Improving Business Processes of Jamaican Agritourism Enterprises: Using ICT
to Increase Collaboration and Information Sharing

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Abstract

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Information and Communication Technologies (ICT) have been used in several sectors and industries and have generated positive results especially in respect of increasing productivity and collaboration. While the discipline of social informatics has studied the use of ICT in agriculture and in tourism as separate fields, little work has been done to look at ICT use in agritourism – the intersection of agriculture and tourism. Even less (or no) work has been done on ICT use in agritourism in small island developing states, the Caribbean, or Jamaica.

This thesis presents the first look at the variables to be considered in applying ICT to agritourism in the Jamaican context. A holistic view of the Jamaican agritourism sub-sector, in the form of the newly crafted Jamaican Agritourism Innovation System (JATIS) model, is presented showing the interactions among the various actors (sectors) required for successful ICT implementation. The JATIS model is an extension of previous Agriculture Innovation Systems (AIS) models and is specifically applied to the Jamaican context. However, as opposed to previous models, the JATIS highlights the critical role of purveyors, or middlemen, operating in Jamaican agritourism. The model formulates a mechanism, different from the current Jamaican agritourism structure, to include all industry players in the supply/demand interaction.

The inclusion of all players is done through a series of farm and purveyor groups, enabled and facilitated by ICT. In addition, the model highlights the improved quality of information exchange among the players as a result of the modified interaction proposed. It might be possible to apply the model to other Small Island Developing States, particularly those in the Anglophone Caribbean, where the socio-cultural variables and economies are similar to Jamaica's. However, further research will have to be conducted to verify, fine-tune, or customize the model for external application.

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Dedication

This thesis is dedicated to my parents, who have always supported my efforts and are still doing so, to Rose, my elder sister, to Learie, my younger brother, who have been emotional towers of strength during the rough times, and to the love of my life, my wife Tricia, who has stood beside me during my times of strength, and who 'lifted' me during my times of weakness.

Acknowledgement

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Chapter 1 - Introduction

1.1 Motivation and Scope

According to Boxill (2004, p. 269), *"...the Caribbean is by far the most tourism dependent region in the world."* Although tourism provides valuable income for island states within the Caribbean, much of this income goes back out of these economies to pay for inputs into the tourism industry - a phenomenon referred to as leakage. In order to take full advantage of the economic benefit from tourism, development plans across small island developing states (SIDS) in general, and the Caribbean in particular, must look seriously at fully integrating tourism into the local economy.

In Jamaica, there is an almost annual phenomenon, as reported through the media, of farmers complaining that they have to dump agricultural produce due to insufficient, or the inability to access, markets to which these produce can be sold. At the same time, restaurants and hoteliers complain of insufficient, or inconsistent, supply of agricultural produce, causing them to import to supply their needs. Jamaica, like other SIDS, must begin to reduce leakage and, ultimately, aim to eliminate it entirely. There are several components to leakage. However, since food production is often a labour intensive and economically important industry in many tourism dependent countries (Belisle, 1983; Telfer and Wall, 1996; UNEP, 2011), addressing the leakage due to agricultural imports is an appropriate starting point in any attempt at reducing overall leakage. Jamaica is estimated to lose up to 50% of its tourism revenue due to leakage and it imports majority of the food consumed by tourists (Daye et al., 2008).

Agritourism is the segment of economic and social activity where agriculture and tourism intersect and can be described as the use of agricultural products, spaces (farms, etc.) and processes, to meet the accommodation, sustenance or entertainment needs of the tourism sector (Koc, 2008; Kuo and Chiu, 2006; Iakovidou, 1995; Phillip et al., 2010; Pulina et al., 2006; Sharpley, 2002). Given the many and varied measurements used - often included in either the agriculture or tourism numbers - and depending on how agritourism is defined by those measuring it, its global economic impact is somewhat difficult to ascertain. However, even without isolating agritourism, the individual impact of both agriculture and tourism on the global economy is significant. Worldwide, agriculture employs approximately 32% of the global labour force (ILO, 2014) and 86% of rural inhabitants depend on it for their livelihood (World Bank, 2007). In 2013, tourism employed 9% of the global labour force, expected to grow to 11.5% in 2014, and contributed 9.5% to global GDP, with an expectation to employ roughly 14% in 2014 (WTTC, 2013a).

For small island developing states (SIDS), both tourism and agriculture have a comparatively larger economic impact than that for larger and more developed states. Therefore, there is greater dependence on agriculture and tourism in SIDS. Although no Caribbean country falls within the world's top 10 tourism destinations, based on arrivals or receipts, in 2013 the Caribbean grossed US$24.8 billion from international tourism receipts and welcomed 21.2 million international visitors. In 2013, Jamaica welcomed approximately 2 million international arrivals (UNWTO, 2015) and in 2012, the most recent figures available, earned roughly US$2.1 billion (JTB, 2014).

The foregoing provides the motivation for Jamaica to find mechanisms to improve tourism income, and specifically, the proportion retained by the country. Information and Communication Technologies (ICT) include a set of tools which has aided other nations and their industries to improve efficiency and generate revenues and is being considered as a probable important enabler for Jamaican agritourism. According to Edquist and Henrekson (2006), the ICT revolution, one of several in human history, has impacted how people lead their lives as well as produce goods and services. Edquist and Henrekson compare the impact of the ICT revolution to the invention of the steam engine and electricity. They note that ICT took a shorter time, roughly 40 - 50 years, to impact productivity than the steam engine did (140 years).

Although ICT has been proven to assist other countries and industries, applying ICT to Jamaican agritourism might not be a trivial matter. The majority of Jamaican farmers are above the traditional retirement age of 65 and most work on farm plots smaller than 2 hectares. In addition, the solutions implemented in other, more developed, societies might not be appropriate for the Jamaican circumstance due to cultural and economic factors. This study will attempt to determine those critical factors required for successful integration of ICT into the business processes of farms to, as best as possible, match the food demanded by the tourism sector to that produced by Jamaican farms.

The production of food is recognised as an essential part of the tourism product and food that is locally distinctive can be seen as both an attraction itself and as a differentiator for the image of a particular destination against that of other destinations (Gössling et al., 2011). Both the production and

subsequent consumption of food are important to the sustainable development of the tourism product. It therefore means that an imperative for SIDS is the sustainable integration of local agricultural production into the tourism product. Several authors, Telfer and Wall (1996), and Hunter (2002), indicate that little attention has been paid, in the tourism literature, to the sustainability issues concerning food production and consumption. This therefore means that countries wishing to sustainably integrate the two may have to do the groundwork themselves.

The United Nations Conference on Trade and Development recognises that developing countries cannot be viewed uniformly (UNCTAD, 2004). Both the UN and World Bank have each identified distinctions among developing countries. Beginning in 1968 and officially instituted in 1971, the UN has recognised a least developed country (LDC) category, and the World Bank has implemented a category called *"low-income (and IDA-eligible) countries"*. The IDA (International Development Association) is the section of the World Bank which assists the world's poorest countries with favourable lending terms and other forms of financial assistance (UNCTAD, 2004).

UNCTAD also highlights two groups of developing countries which have been internationally recognized as being "geographically disadvantaged", these are: 1. land-locked developing countries and; 2. Small Island Developing States. This study focuses on the second geographically disadvantaged group – small island developing states – and will use the Jamaican example which typifies the circumstances and conditions prevalent in many other small island developing states, to, as far as possible, develop a model.

1.2. Role for ICT

Approximately one-third of all tourism expenditure is directed towards food (Torres, 2003). Small developing countries, with relatively large agrarian populations, must seek to create sustainable linkages between tourism and agriculture and understand the complex relationship between the two sectors. Once the relationship is understood, information and communication technologies might then be used, as in other sectors, to implement solutions aimed at increasing efficiency, lowering costs and meeting customer needs.

Up to now, research has focussed on implementing ICT in agriculture generally, mainly in developed countries or in those of significant size. However, little or no research has been conducted toward applying ICT to agritourism. It is highly likely that targeting ICT to this specific sub-sector involves more than simply transferring solutions from the general agricultural sector, or even transferring solutions from small scale agriculture, to agritourism. The solutions might require customization because the variables affecting the various countries and separate sectors might not be the same. Specifically, careful attention should be paid to the variables that affect supply and the peculiarities of demand from the tourism industry which are often seasonal and dynamic.

There is no doubt that smaller states and small island developing states (e.g. those in the Caribbean) rely heavily on both agriculture and tourism. Unfortunately, organisations operating in the tourism industry in most of these states often import a significant amount of the food consumed by tourists (Belisle, 1983; Mondher and Norwak, 2007). The leakage from the industry to pay for food deprives these states of much needed revenue, and the logistics

and administrative costs associated with importation increases the overall operating costs of the organisations within the sector. This research is needed to examine the issues specific to Jamaica, and possibly transferable to other SIDS, especially those in the Caribbean, which affect the supply of food to the tourism sector. The vision is to devise a solution for the organisations within the agritourism sector, as well as assisting states that rely on tourism receipts, to craft a sustainable solution which properly matches locally produced food with the demand from the tourism industry.

1.3 Originality of this research and its contribution to knowledge and management practices

The research looks at the use of information and communication technologies where three important components intersect: 1. Small and Medium-sized Enterprises; 2. Small Island Developing States, and Jamaica in particular; and 3. Agritourism. Neither the academic nor industry literature examined reveal a solution that addresses these three components when combined. While it may seem logical to assume that solutions developed in, and for, developed countries should be transferable, especially if the industry is similar, this may not be the case. Some obvious differences, such as land use patterns and size of land holdings, farming culture and the level of mechanisation, and the type of crops typically grown, mean that some specific solutions have to be devised for small states. These solutions must be evidence-based, that is, driven by research data, if they are to effectively impact the agritourism sector in the target countries.

The research presented in this thesis attempts, as a first step, to determine which prior solutions are transferable and what customizations

need to be made to these solutions for them to work effectively in Jamaica. In
addition to the fact that the majority of available solutions were developed for
the agricultural sector in larger countries, the literature examined provides no
evidence that solutions have been developed for agritourism, that is,
agriculture and tourism combined. Findings from the literature and practice
reveal that solutions developed for applying ICT to any one, or pair, of the
aforementioned components, that is, ICT in agriculture, or ICT in tourism, may
not be applicable, without modification, to the combined components of
agritourism.

As a second step, the study identifies possible new solutions specific to
Jamaica and possibly transferable to other SIDS. As will be shown in the
literature review, much of the research conducted so far has focussed on either
ICT in agriculture or on ICT in tourism, in countries whose characteristics are
different from those in small island developing states. The original contribution
of this research will be the examination of the factors specific to small and
medium sized Jamaican farms towards developing a solution that uses ICT to
match the produce supplied by these farms with the demand from the tourism
sector.

1.4 Statement of the Problem

Leakage from the tourism industry robs Small Island Developing States
of much needed resources which could be channelled to sectors in the economy
where the need is greatest. In the Caribbean, the total contribution of travel
and tourism to total GDP is 14%, while in Jamaica, it is 25.6% (WTTC, 2013b).
The preceding figures indicate that over a quarter of Jamaica's GDP is related to

tourism but the country is estimated to lose up to 50% (ECLAC, 2011, Oxford

Economics, 2012, Ramjeesingh, 2008) of its tourism revenue due to leakage and

it imports majority of the food consumed by tourists (Daye et al., 2008).

