter (2017))



- Grant funding

Government and private grant funding is the primary source of money for many of the existing urban farming initiatives in Johannesburg. South Africa's commitment to the United Nations Sustainable Development Goals (SDGs) 2016 will most likely ensure that funds are made available from the national fiscus for initiatives that can contribute towards improving food security and climate change. Many corporate organisations in the country have developed Enterprise and Supplier Development programmes that provide monetary and non-monetary assistance to Small, Medium and Micro-sized Enterprises (SMMEs), helping them accelerate their development and ultimate sustainability. It is envisaged that donor funding, either public or private, will be the major source of the funds required to set-up the proposed urban farming initiative.

- Social Loans

Social loans, also called Social Impact Investments, are made by social investors with the main objective of creating considerable social and environmental impact. These differ from grants in that the investors expects to receive a financial return on investment.

- Crowd Funding

This is less explored form of funding can be a surprisingly effective way to source monetary resources from the public. Using this innovative form of funding the urban farming initiative would be able to receive monetary investments from individuals who may be personally connected to the mission of the social entrepreneurship project. This is a cost-effective alternative to traditional methods of raising capital.

- Traditional funding sources

As the social enterprise scales up, proves its financial viability and reduces it investment risk profile the traditional funding mechanisms will become easier to access. These include:

    - Commercial Loans from the Banks.
    - Government Loans from small enterprise development programmes.
    - Equity Investment from venture capital firms and Angel investors.

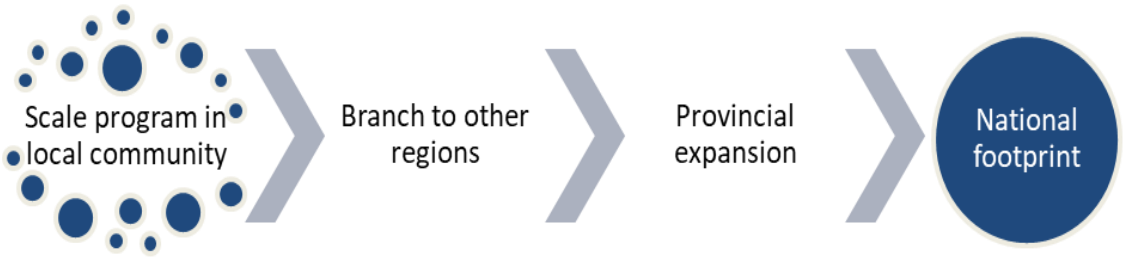
Impact Measurement

If farmers and all the other stakeholders had better access to upstream and downstream data, they could better mitigate their risks. This can be achieved by having a shared database with all the relevant information, including production and market demand numbers. The data collected in this database will be used to measure the social impact achieved.

The wide-spread implementation and dissemination of the social entrepreneurship project is an integral success factor for the achievement of the mission of this initiative. Scaling out allows for the maximum impact to be realised. There are numerous alternatives to effective scale out this project. Considering the nature of the project and the lack of proven case studies a conservative staged approach is proposed for the scaling out of the project.

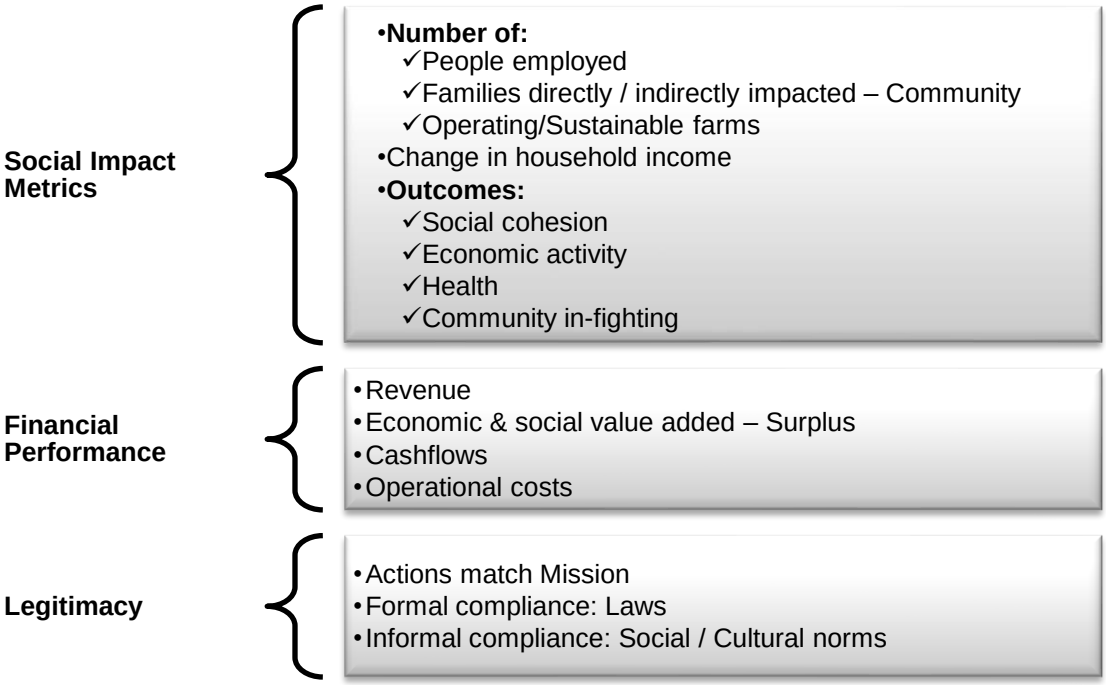
The basic model would be to be first scale-up the first initiative in the local community, then branch out to other nearby regions using the insights and lessons learnt from the first implementation of the project. At this stage the project would be rolled out provincially and slowly building a national footprint.