Information and Communication Technologies have not yet been applied to the

agritourism sector in small island developing states, the Caribbean, or Jamaica,

in order to affect supply, or, to match existing or potential supply, with market

demand.

1.5 Research Objective

The research is designed to identify how ICT solutions can be applied to

the agritourism sector in Jamaica and the customizations necessary to ensure

successful application. This will result in a sustainable model for applying ICT

to agritourism in Jamaica to increase the collaboration required to match local

production to market demand in the tourism sector.

1.6 Research Question

The critical question posed by this thesis is, in what specific ways can

information and communication technologies be applied to the Jamaican

Agritourism sub-sector in order to match farm output to market demand within

the tourism sector? Several specific questions emanate from the more general

one:

1. What is an effective agritourism model, one which includes all relevant

   actors in the agritourism sub-sector, for Jamaica as perceived by

   selected players in the agritourism sub-sector?

2. What are the characteristics of the agritourism model identified by

   selected players as being effective for Jamaica?

3. To what extent has ICT been applied, in Jamaica, to the components of the agritourism model conceptualised from the theory?

4. How might ICT be best applied to agritourism in Jamaica?

1.7 Organization of the thesis

A review of the relevant literature is presented in Chapter 2.

Chapter 2 - Review of Literature. The literature presented in Chapter 2 begins with the premise that in order to understand how technology might be used to change or improve any area, one must understand how it is adopted by the users and organisations there. Theories concerning technology adoption and technology use are presented along with a discussion about Small Island Developing States, small and medium-sized enterprises, the current use of information and communication technologies in agriculture, and a system which encourages innovation among sectors.

Chapter 3 - Research Outline provides the conceptual or theoretical framework developed from the literature analysed in Chapter 2 and presents a research outline for the investigation undertaken. The theoretical framework presented includes a preliminary Jamaican agritourism innovation system, adapted from the system presented in the literature review, showing the possible sectors in the Jamaican environment and the links among them.

Chapter 4 – Research Methodology details the process undertaken to conduct the research, along with the associated theoretical and practical justifications. An indication of possible researcher bias and ways used to mitigate this, as well as the steps taken to ensure ethical integrity, are presented. In addition, details on the ontological and epistemological

underpinnings of this thesis, the justification of each perspective, and the general plan used to conduct the investigation, are presented.

Chapter 5 – Presentation, Analysis, and Discussion of Findings presents an analysis and discussion of the data unearthed during the research. The data discussed in this chapter were collected in two distinct but related investigations: a preliminary investigation, using semi-structured executive interviews, and an exploratory survey; and a final investigation, using in-depth semi-structured interviews and document analysis. Both investigations were conducted to answer the main research question and supplementary questions.

Chapter 6 – Proposed Model for the use of ICT in Jamaican agritourism outlines the model proposed by the researcher proposes a model, the Jamaican agritourism innovation system model (JATIS), using a combination of the research findings and the literature, to address the integration of ICT into the business processes of participants in the Jamaican agritourism sub-sector for increased collaboration and information sharing. The chapter, before presenting the details of the JATIS, also summarises the theoretical framework which was presented in Chapter 3.

Chapter 7 – Recommendations, Management Implications and Future Research summarizes the conclusions drawn by the researcher and presents additional, in-direct, recommendations which focus on the facilitating environment required for the JATIS model to be successfully implemented. In addition, the chapter presents the implications of the work presented in this thesis, and the future research required to extend or optimise it.

1.8 Summary

For small island developing states (SIDS), both tourism and agriculture have a comparatively larger economic impact than that for larger and more developed states. Therefore, there is greater dependence on agriculture and tourism in SIDS. Information and Communication Technologies (ICT) have been applied to several sectors and industries and have generated positive results especially in respect of increasing productivity and collaboration. While the discipline of social informatics has studied ICT use in agriculture and in tourism as separate fields, little work has looked at ICT use in agritourism – the intersection of agriculture and tourism. Even less (or no work) has been done on ICT application to agritourism in small island developing states, the Caribbean, or Jamaica. The research looks at the use of information and communication technologies where three important components intersect: 1. small and medium-sized enterprises; 2. Small Island Developing States, and Jamaica in particular; and 3. agritourism.

The critical question posed by this thesis is, in what specific ways can information and communication technologies be applied to the Jamaican agritourism sub-sector in order to match farm output to market demand within the tourism sector? This, alongside four supplementary questions were investigated using a combination of quantitative and qualitative research methods, in two separate but related investigations. The results were the basis for the Jamaican Agritourism Innovation System (JATIS) model presented as a holistic solution to address the several issues identified in the sub-sector,

towards increased collaboration and information sharing through the increased use of ICT.

Chapter 2 - Review of Literature

2.1 Introduction

This chapter introduces and analyses the literature concerning the critical elements of the investigation undertaken in this thesis, focusing on Information and Communication Technologies (ICT) and their entry and use in a particular environment; the use of technology in agriculture and agritourism; and the future possible impact of technology use by small and medium-sized enterprises in Jamaican agritourism. Several models for using ICT in agritourism are also explored. The theoretical framework described in Chapter 3 emanates from the analysis of literature in this chapter.

The chapter organises the discussion by beginning with an introduction outlining what the chapter is about, and a roadmap of the various elements of the discussion. The next two Sections, 2.2 and 2.3, provide the basis, specifically as it relates to technology acceptance or adoption, and technology use respectively, and set the foundation for the rest of the discussion. Sections 2.4 to 2.7 look at the literature on agritourism (2.4), the impact of tourism on small island developing states (2.5), the impact on local agriculture (2.6), and small and medium-sized enterprises (2.7). These sections provide the context for the practical application of ICT being investigated in this thesis. While Sections 2.2 and 2.3 provide an overview of the relevant information systems theories, Sections 2.4 to 2.7 look at the functional areas.

Sections 2.8 and 2.9 are more specific. Section 2.8 analyses the literature on the application of ICT to agritourism and Section 2.9 looks at the set of components (actors and sectors), using an agricultural innovation system approach, which would interact, using technology, to craft innovative solutions

for current and future problems. The chapter ends, in Section 2.10, with a summary of what was discussed in the previous sections.

Where no specific mention is made, in the literature, in respect of applying ICT to the merged area of agritourism, its application to the separate areas of agriculture and tourism are still discussed and analysed. This discussion and analysis examine the use of information and communication technologies in agriculture and in tourism, as proxies, where applicable, for use in agritourism.

2.1.1 What are Information and Communication Technologies?

Information and Communication Technologies (ICT) refer to any device, tool, or software application, which facilitates the capture, transmission, or storage of data and spans a wide variety of technologies, from satellites to cellular telephones (Zuppo, 2012). ICT include a set of tools which enable greater interaction among people and increased productivity for industry (Glass, 2009; Kennewell et al., 2000). Properly applied, ICT have the potential to revolutionize any industry and lead to exponential benefits compared to the cost to acquire and maintain them (Kuhlmann, 2006).

According to Edquist and Henrekson (2006), the ICT revolution, one of several in human history, has impacted how people lead their lives as well as produce goods and services. Edquist and Henrekson compare the impact of the ICT revolution to the invention of the steam engine and electricity. They note that ICT took a shorter time - roughly 40 to 50 years - to impact productivity than the steam engine did (140 years). ICT might have similar potential if

effectively applied to agritourism and, due to their current level of affordability, might be applicable in several spheres (Kinaanath, 2013).

2.2 Technology Acceptance or Adoption

The work covered in this thesis involves the innovative use of technology in the agritourism sub-sector. However, before one can use technology in an innovative fashion, he/she has to first be prepared to accept or adopt technology for use in his/her environment. Technology adoption is therefore a prerequisite to innovative use. In order to properly focus on its application to Jamaican agritourism, it is useful to consider how, in a general sense, technology is accepted by users, that is, how technology enters a user's environment. The question of technology adoption is not a trivial one. The literature contains several theories, some of which build on previous ones, while some assert things in opposition to previous theories. Perhaps the most popular theory on technology adoption is provided by Davis (1986) in his Technology Adoption Model (TAM). The TAM is a very useful theoretical model for explaining technology adoption. However, of note, is the fact that it was preceded by the work of Rogers (1962) with his Diffusion of Innovations theory. The early, 1962, work on Diffusion of Innovations was followed by relatively more recent work, in 1992, on the same theory. In addition to Rogers, several other authors (Mustonen-Ollila and Lyytinen, 2003; Wainwright and Waring, 2007) have conducted work to articulate the technology adoption process through diffusion of technology innovations.

To assist in organizing the literature, Arpaci et al. (2012) provide a simple yet useful arrangement of the theories relevant to technology

acceptance or adoption. They divide technology acceptance or adoption into two distinct categories:

1. technology acceptance at the individual level; and
2. technology acceptance at the organizational level.

At the individual level, technology acceptance or adoption might be explained by several theories:

i. **The Technology Acceptance Model** (Davis, 1986; Davis 1989; Davis et al, 1989) and the **Updated Technology Acceptance Model** (Venkatesh and Davis, 2000);

ii. **The Theory of Planned Behaviour** (Ajzen, 1985; Ajzen, 1991); and

iii. **The Unified Theory of Acceptance and Use of Technology** (Venkatesh at al., 2003).

Similarly, several theories exist for explaining technology acceptance or adoption at the organizational level:

i. **Diffusion of Innovations Theory** (OECD, 2005; Rogers, 1962, 1971, 1995, 2003);

ii. **Technology-Organization-Environment Framework** (Iacovou et al., 1995; Kuan and Chau, 2001); and

iii. **Institutional Theory** (Li, 2008; Scott, 2004).

While Arpaci et al. (2012) separate the theories between individual and organizational acceptance, this distinction does not hold for all authors. As an example, Dillon and Morris (1996) indicate that the Diffusion of Innovations theory can be applied at both the individual and organizational level. Table 1 provides an illustration of the theories listed by Arpaci et al. (2012). The

subsequent expansion of the theories related to technology acceptance, in the

remainder of Section 2.2, will adopt the organization used by Arpaci et al.

2.2.1 Technology Acceptance or Adoption by Individuals

The three theories on technology acceptance or adoption by individuals,

which are of most relevance to the Jamaican context, focus on what motivates

an individual to accept a particular technology. However, the theories do not

cover how effective the technology, once accepted, is utilised.

TABLE 1 - THEORIES ON TECHNOLOGY ACCEPTANCE

Technology Acceptance – Individuals	The Technology Acceptance Model (Davis, 1986; Davis, 1989; Davis et al., 1989
	Updated Technology Acceptance Model (Venkatesh and Davis, 2000)
	The Theory of Planned Behaviour (Ajzen, 1985, 1991)
	The Unified Theory of Acceptance and Use of Technology (Venkatesh et al., 2003)
Technology Acceptance – Firms	Diffusion of Innovations Theory (OECD, 2005; Rogers, 1962)
	Technology-Organization-Environment Framework (Kuan and Chau, 2001; Iacovou et al., 1995)
	Institutional Theory (Scott, 2004; Li, 2008)

2.2.1.1 The Technology Acceptance Model

The Technology Acceptance Model (TAM), which was developed by Fred

Davis Jr. and presented as a part of his doctoral thesis [in 1985], is one of the

more popular information systems theories and has its genesis from the Theory

of Reasoned Action (Fisbein and Ajzen, 1975). The Theory of Reasoned Action

(TRA) states that an individual's behavioural intention affects their actual

behaviour. Behavioural intention is, in turn, affected by their attitude and

subjective norms (Wu et al., 2011). Fisbein and Ajzen define subjective norm as

"a person's perception that most people who are important to him think he should

or should not perform the behaviour in question" (p. 302).

According to Davis et al

> The goal of TAM is to provide an explanation of the
> determinants of computer acceptance that is general, capable
> of explaining user behaviour across a broad range of end-user
> computing technologies and user populations, while at the
> same time being both parsimonious and theoretically justified.
> (1989, p. 985)

The TAM (fig. 1.), according to Davis (1989), states that a user's

acceptance of an information system (or technology) is mainly determined by

two factors:

1. Perceived usefulness; and
2. Perceived ease of use.

Davis et al. (1989) define perceived usefulness, in an organisational context, as

the potential user's view that the use of the technology will increase his/her job

performance. Perceived ease of use is the prospective user's view of the effort,

more specifically, the lack of effort, required to use the technology in question.

Although these are the two main factors affecting user acceptance, they are

influenced by other factors not directly related to the piece of technology to be

accepted. The other factors are referred to as external factors (Surendran,

2012). According to Surendran, the external factors fall into 3 groups:

1. social factors – such as language, previous skills and conditions which
   facilitate the user's learning to use, or continued use of, the technology;
2. cultural factors – such as beliefs, values and traditions; and
3. political factors – such as the impact of using the technology on the
   organization, community or group.

Figure 1 - The Technology Acceptance Model
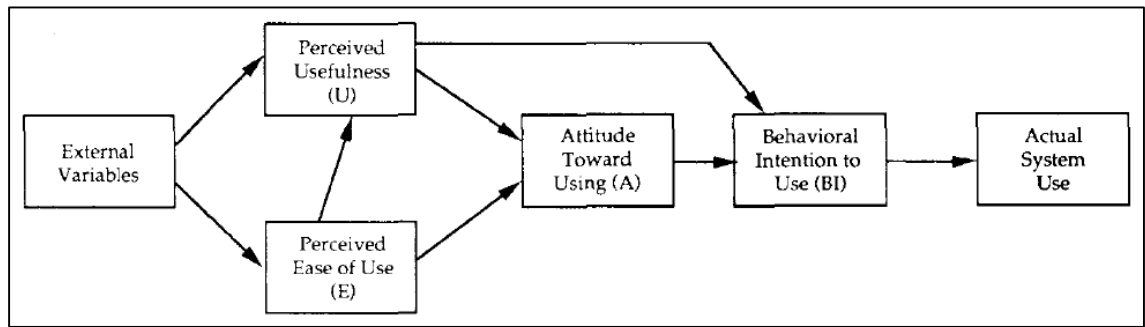
Davis et al (1989) further explain the model. They state that computer (or technology) usage is determined by one's behavioural intentions (BI). All things being equal, people form intentions to perform behaviours (or actions) toward which they have a positive effect. This is illustrated by the A to BI relationship in figure 1. One's BI is, however, co-determined by the attitude toward using technology (A) and the perceived usefulness of the technology (U). Computer (or technology) usage can be depicted by the following equation:

$$BI = A + U$$

Attitude is affected by both perceived ease of use (E) and perceived usefulness (U); and perceived usefulness (U) is affected by both perceived ease of use (E) and the external variables (namely the political, social and cultural factors). The E to U relationship (in fig. 1) basically states that the easier a system is to use, the more useful it can be, and ultimately the more positive a person's attitude towards using it will be.

The TAM is useful in the Jamaican context because it outlines, at a basic level, the variables which affect initial technology acceptance. Without a realisation

of the factors presented in the model, it is unlikely that information technology will enter the agritourism sub-sector, much less be used innovatively.

2.2.1.2 The Updated Technology Acceptance Model (TAM2)

Although the initial TAM provided a useful starting point, it did not go far enough to explain technology acceptance. The factors affecting acceptance did not fully explain the complex relationship which exists between the user's perception and actual usage behaviour. The updated Technology Acceptance Model (TAM2; fig. 2.) includes additional factors, referred to as "causal antecedents" (Venkatesh and Davis, 2000) which affect perceived usefulness.

FIGURE 2 - EXTENSION TO THE TECHNOLOGY ACCEPTANCE MODEL
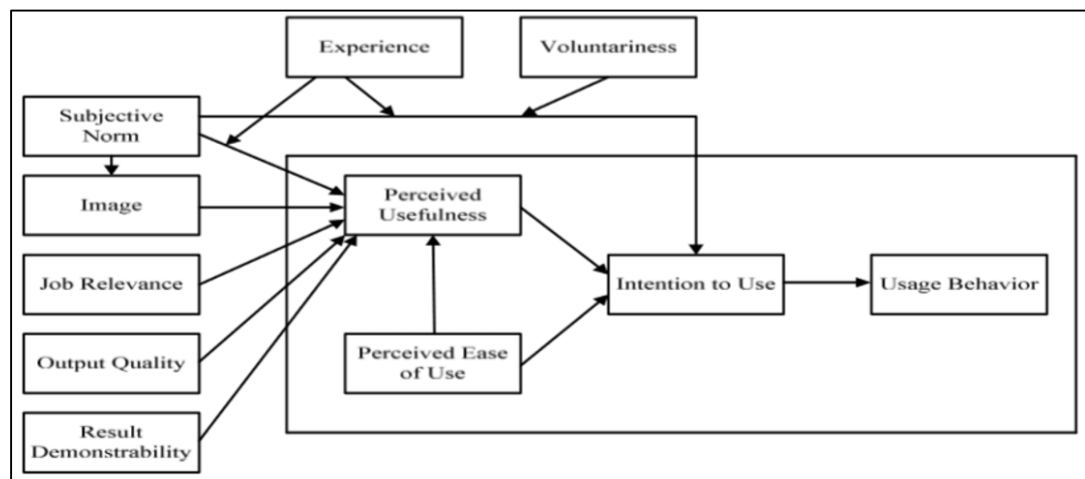
Source: Venkatesh and Davis (2000, p. 188)

In the original TAM, perceived usefulness was only affected by perceived ease of use and the external variables (political, social, and cultural factors which affect both perceived usefulness and perceived ease of use). However TAM2 identifies 7 additional variables. Five of these (Subjective Norm, Image, Job Relevance, Output Quality, and Result Demonstrability) affect perceived usefulness, one (Subjective Norm) affects Intention to Use, and two (Experience and Voluntariness) are moderating variables affecting the effect of Subjective Norm on Intention to Use and also moderate the effect of Subjective Norm on

Perceived Usefulness. TAM2 is more complex than TAM, in that it recognizes that an individual's perception of what value technology use adds to them successfully completing tasks is affected by several additional variables than was at first assumed.

Wu et al. (2011) provide a useful description of the variables (identified in fig. 2) which affect perceived usefulness. These variables were divided into two groups considered crucial to user acceptance - social influence processes and cognitive instrumental processes. Social influence processes are the social forces impacting a person's adoption or rejection of a new system (or technology). These include:

- **Subjective Norm** – an individual's perception *"…that most people who are important to him think he should or should not perform the behavior in question"* (Fisbein and Ajzen; 1975, p. 302);
- **Image** – the extent to which the use of a particular system (or technology) will increase a person's standing in the eyes of the members of their social group;
- **Voluntariness** – the potential user's perception that the adoption decision is optional. This is a moderating variable affecting the effect of Subjective Norm on Intention to Use.

The other group of variables considered crucial to user acceptance are termed cognitive instrumental processes and are used to compare the capability of a system (or technology) with what they need to get done in their job (Venkatesh and Davis, 2000). The cognitive instrumental processes are

- **Job Relevance** – the extent, as perceived by the potential user, to which the system (or technology) is applicable to a person's job;

- **Output Quality** – aside from the capability of the system (or technology), the extent to which the tasks which the system (or technology) can perform match the user's job goals;

- **Result Demonstrability** – whether the result of using the innovation can be independently measured;

- **Perceived Usefulness** – the same as in TAM, the extent to which a person believes that using the system will increase job performance.

In addition to the additional 6 variables, TAM2 incorporates experience into the model. As Wu et al. (2011) put it, *"Users' acceptance of an innovative system could vary with an increase in their experiences"* (p.138).

2.2.1.3 The Theory of Planned Behaviour

Similar to the Technology Acceptance Model, the Theory of Planned Behaviour emanated from the theory of reasoned action and is an extension of that theory (Ajzen, 1991). The Theory of Planned Behaviour delves deeper into the mind-set of the individual user and states that a person's actions are steered by their behavioural intentions. An individual's behavioural intentions are the plans to undertake a particular course of action and are functions of that person's attitude toward the behaviour, the subjective norms surrounding the performance of the behaviour, and behavioural control - the individual's perception of the ease with which the behaviour can be performed.

Behavioural intention is a central factor in the theory and it determines the actions a person eventually take (Ajzen, 1991; Eagly and Chaiken, 1993).

Eagly and Chaiken define Attitude toward the behaviour as the individual's positive or negative emotions about performing a behaviour, and subjective norm as an individual's perception of whether people important to the individual think the behaviour should be performed.

As Figure 3 illustrates, the relationship between an individual's behaviour and his/her intention is directly affected by intention and perceived behavioural control. According to Eagly and Chaiken (1993), Ajzen states that the relationship between perceived behavioural control and behaviour (fig. 3) should instead be between actual behavioural control and behaviour, however, since measuring actual behavioural control proved difficult, perceived behavioural control was used as a proxy.

As Ajzen puts it:

> Intention, perception of behavioral control, attitude toward the behavior, and subjective norm each reveals a different aspect of the behavior, and each can serve as a point of attack in attempts to change it.
>
> The underlying foundation of beliefs provides the detailed descriptions needed to gain substantive information about a

Figure 3 - Theory Of Planned Behavior
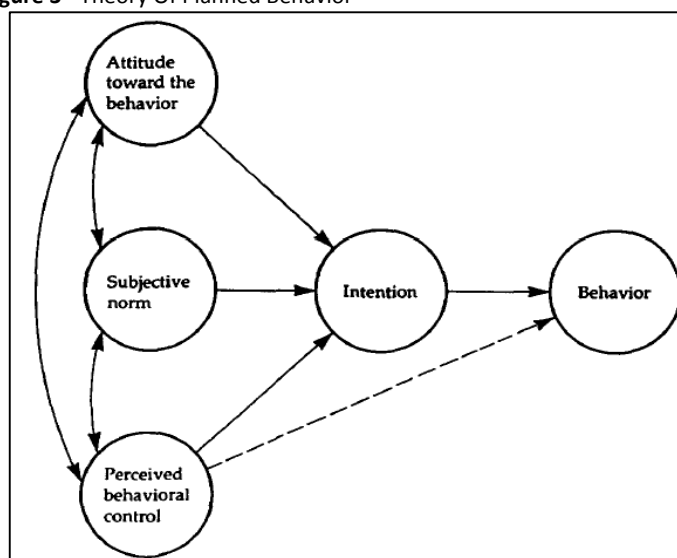
Source: Ajzen (1991, p.182)

behavior's determinants. It is at the level of beliefs that we can learn about the unique factors that induce one person to engage in the behavior of interest and to prompt another to follow a different course of action. (1991, p. 179)

2.2.1.4 The Unified Theory of Acceptance and Use of Technology (UTAUT)

The theories presented so far, look at an individual's mind-set toward using a particular technology and the factors influencing acceptance of that technology. The UTAUT was developed to provide a tool for managers to assess the likely impact of a newly introduced technology and to assist them design interventions which target users who are less inclined to adopt and use new systems (Venkatesh et al., 2003). The theory uses similar constructs to those in the theories previously articulated in this section and begins with the three basic components illustrated in figure 4.