Figure 7. Graphical presentation of scaling model



Impact measurement will be measured using the following metrices:

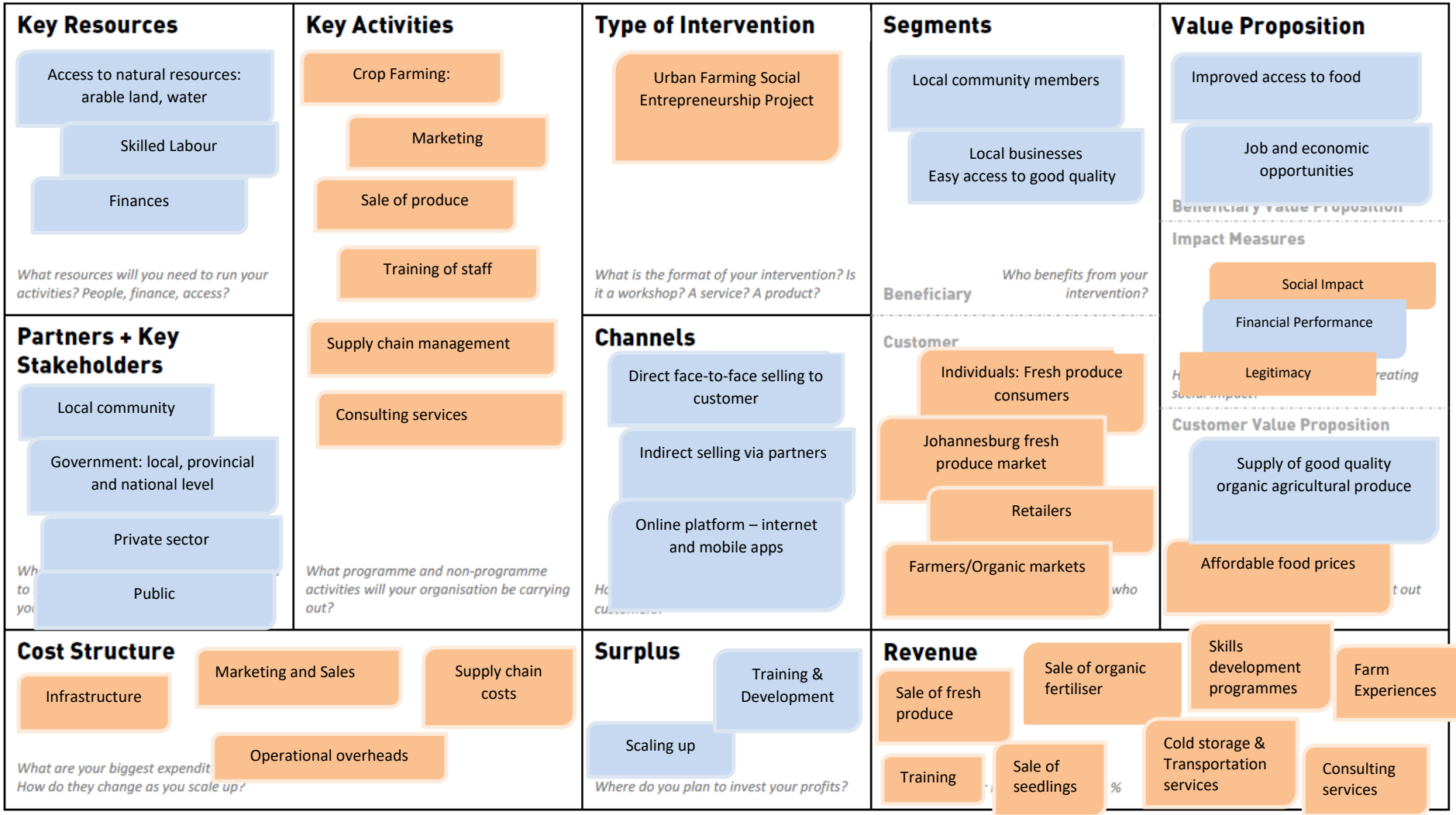
Figure 8. Impact Measurement Metrices



Business Model Canvas

The business model canvas is an effective tool to link high level strategies and the actions that need to be taken by the organisation to arrive at a suitable organisational business model for this project.

Figure 9. Business Model Canvas



Conclusion

The field of social entrepreneurship is still not well defined with many varying definitions. However, this new kind of business model that is not solely focused on profitability but also on the social impact of business activities is much needed to transform society

An examination of existing literature and interviews conducted with experts in urban agriculture and entrepreneurship revealed some of the major operational and strategic challenges faced by urban farming initiatives in Johannesburg. The data produced was used to conceptualise a high-level business model based on social entrepreneurship principles for the development of small urban farms in Johannesburg. The business model addresses key operational, business and financial competencies that are required to enable the successful implementation of a sustainable social enterprise to address an unmet need in society.

This social entrepreneurship project document should only be the beginning of formulating a more detailed plan to operationalise the proposed urban farming project. Through the compiling of this paper it became evident that a substantial amount of work still needs to be done to create an enabling environment for small urban farms to distinguish themselves and become an integral part of driving systemic change and maximising social impact.

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