The basic concepts, as articulated by Venkatesh et al., of acceptance models are:

i.   The Actual Use of information technology which is influenced directly by the two other factors (below);

ii. An individual's intentions to use information technology; and

iii. An individual's reactions to using information technology.

FIGURE 4 - BASIC CONCEPT UNDERLYING USER ACCEPTANCE MODELS
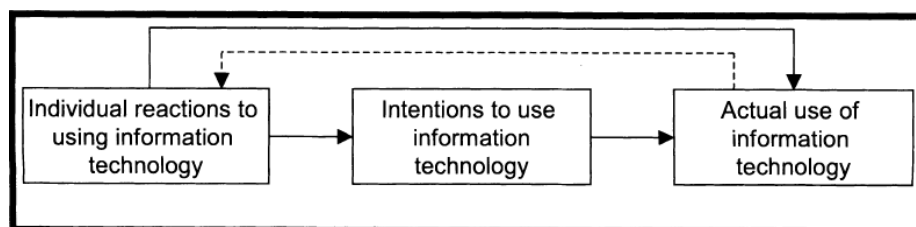
Source: Venkatesh et al. (2003, p. 427)

As illustrated in figure 4, an individual's reactions to using information technology will, over time, be affected by his/her experience using the technology.

37

The UTAUT (Venkatesh et al., 2003) identifies three factors which determine an individual's intention to use information technology and indicate how these change their effect on the actual use of information technology, through modifying the individual's intention, over time. The determinants of intention (illustrated in fig. 5) are:

i.   **Performance expectancy** – *"...the degree to which an individual believes that using the system will help him or her to attain gains in job performance"* (p. 447). This is similar to "perceived usefulness" in TAM and TAM2.

ii. **Effort Expectancy** - *"...the degree of ease associated with the use of the system."* (p. 447). Similar to "perceived ease of use" in TAM and TAM2.

iii. **Social Influence** – *"...the degree to which an individual perceives that important others believe he or she should use the new system"* (p. 451). Similar to subjective norm in TAM2.

FIGURE 5 - DETERMINANTS OF TECHNOLOGY USE
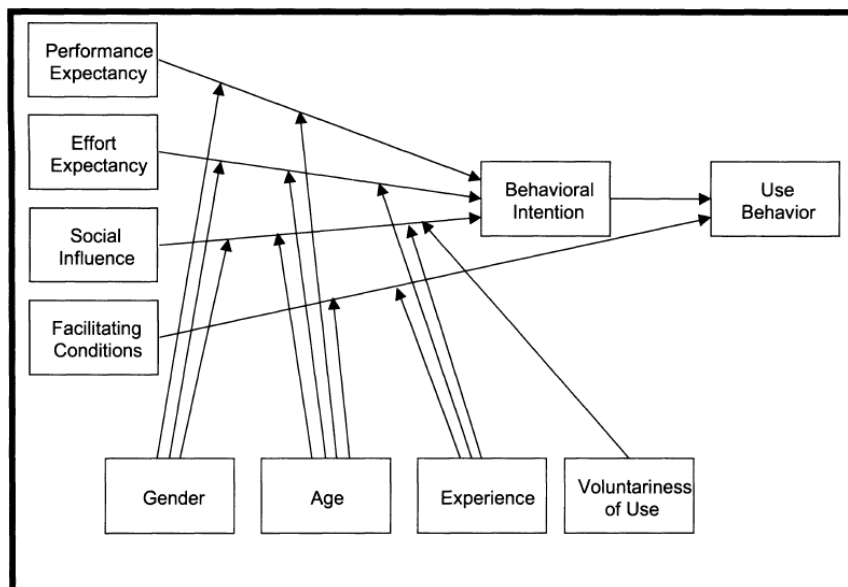
Source: Venkatesh et al. (2003, p. 445)

The theory states that all three determinants are moderated by one or a combination of the following: an individual's gender; age; experience; or whether using the system has been mandated by an employer or other entity – referred to as "voluntariness of use". The theory notes several key points related to what affects the determinants of Behavioural Intention and the facilitating conditions required for technology acceptance:

- **Performance expectancy** is affected by an individual's gender and age and has a greater impact on the behavioural intentions of younger men. In other words, younger men's behavioural intentions toward information technology are more affected by their perception of the value technology use will add to them attaining their work goals, than women (young and old), and older men.

- **Effort expectancy** is also affected by an individual's gender and age, as well as experience with using similar technology. However, its impact on behavioural intentions was greater in women, more so, in older women.

- **Social influence** is moderated by gender, age, experience, and voluntariness of use. Its impact on behavioural intentions is more acute in the context of mandatory technology use, more so among women, and especially in older women.

- **Facilitating Conditions** – "*...the degree to which an individual believes that an organizational and technical infrastructure exists*

to support use of the system" (p. 453), only has an impact on actual use and does not affect behavioural intentions.

The UTAUT is different from the previous theories discussed in that it identifies only two factors that determine an individual's use of technology:

  i.   Behavioural intentions;
 ii.   Facilitating conditions.

The UTAUT makes some valuable conclusions about the use of information and communication technologies which might be applied in the Jamaican agritourism context. Venkatesh et al. (2003) state:

> …***social influences do matter***; however, they are more likely to be salient to older workers, particularly women, and even then during early stages of experience/adoption. The pattern mirrors that for effort expectancy with the added caveat that social influences are more likely to be important in mandatory usage settings.

> …***as the younger cohort of employees in the workforce mature, gender differences in how each perceives information technology may disappear***. This is a hopeful sign and suggests that oft-mentioned gender differences in the use of information technology may be transitory, at least as they relate to a younger generation of workers raised and educated in the Digital Age.
> (p. 469)

2.2.2 Technology Acceptance or Adoption at the organisation level

The theories articulated in the previous section were grouped, based on what was proposed by Arpaci et al. (2012), with similar theories focusing on

technology acceptance by the individual. Although the aforementioned

theories are also applicable to the organizational context, those in this section

are more focused on the organization and highlight organizational variables

more starkly than variables affecting the individual.

2.2.2.1 Diffusion of Innovations Theory

Rogers (1962, 1971, 1983, 1995, 2003) provides a useful theory for

technology adoption, which has been grouped by Arpaci et al. (2012), with

other theories described as those concerning technology adoption at the

organisational level. However, Rogers' theory transcends the organisation and

includes social systems within the wider society. Rogers' theory is referred to

as the Diffusion of Innovations theory and was first published in the book

"Diffusion of Innovations" in 1962 with several updated editions following (in

1971, 1983, 1995, and 2003). The core theory, however, remains unchanged.

Rogers (1995) describes diffusion as *"…the process by which an*

innovation is communicated through certain channels over time among the

members of a social system" (p.5). He indicates that the communication is

specific to the sharing of information about new ideas for the mutual

understanding of participants. According to Rogers, this mutual understanding

does not preclude a divergence of views. However, the flow of information is

bi-directional (or multi-directional if more than two parties are present in the

communication). Each party to the communication contributes content to it.

Rogers (1983) provide more clarity

> So *diffusion* is a special type of communication, in which the
> messages are concerned with a new idea. It is this newness of
> the idea in the message content of communication that gives

diffusion its special character. The newness means that some degree of uncertainty is involved.

Uncertainty is the degree to which a number of alternatives are perceived with respect to the occurrence of an event and the relative probability of these alternatives. Uncertainty implies a lack of predictability, of structure, of information.
(p.6)

The Diffusion of Innovation Theory presents a model which purports to explain, using a set of generalisations, the typical spread of innovations within a social system. The theory (Rogers, 1995) has four main elements:

1. **The Innovation** – *"an idea, practice or object that is perceived as new by an individual or other unit of adoption"* (p.11). "New" may not mean that the innovation did not previously exist but rather that the individual might not have developed an attitude (positive or negative) toward it nor have adopted or rejected it. *"'Newness' of an innovation may be expressed in terms of knowledge, persuasion, or a decision to adopt"* (p.11).

2. **Communication Channels** – the mechanisms used to convey information between or among participants. Of note, according to the theory, most individuals rely on the assessment of other trusted individuals, who have previously adopted the innovation, when deciding on their reaction to that innovation.

3. **Time** – which has 3 dimensions

   a. how long after an individual knows about an innovation does he adopt or reject it?

    b. compared to other adopters, what is the relative

       earliness or lateness of an innovation's

       adoption/rejection?

    c. the rate of an innovation's adoption among the members

       of a particular group or population.

4. **A Social System** – *"...the interrelated units that are engaged in*

joint problem-solving to accomplish a common goal" (p.23).

An individual's decision to accept or reject an innovation is not sudden.

The process to decide on an innovation (fig. 6) involves four distinct steps.

- Step 1 – **Knowledge**
  - The individual becomes aware of the innovation and has at least a basic understanding of how the innovation works;

- Step 2 – **Persuasion**
  - The individual forms an attitude (favourable or unfavourable) toward the innovation;

- Step 3 – **Decision**
  - The individual chooses to accept or reject the innovation after engaging in activities which facilitate the choice;

- Step 4 – **Implementation**
  - The individual begins to use the innovation;

- Step 5 – **Confirmation**
  - The individual evaluates the results of the innovation-decision.

FIGURE 6 - A MODEL OF STAGES IN THE INNOVATION-DECISION PROCESS
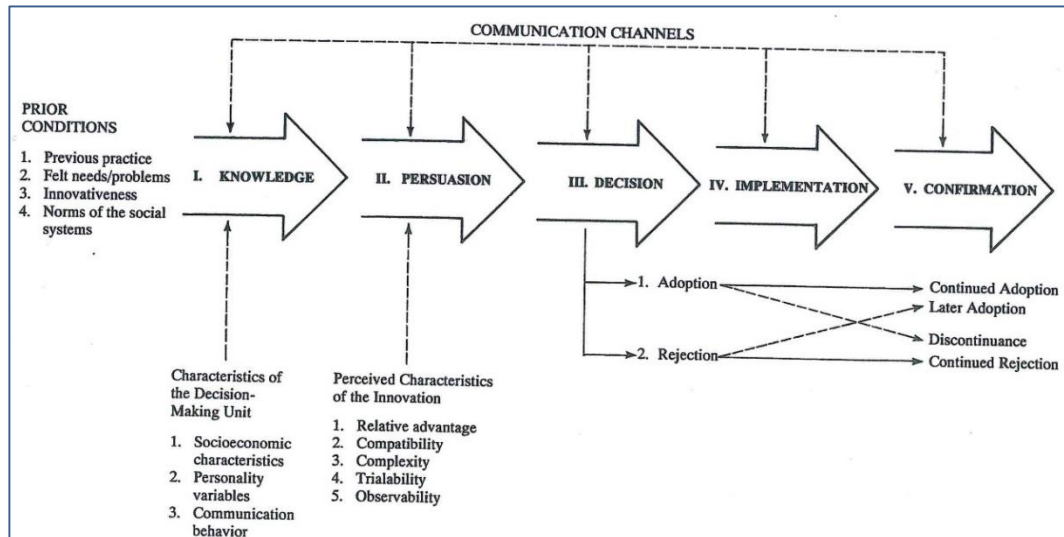
An important element of the theory is that individuals will adopt an innovation if, after considering all factors available to them, the innovation adds a net positive value to their lives or work. This positive net value, or utility, may be social or work related.

In addition to the factors affecting an individual's decision to adopt an innovation, the DOI theory recognises that, based on a combination of several factors, individuals adopt innovation at different relative speeds or rate of adoption. This, as stated earlier, under "Time", is one of the four elements of the DOI theory. As is illustrated by figure 7, the variables determining the rate of adoption of an innovation are the:

  i.   perceived attributes of the innovation;

  ii.   type of innovation decision – whether the use of the innovation is optional or required by the organization. *"Innovations requiring an individual-optional innovation decision are generally adopted more rapidly than when an innovation is adopted by an organization."* (Rogers, 1995, p. 206);

iii.   communication channels used to diffuse the innovation;

iv.   nature of the social system; and extent of Change Agents' promotion

    efforts.

FIGURE 7 - Variables Determining Rate of Adoption
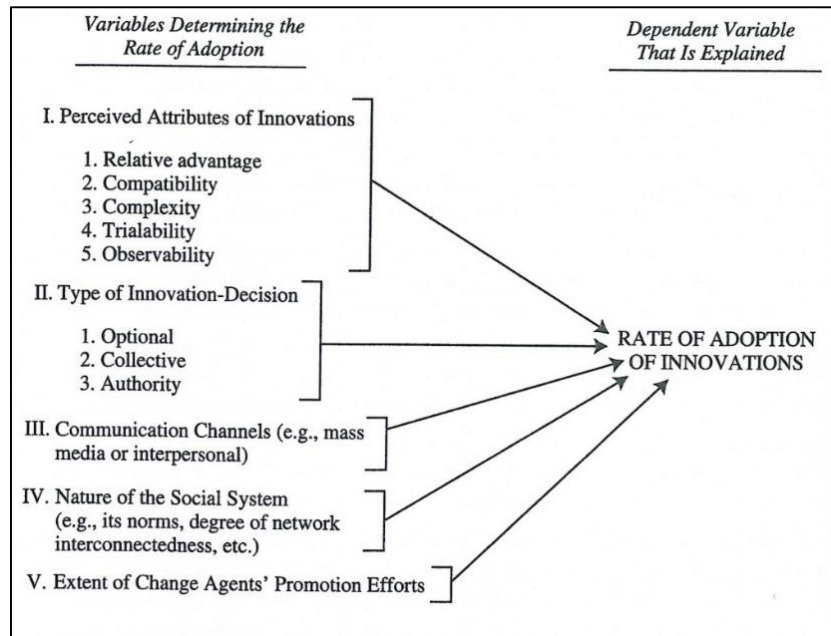
The theory places an individual into one of five groups, or technology

adopter categories, based on their rate of adoption. In addition, the theory

posits that the members of each group exhibit a common set of behavioural

characteristics. The groups, illustrated by figure 8, are:

i.   **Innovators** – the first to adopt an innovation. Individuals in this group

    enjoy being on the cutting edge and are eager to try new experiences.

    These influence the next group.

ii.   **Early adopters** – adopt an innovation after evaluating information

    about the innovation and observing whether the innovation has been

    effective for the innovators. This group contains most of the opinion

leaders in the population and is respected for its judicious, well-informed decision making.

iii. **Early majority** – these, of all adopters, are the largest proportion of the population and take their time to understand how the technology works before adopting it.

iv. **Late majority** – these use a "wait and see" approach and only adopt after most of the population and only after awaiting the feedback about the possible pitfalls associated with using the technology.

v. **Laggards** – these are the last to adopt an innovation and may either be very traditional or isolated from the social system within which they fall.

The theory makes an important point, one that resonates with the Jamaican social environment. Persuading opinion leaders, through communication channels, is the easiest way to form positive attitudes toward an innovation.

FIGURE 8 - THE TECHNOLOGY ADOPTION CURVE

The Technology Adoption Curve
As captured by Everett Rogers in his book Diffusion of Innovations, *people tend to adopt new technologies at varying rates. Their relative speed of adoption can be plotted as a normal distribution, with the primary differentiator being individuals' psychological disposition to new ideas.*

Innovators
(2.5%) are risk takers who have the resources and desire to try new things, even if they fail.

Early Adopters
(13.5%) are selective about which technologies they start using. They are considered the "one to check in with" for new information and reduce others' uncertainty about a new technology by adopting it.

Early Majority
(34%) take their time before adopting a new idea. They are willing to embrace a new technology as long as they understand how it fits with their lives.

Late Majority
(34%) adopt in reaction to peer pressure, emerging norms, or economic necessity. Most of the uncertainty around an idea must be resolved before they adopt.

Laggards
(16%) are traditional and make decisions based on past experience. They are often economically unable to take risks on new ideas.

Source: Hostyn (2010)

2.2.2.2 Technology-Organization-Environment (T-O-E) Framework

While the DOI looks at technology adoption across society, the T-O-E
framework (fig. 9) outlines the factors which influence the adoption and
implementation of innovations in the context of a organiation. The framework
presents the organisation's context in the form of three elements: 1. the
technological context; 2. the organizational context; and 3. the environmental
context. All three elements influence technological innovation (Baker, 2012).
All the technologies relevant to the organisation make up the technological
context and the organisation's existing technologies determine the scope and
pace of technological change which the organisation can undertake (Collins et

FIGURE 9 - THE TECHNOLOGY-ORGANIZATION-ENVIRONMENT FRAMEWORK
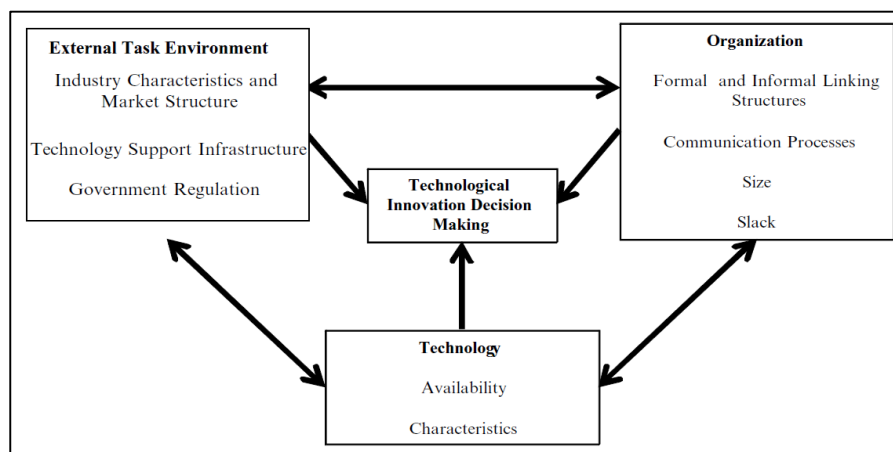
Source: Baker (2012, p. 236)

al, 1988; Baker 2012).

The technological context also recognises innovations outside the
organisation and arranges these into three basic groups (Ettlie et al., 1984;
Tushman and Nadler, 1986):

    i.   **incremental innovations** - which are least risky and, by the
organisation introducing new features or new versions of

existing technologies, require the least amount of business

process change if adopted;

ii. **synthetic innovations** – which combines existing ideas or

technologies in a novel manner, and are of moderate risk; and

iii. **radical innovations** – which significantly departs from current

technology or processes.

As Baker (2012) puts it

> ...organizations must carefully consider the type of
> organizational changes that will be created by adopting a new
> innovation. Some innovations will have a dramatic impact on
> the [organisation] and the industry in which it [operates],
> while others will have a relatively small impact. (p. 233)

The organizational context is comprised of the characteristics of the

organisation and its resources (Baker, 2012). One characteristic, the structure

of the organization, has been highlighted by several authors (Burns and Stalker,

1962; Zaltman et al., 1973; Daft and Becker, 1978) as a key determinant of

technology adoption. Other characteristics such as communication processes

(Tushman and Nadler, 1986; Austin et al., 2003), slack (Tornatsky et al., 1983;

Tornatsky and Fleischer, 1990; Rogers, 1995) and size (Scherer, 1980; Kamien

and Schwartz, 1982) are also prominent.

The environmental context refers to the factors which are external to

the organization, but present in the industry, country/region or global setting

in which the organization operates (Mansfield et al., 1977; Rees et al., 1984;

Kamath and Liker; 1994). Factors affecting the environmental context include:

- Industry structure;

- Competition;

- Industry life-cycle;

- Support infrastructure for technology;

- Availability of skilled labour; and

- Government Regulation.

The T-O-E provides useful assistance in assessing the likelihood of organisations, regardless of their size, adopting technology innovations and provides the factors, grouped into three contexts (technology, organization, and environmental), which may be used in the analysis.

2.2.2.3 Institutional Theory

The DOI theory and T-O-E framework view technology adoption from outside-in, whereas Institutional theory focuses on the impact of the organisation on technology adoption, a perspective from the inside-out. It states that the organisational environment critically shapes the organization's structure and its actions. The decisions of an organization are not purely rational but consider social and cultural factors in addition to concerns for legitimacy (Oliviera and Martins, 2011; Scott and Christensen, 1995; Scott 2004). The theory recognises that organizations operate at multiple levels. These levels are influenced by the various cultures, structures and routines operating within these organizations.

In addition, according to Oliviera and Martins' (2011) interpretation of Dimaggio and Powell (1983), organisations operating in the same industry or field, driven by external pressures to provide a level of service similar to others in the industry, tend to copy each other's actions. The act of copying the actions of other industry participants leads organisation to adopt similar technologies

to a point where all organisation are using similar technologies. At this point, organisation no longer compete on innovation but use other factors which differentiate them from the competition.

2.3 Technology Use

Once technology has been adopted by either the individual or organization, how this technology is used, has to be examined. Some authors (Brady, 2003; Fichman, 2000; Fichman and Kemerer, 1999; Zhu, Kraemer, and Xu, 2006) make the important distinction between technology adoption and assimilation into the work activities of an organization or individual. These authors state that the widespread usage of adopted technology tends to lag behind the pace of their adoption.

Zhu, Kraemer, and Xu (2006) citing Fichman and Kemerer (1999), speaking specifically about the organisation, state the following, *"A new technology may be introduced amid great enthusiasm and enjoy widespread initial acquisition, but nevertheless still fails to be thoroughly deployed among many acquiring [organisations]"* (p. 1559). Zhu, Kraemer, and Xu go further to state that once a new technology has been adopted it needs to be:

1. accepted for wide-scale usage among all users;

2. adapted to the needs of the organisation or individual undertaking a particular task at a particular time;

3. routinized – placed into the set habits and patterns of behaviour of the user; and

4. institutionalised – at the organizational level to become a critical part or the operations of the entity

The Assimilation of Information theory makes the point that it is not sufficient to speak about technology adoption, which might be on a small, non-productive, scale, the discussion should be widened to include the level of productive use. The assimilation gap, that is, the difference between those who have adopted the technology and those who have placed it in their personal and institutional routine (Keim, Malinowski and Weitzel, 2005), is a key measure which ought to be considered.

Tan et al. (2009) state that, in certain circumstances, current ICT use in small-scale agribusiness might be regarded as innovative. Frambach and Schillewaert (2002) and Rao (2007) make the point that this innovative use of ICT is especially evident in developing countries and has led to noticeable growth in the availability of ICT to the population of these regions or countries. Aleke et al. (2010) state that one case of innovative ICT use is in the shortening of the supply chain, which in turn leads to lower procurement costs and increased economic output. However, the innovative use of ICT in Caribbean agriculture and specifically agritourism has not yet been explored extensively and represents a lacuna in the current scholarly or industry literature.

In a more general sense, Kuhlmann (2006) outlines 3 specific ways in which technology, once adopted, can benefit any industry:

1. by supporting the production process;

2. by supporting procurement; and

3. by supporting logistics.

Looking specifically at agriculture, which is the superset of the agritourism investigated, Kuhlman (2006) provides an example where ICT can be practically applied to the agricultural sector, he states:

One major application of IT in agriculture will certainly be the

development of knowledge-based, bio-economic models which

> (i) will contain appropriate input-output-relationships as
>
> generalized production functions;
>
> (ii) will take into account space and time variability by
>
> incorporating the relevant, non-controllable yield factors,
>
> preferably with their direct values or at least with their
>
> probability distributions; and
>
> (iii) will contain biological and technological, as well as
>
> economic components, in order to provide effective decision
>
> support for the agricultural land users. (p.16)

Kuhlmann's (2006) statements on the application of ICT to the

agricultural sector is on the production-side and might seem abstract, however,

Iddings and Apps (1990) has a more direct approach. They indicate that a

specific application of ICT to agriculture is the use of a computer on the farm.

They outline several factors, framed broadly using the farmers' background,

environment, and personality, which influence computer use among farmers.

The following factors were identified:

1. **Complexity of Farm**

   This factor has two aspects which are seemingly in conflict, these

   are; 1. Level of complexity of farm activity; and 2. Size of farm.

   Larger farms tend to have more complicated activities and the

   more complicated a farm, the more valuable the use of ICT will be.

   However, larger farms require more time for data entry and more

complex databases and spreadsheets which mitigates against computer use.

2. **Degree of external support**

   Paradoxically, the greater the level of support received from external entities (which also store data related to the business of the farm) the less the perceived need there is for the farmer to store and process his own information.

3. **Age**

   Many farmers, even the ones in their 30's, thought they were too old to learn and hence were not motivated to acquire or use a computer in their operations.

4. **Views on Management**

   Management activities are given low priority. The perception is that time spent on the computer indoors to undertake management-related activities takes one away from outdoor farm activities, that is, "real farm work".

5. **Time**

   The single biggest hurdle for the farmer is learning to use software. A relatively substantial time investment must be made in order to learn software and use them proficiently. Farmers are often busy with daily farm activities and thus find it difficult to dedicate the time towards learning.

6. **Past Experience**

   A farmer's initial experience with computer use will affect overall adoption. If initially the experience was unpleasant (i.e., software

difficult to use or documentation unfriendly) the farmer, even after

having acquired a computer, may opt not to use it. *(Similar to that*

stated in TAM2.)

7. **Network**

   If the farmer has a support system of fellow computer and

   software users, s/he is more likely to use (or continue to use) the

   computer and application already acquired or may choose to make

   the initial acquisition. *(Similar to "Facilitating Conditions" identified*

   in the previous technology adoption theories presented.)

8. **Availability of Information**

   The absence of software for a specific farming practice or

   production system was also noted. In the foregoing situation,

   farmers chose not to use computers since these had no direct

   benefit for them. *(Similar to "Perceived Usefulness" in TAM and*

   TAM2.)

9. **Personality and Approach to learning**

   Self-motivated learners and those interested in learning new

   things were more likely to adopt the technology and fully utilize

   computers in their operations.

IICA (2006) takes, and extends, the discussion from one of mere farm

productivity towards community and national development. IICA's view of

development is an improvement in living standards and quality of life in the

general agricultural community and offers 8 recommendations for applying ICT

to agriculture, these are:

i. Any project to implement ICT at the farm-level or within a farming community should use a participatory and integrated design which includes a maintenance budget.

ii. Relationships must be built between technical implementers and ultimate end-users to ensure a sense of ownership from end-users, since it is they who will use the ICT solution(s) in the medium to long term.

iii. The ICT solution(s) should address local needs.

iv. Although ICT solutions are often implemented as projects, there should be provision for continued future capacity development.

v. The ICT options chosen should vary and provide alternatives to the discrete sections of the user community. In addition, the technical experts assigned to the community or venture should continually monitor the ICT landscape for new or improved ICT.

vi. Experiences gained in one location should be shared with people in another location so that a mechanism of learning and knowledge is created and maintained.

vii. Since ICT projects require time to become established, these must be integrated into the business or sector in order to ensure sustainability.

IICA further states that the success of an ICT implementation not only relies on the technical elements but also on policy. *"A conducive policy environment is necessary to foster the use of ICT to enhance rural livelihoods. Use of common standards and shared and compatible systems is necessary to make information easily accessible for end-users."* (2006, p.9)

2.4 An explanation of agritourism

Gelb and Parker (2006) note that the agricultural sector faces specific challenges which constrain its adoption of technology. The first factor mentioned is the lack of effective training of potential users, even younger ones who are more receptive to technology use. Another challenge identified was that the available ICT was not tailored for agricultural purposes, therefore, some farmers did not see the direct benefit of using technology.

Even though agritourism is the main focus of the investigation, the farm is a critical component. It is at the farm-level that ICT might be applied and therefore ICT's impact at that level must be taken into account. However, in order to differentiate this study from one where the focus is on agriculture generally, a clear definition of the unit of study is required. Again, the unit of study is agritourism, however, several other terms might have been used just as easily.

Terms such as agro-tourism (Iakovidou, 1997; Pulina et al., 2006; Sharpley, 2002), farm tourism (Davies and Gilbert, 1992; Dernoi, 1983; Frater, 1982; Garcia-Ramon et al., 1995), farm-based tourism (Evans and Ilbery, 1992), rural tourism (Fleischer and Pizam, 1997; Perales, 2002; Reichel et al, 2000; Sharpley, 2002), and agri-tourism (Koc, 2008; Kuo, 2006; Phillip et al, 2010) are also used. Phillip et al. (2010) indicate that these several labels have been used interchangeably to denote the same thing (citing Barbieri and Mshenga, 2008; Roberts and Hall, 2001; Wall, 2000) or to refer to similar but distinct concepts (citing Iakovidou, 1997; McGhee and Kim, 2004; Sharpley and Sharpley, 1997). This thesis will employ Phillip et al.'s (2010) definition of agritourism.

Phillip et al. use 'agritourism' as an all-encompassing term referring to the sub-sector where agriculture and tourism intersect.   This study also employs the framework or typology of agritourism types proposed by Philip et al. employs three characteristics as the basis for categorising agritourism types. These characteristics are:

1. Working farm – a place where agricultural activities are currently being practiced (p.2).

2. Contact with agricultural activity (p.2) – a relative measure of the type and frequency of contact between tourism and the agrarian environment. This measure is designed to clarify the role of agricultural activity in the tourism product.

    Contact with agricultural activity can be divided into three types, direct contact, indirect contact and passive contact. With direct contact, agricultural activities are a predominant part of the activity in which the tourist participates in the agrarian environment, e.g. harvesting a crop. Indirect contact on the other hand indicates a secondary contact with the agrarian environment for example through the consumption of foods produced on the farm. Passive contact between tourist and agricultural activity indicates that tourism and agriculture are operated independently and only share a common geographic space.

3. Authenticity of tourists' agricultural experience (p.2). A continuum of the amount of staging (activity done specifically for tourists' view) for the agricultural activity to which the tourist is

exposed. That is, modified from the original activity in order to accommodate the tourist (citing MacCannell, 1973);

> The prospect of tourists experiencing authentic agricultural activity is quite rare and normally involves physical participation in farm tasks. In the majority of cases where tourists have the opportunity to come in direct contact with authentic agricultural activities there will be at least some element of staging. (p.3)

Using the aforementioned characteristics, Phillip et al. then constructs a comprehensive five point typology of agritourism and state that more than one type can co-exist on a single landholding. Phillip et al.'s typology includes:

1. Non-working farm agritourism (NWF). Agricultural activity is not presently being practiced but the attraction comprises what used to take place on the farm (heritage attraction) or involves a conversion of a former working farm into an attraction using the same space, for example, horseback riding.

2. Working farm, passive contact agritourism (WFPC). The working farm provides the context to tourism but is not a part of the activity of the tourist. WFPC is often used as an additional income stream by farmers without affecting the core business of agriculture and may be considered as a route to farm diversification as opposed to tourism development. Tourism activities still take place on the farm but do not affect the workings

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of the farm, e.g., activity centres and holiday cottages using disused farm spaces.

3. Working farm, indirect contact agritourism (WFIC) – minimal integration of agriculture with the tourism product. Focuses on the use of agricultural products of the farm, as opposed to the actual farm, in the tourism product. This may include the growing of food for restaurants or hotels for tourists' consumption.

4. Working farm, direct contact, staged agritourism (WFDCS). Although situated on a working farm, tourist activities are staged and are separate from actual farm activities. This staging may take place through reproducing a section of the actual farm for viewing by tourists or through demonstrating farm activities. These demonstrations may be real activities, such as feeding times, coordinated to match tourist visits or designed specifically for tourists, e.g., the milking of cows.

5. Working farm, direct contact authentic agritourism (WFDCA). Tourists are exposed to actual first-hand farm activities and may even participate in these. *"This is the only type of agritourism which goes beyond 'normal' tourist settings into agricultural 'back regions'"*, (citing MacCannell, 1973).

According to the STATIN (2007), the vast majority of farms in Jamaica do not accommodate tourists nor do they provide entertainment or other attractions for visitors. Rather, these farms, the majority of which are less than 4 hectares, produce food for the tourism market (STATIN. 2007). Therefore,

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using Philip et al.'s agritourism typology, the majority of Jamaican farms participating in agritourism would fall under Working Farm Indirect Contact (WFIC) agritourism. Given the foregoing, WFIC agritourism is the only tourism type applicable to the Jamaican environment and will therefore be the focus of the remainder of this thesis. All future references to agritourism in this thesis will be to WFIC agritourism.

2.5 The impact of tourism on Small Island Developing States

The investigation presented in this thesis, while specific to Jamaica, is framed within the context of small island developing states in the Caribbean. Several authors (von Tigerstrom, 2005; Baldacchino, 2006; Dulal et al., 2009; Sharpley, 2009) speak to the complexity of small island developing states and the difficulty with crafting solutions for them. UNCTAD prefaces its 2004 publication with the following sentence, *"Probably no category of countries has ever been more commonly misunderstood than small island developing States (SIDS)"* (p.vi). Before delving deeper into the complexities of SIDS as these relate to agritourism, a proper working definition is required. Several such definitions exist, however the most useful and practical one is provided by the Commonwealth of Learning (COL) through a document edited by Filho (1994). Filho provides this very seminal definition in a 1994 publication which defines SIDS as *"...all sovereign islands whose territory does not exceed six hundred thousand square kilometres and whose per capita GNP does not exceed US$ 11,000"* (1994, p.1). This definition does not include colonies or overseas territories and recognises that not all SIDS can be described as poor developing nations.

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Building on the Filho (1994) definition, the United Nations (UN-OHRLLS, 2011) has identified three geographic regions where SIDS are located. These regions are:

1. the Caribbean;
2. the Pacific; and
3. the Atlantic, Indian Ocean, Mediterranean and South China Sea (AIMS).

Each region has its own regional body, to ensure regional cooperation, to which each respective small island developing state may belong. For the Caribbean, there is CARICOM; for the Pacific there is the Pacific Islands Forum; and for a part of AIMS, there is the Indian Ocean Commission.

SIDS are different from other states because they have a greater dependence on tourism than larger countries (Sharpley, 2003; Ioannides and Holcomb, 2003). This is often due to them leveraging their competitive advantage based on natural attractions and climate, instead of fully diversifying into other areas such as manufacturing and industry (Briguglio and Briguglio, 1999; UNCTAD, 2004). Often, a disproportionate number of the population is dependent on tourism and, as Archer (1982) contends, there is a multiplier effect within the larger economy because of the large proportion of national income which originates, directly and indirectly, from tourism. This relatively disproportionate multiplier effect means that the economies of SIDS are more susceptible to external shocks that negatively affect tourism. For the Caribbean, tourism contributes 14% of the region's GDP, which is one and a half times the global average of 9% (WTTC, 2013a).

2.6 The impact of tourism on local agriculture

Tourism has vast potential; it generates income, provides employment and can be linked with other sectors to promote economic diversification. This potential can also be leveraged to underpin the development strategy of those small countries that specialize in it (UNWTO, 2006 cited in Mondher and Norwak, 2007). Torres (2003) ranks tourism among the largest industries globally and state that up to one third of tourism expenditures are used to purchase food items. This makes food one of the biggest expenditure items of the tourism industry and presents a large opportunity for those providing food to tourists.

Tourism has positive effects on the host country's agricultural sector. The two sectors are natural complements and both are integral to the socio-economic fabric of the regions engaging in them (Fleischer and Tchetchik, 2005). Cox et al. (1995) state that tourism has, in some countries, extended agricultural production both quantitatively, by stimulating increased output through increasing demand, and qualitatively, by adding to the diversity of crops through the demand for non-traditional items. Cox et al. (1995) cites Hawaii as an example where tourism successfully influenced the inclusion of non-traditional fruits, coffee, nuts, flowers and nursery products.

Cox et al. (1995) are not alone in their praise of the positive effect of tourism on local agriculture. Gooding (1977), de Kadt (1979) and Belisle (1983) also recognise the positive effect tourism has on local agriculture. However, they indicate that while tourism does have a beneficial effect on local agriculture, farmers must adjust their production in order to meet the demand from the tourism market. They state that this adjustment not only has the

potential to increase overall output, but can potentially lead to diversification into high-value agricultural products.

While tourism has a positive overall effect on local economies, it can also have a negative impact if not properly integrated in a holistic programme of development. Belisle (1983) cites the Caribbean example of food importation for tourist consumption leading to a loss of well needed foreign exchange. According to Belisle, one negative impact tourism has on local agriculture is that of limiting local agricultural production (or expansion) and diversification due to the imports. Basically, imports "crowd out" local agricultural production.

Belisle also outlines three inter-related negative impacts of tourism on local agriculture which may eventually lead to decreased or stagnant agricultural output. Citing Bryden (1974), Jefferson (1972), O'Laughlin (1968), Archibals (1970) Alleyne (1974) and Glover (1976), Belise states that tourism can, potentially, increase the price of locally produced food by influencing the input cost of labour. Tourism, according to Belisle (1983), has the potential to attract labour from agriculture to tourism which may result in the cost of local agricultural labour becoming uncompetitive. Relatively high labour costs may make local agricultural production unsustainable.

Another negative impact, according to Belise (1983) is a reduction in the availability of agricultural land when such land is used for recreational purposes. However, Bryden (1973) has a different view. He indicates that the reduction in available agricultural land is negligible in the larger Caribbean islands such as Jamaica, Puerto Rico and Hispaniola, but is significant, leading to agricultural decline, in the smaller, leeward, Caribbean islands. Therefore,

while tourism may convert land use from agriculture to recreation, this conversion is fairly innocuous in larger territories where land availability is relatively high.

2.7 Small and Medium Sized Enterprises (SMEs)

There is no globally accepted definition of what an SME is, and as Christodoulou (2009) indicates, depending on the definition employed by a particular country, SMEs can range from very small to very large companies. Most country definitions use the number of employees and the annual turnover of the organisation to classify SMEs. Hauser (2005) indicates that, officially, the OECD defines an enterprise as an SME if it employs less than 250 employees and has turnover of less than 50 million euro. The OECD definition goes further, and includes an ownership criterion by stating that, if it is to be considered an SME, not more than 25% of the entity's shares should be held by another enterprise.

Although the OECD has an official definition for SMEs, member countries often have their own SME definition. For instance, the Institute for Small Business Research (IfM) in Bonn, Germany, has separated small and medium sized enterprises. The IfM (2002) defines small enterprises as those having up to 9 employees and turnover of up to 1 million euro, and medium enterprises as those with up to 499 employees and turnover of up to 50 million euro. The European Commission, EC (2005), has a very comprehensive definition, similar to that of the OECD and includes the following criteria:

- head count (annual work unit);
- annual turnover; and

- annual balance sheet total.

According to the EC definition, which was drafted in 2003, a micro enterprise is defined as having less than 10 employees, with turnover or an annual balance sheet total of up to 2 million euro. A small enterprise has less than 50 employees and up to 10 million euro in annual turnover or annual balance sheet total. A medium-sized enterprise has less than 250 employees, annual turnover of up to 50 million euro, or, an annual balance sheet total of up to 43 million euro.

While the traditional definition used for SMEs can be applied to agricultural sector generally, there is no specific definition for SMEs involved in agricultural production. The IFC (2011) has proposed a useful illustrative framework for segmenting primary agricultural producers into different categories. The IFC framework, which can be usefully applied to WFIC Agritourism in Jamaica, segments farms into four categories: 1. Large farms; 2. Medium-sized farms; 3. Commercial small holdings; and 4. Semi-commercial small holdings. The IFC then includes only commercial small holdings and semi-commercial small holdings in its definition of Agricultural SMEs.

The IFC (2011) states that medium sized farms are those with more than 20 hectares up to 500 hectares under production, an annual net income of between 0.9 and 1.9 times that of a skilled labourer in that region, and which generate meaningful income from farming. While large farms produce and market their output in a professional manner, employ staff, are more than 500 hectares in size, and have net income after costs of roughly two times the annual earnings of a skilled labourer in that region.

In the Jamaican situation, farms are grouped in a different manner to that stated by the IFC and therefore the SME definition for farms would, of necessity, be different than that articulated by the IFC. In the Jamaican situation, farm size ranges are as follows:

1. under 1 hectare;

2. 1 – 5 hectares;

3. 5 – 50 hectares;

4. 50 to less than 200 hectares; and

5. 200 or more hectares (Statin, 2007).

No commensurate data was located relating to income or the number of persons employed and therefore the SME definition for the Jamaican situation would only include farm size. The foregoing means that the Jamaica definition of an agricultural SME would be all farms except for those within group 5 (200 or more hectares).

2.8 Applying ICT to the agritourism sub-sector

Few authors have recorded the application of ICT to agritourism and even fewer have done so for the Caribbean. In fact, none have been found from the analysis of the published work to date. There are, however, a myriad references to applying ICT to agriculture as well as applying ICT to tourism. The focus of this investigation is whether ICT can positively impact agritourism among specific farms. However, before focussing on the impact of ICT on agritourism, it is useful to look at the impact of ICT on productivity in a more general sense. Importantly, and especially for a developing country like Jamaica, although Edquist and Henrikson (2006) laud the impact of ICT on

productivity, implicit in the discourse is that, for a country and industry to benefit from it, technology must first be adopted. Logically, if a country/industry does not adopt technology, it will not realise the productivity benefits.

Successfully applying ICT to WFIC Agritourism will depend largely on how readily farmers accept and use the technology. Pretty (2004) state that equally important as having access to the technology is knowledge of how to use it. Much of the work of user acceptance of technology is based on the technology acceptance model first posited by Davis (1986; 1989). Davis' twin variables for determining whether a user accepts a particular piece of technology, are the user's perception of how easy the technology is to use, and how useful the technology is to their doing the task to which it is applied.

For farmers, Adrian et al (2005), state that an attitude of confidence towards using a particular technology and the perception of its usefulness, both positively influence technology adoption, they state, *"A potential user of a technology who perceives the technology as easy-to-use is more likely to perceive the technology as useful and more likely to adopt these technologies."* (p. 260). Therefore in order to ensure that WFIC Agritourism farmers accept and use ICT, those applying the technology must first convince the farmers that the technology is easy to use and that it is, in fact, useful.

Given the relatively small size of the majority of the entities in Jamaica, it is conceivable that the ICT benefits described by several contributors (Tan et al., 2009; Frambach and Schillewaert, 2002; Rao, 2007; Aleke et al., 2009; Kuhlmann, 2006) might be adopted by WFIC farms at following three levels:

1. *small devices* - the use of small devices such as multifunction cellular telephones to quickly access and transmit data, and nanotechnology for food safety;

2. *infrastructure* - using telecommunication networks and cloud computing facilities to receive, transmit, and store WFIC Agritourism data; and

3. *software applications* – to assist in managing information as well as, among other things, to track items in the WFIC Agritourism supply chain and using the data obtained to match production to the demand of the sector.

Zuppo (2012) also indicate that ICT-enabled services often use multiple technologies, applied simultaneously to the same issue, and are more effective than applying a single technology.

2.9 Agriculture Innovation Systems

The discussion so far has looked at technology in the context of its application to agritourism or to the broader agricultural sector. However, to maximise the potential benefit of ICT, one has to consider the entire system within which agritourism operates. A system is a set of interrelated components working together towards the same (or similar) outcome (Kast and Rosenweig, 1972; Harary and Batell, 1981). Rajalahti et al (2008) describe an innovation system as *"…the network of organizations, enterprises, and individuals focussed in bringing new products, new processes, and new forms of organization to economic use…"* (p.3). Put differently, an innovation system uses technology as the driver to fulfil the goal being sought by the actors. According to Agwu et al. (2008, p.1605)

[An] Innovation system approach offers a more holistic,

multidisciplinary and comprehensive framework for analyzing

[the] innovation process, the roles of science and technology

actors and their interactions, emphasizing on wider

stakeholder participation, linkages and institutional context of

innovation and processes.

The Food and Agricultural Organization (FAO, 2014) recognizes the

positive effect innovation systems have on small-scale agriculture. It indicates

that a key component, in addition to other factors, of a successful agricultural

innovation system is an enabling economic and institutional environment. The

FAO (2014) states that globally, farms of less than 1 hectare account for 72% of

all farms, while 12% are between 1 and 2 hectares, 10% are farms between 2 –

5 hectares and only 1% are more than 50 hectares. Other key components of

agriculture innovation systems are advisory services which build on local

knowledge and traditional systems *"...in combination with new sources of*

knowledge from formal research systems" (p.8).

As Rudgard et al (2011) observe, the increased pervasiveness of ICT has

added to its relevance for agricultural innovation systems. Agricultural

innovation systems are composed of several sectors which, according to Agwu

et al. (2008), include:

- o the market demand sector, made up of wholesalers, retailers and consumers;
- o the enterprise sector, made up of those who produce and sell products;
- o the research sector, made up of those who generate knowledge;

- o the diffusion sector, made up of intermediary organizations which

  transmit knowledge to the other sectors; and

- o the infrastructure sector, which is made up of the policy-making

  agencies, transportation and marketing infrastructure as well as the

  education system.

Figure 10 provides an illustration of the Agriculture Innovation System

described by Agwu et al.

FIGURE 10 - Agricultural Innovation System
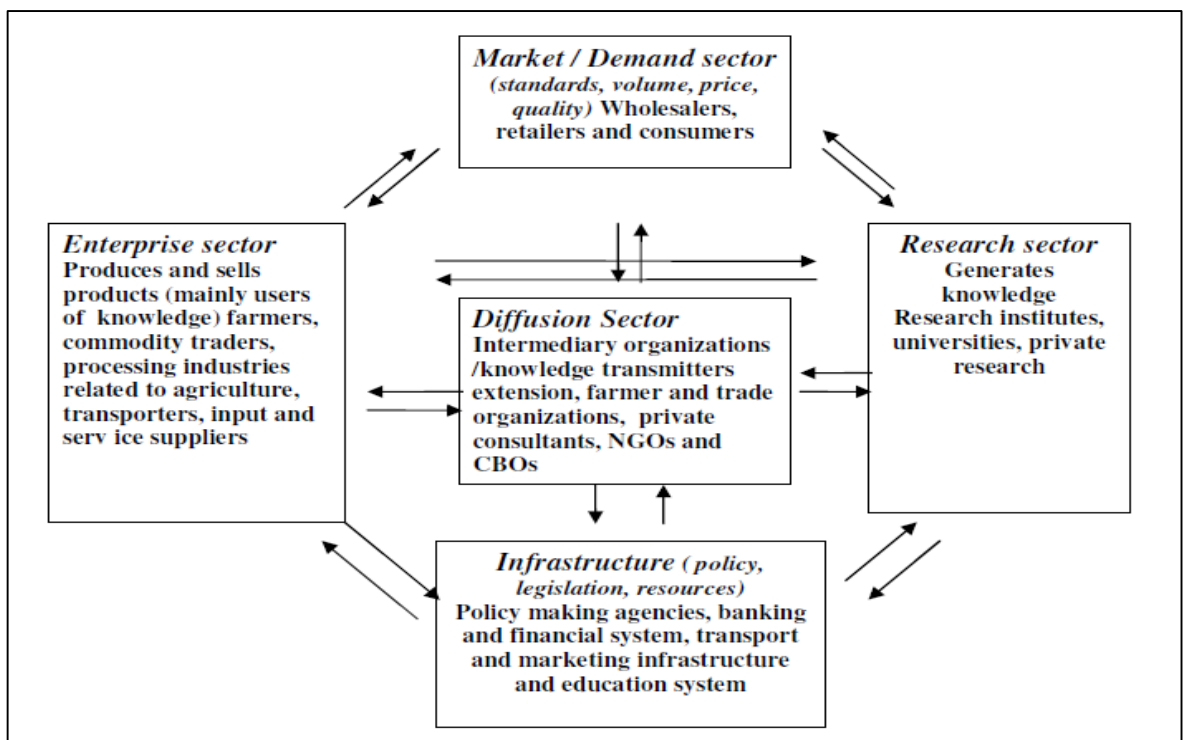
The agricultural innovation system promotes direct interaction among the

sectors but also has a sector which is tasked with dissemination information to

the other sectors. The sectors of the agricultural innovation system as

presented by Agwu et al. (2008) who adapted them from Rajalahti (2008) are:

- **The Demand Sector**

  This sector consists of entities or individuals that will use agricultural

products and includes the end consumer (householder), international commodity markets, and those agencies that draft agricultural policy.

- **The Enterprise Sector**

  This sector consists of entities or individual producers. Information is provided to this sector in a format that is easily interpreted and applicable to their needs. This sector includes farmers, commodity traders, companies (including those in agri-processing) and transporters.

- **The Research Sector**

  This sector produces most of the knowledge to be used by the other sectors. Members of this sector include research organizations, universities and colleges, private foundations or companies, and Non-Governmental Organizations (NGOs).

- **The Diffusion Sector**

  This sector is responsible for the dissemination of information to those who need it. Although this sector has information dissemination as its primary responsibility, the other sectors can interact directly with each other in order to share information. The members of this sector include NGOs, extension services, farmers and trade organizations, and donors.

- **Infrastructure**

  This supports the process of information generation, transmission and use and includes the education system, the financial system, transport and marketing infrastructure, and professional networks, including trade and farmer associations.

Although the model presented is considered most applicable to the Jamaican context, there are other interpretations, such as the one provided by Rajalahti et al. (2008). They, in addition to identifying the sectors by different names, state that there is a heightened need to re-examine how innovation occurs in the agricultural sectors. This re-examination would include the following considerations:

1. Agricultural development is driven by markets and not farmers;

2. The demand side and its facilitators such as traders are growing more dynamic and have evolved to require greater flexibility from those who supply the market;

3. As intimated in the theories on technology adoption, knowledge, information availability and technological capacity are generated, diffused and applied through the private sector;

4. Knowledge developed in disparate areas is increasingly being adapted, using ICT, to new areas, especially agriculture;

5. The agricultural sector's knowledge structure has changed and is changing; and

6. The developments in agriculture is becoming increasingly globalized.

While the agricultural innovation system is an important concept which integrates the various components of an industry or practice, the World Bank (2006) cites 3 factors which limit their effectiveness:

1. The inter-sector linkages required for creating dynamic systems of innovation are often absent;

2. The missing inter-sector interaction leads to several other issues such as insufficient articulation of the research and training needs of system participants, insufficient technological learning, insufficient organizational learning, insufficient planning, and insufficient integration with sources of funding.

3. Culture (attitudes and practices) plays a vital role and major obstacle to innovation, restricting the collaboration necessary for a well-functioning innovation system.

2.10 Summary

This chapter analysed the literature pertinent to the application of ICT to Jamaican agritourism. The introduction identified the literature providing a definition (2.1.1) of ICT and its impact on global productivity. The definition presented in the introduction is the working definition used throughout the rest of the chapter and thesis.

In order to understand how technology might be used to change or improve any area, one must understand how it is adopted by the users and organisations there. Section 2.2 analysed the theories relevant to technology adoption. The theories were divided, based on a useful grouping provided by Arpaci et al. (2012), into two basic groups: 1. those adopted by individuals; and 2. those adopted by organisations. It should be noted that the grouping used in the chapter is one of several which could have been used and that some other authors group the theories differently.

An important variable shared by the theories presented is the importance of social factors, whether the influence of other users who

previously adopted the technology or the perception of how technology acceptance might affect one's image, in an individual's decision to accept technology. Some of the theories indicated that sex and age also play a role in initial acceptance, while experience with previous technologies is another important factor. The Diffusion of Innovations theory, one of the more influential theories, states that persuading opinion leaders, through established communication channels, is the easiest way to form positive attitudes towards innovation.

While adoption is an important first step, some authors (Brady, 2003; Fichman, 2000; Fichman and Kemerer, 1999; Zhu, Kraemer, and Xu, 2006) state that there is a clear difference between technology adoption and frequent productive use – referred to as technology assimilation. Keim, Malinowski and Weitzel (2005), state that the assimilation gap, the difference between those who have adopted the technology and those who have placed it in their personal and institutional routine, is a key measure which ought to be considered.

A significant gap in the literature is the application of ICT to agritourism. Therefore, much of the discussion in the chapter focussed on the use of ICT in agriculture as a proxy for ICT use in agritourism. However, even with this, there is also a gap identified in the literature pertaining to the use of ICT in agriculture in small island developing states (SIDS) like Jamaica. This therefore required an analysis of the literature on SIDS, especially those in the Caribbean where the impact of tourism on GDP is roughly one and half times the global average (WTTC, 2013a).

While it was important to look at the theories about technology adoption, the area for application – agritourism, and the context – SIDS, it was also critical to take a look at the possible components comprising the agritourism system. Section 2.9 analysed the literature on the agricultural innovation system, again, as a proxy for an agritourism innovation system, to which ICT can be applied. Chapter 3 will outline the conceptual or theoretical framework developed from the literature analysed in this chapter and will present the research outline for the investigation undertaken in this thesis.

Chapter 3 - Research Outline

3.1 Introduction

This chapter describes the structure of the research by providing an overview of the approach used to conduct it, as well as its theoretical context. The chapter is divided into 3 sections: Section 1 (3.1 Introduction) provides the research context and a summary of its contents; Section 3.2 contains the theoretical framework; and Section 3.3 states the research questions and the approach taken to answer them. A summary of the chapter is included in Section 3.4. Chapter 4 – Research Methodology, provides details of the research approach and its theoretical justification.

3.1.1 The Theoretical Framework

Most scholars use the terms "theoretical framework" and "conceptual framework" interchangeably (Maxwell, 2012; Leshem and Trafford 2007; Sinclair, 2007; Mirriam and Simpson, 2000; Miles and Huberman, 1994), however, some recognise, and approach, these separately (Rocco and Plakhotnik, 2009). The researcher has decided to use the terms interchangeably and has not engaged the debate about the differences between them or which comes first.

A useful definition of what a theoretical framework is comes from Cubitt (2005, in Waller, 2006). According to Cubitt:

> A theoretical framework is a self-conscious set of (a) fundamental principles or axioms (ethical, political, philosophical) and (b) a set of rules for combining and applying them (e.g. induction, deduction, contradiction, and extrapolation). A theoretical framework defines the objects of a discourse, the permissible ways of thinking about those

objects, and so determines the kinds of knowledge about the objects that can be produced legitimately within the framework (p. 25)

The theoretical framework guides the research process and allows the researcher the use relevant theories, methods and research approaches (Borgatti, 1999). Some (Maxwell, 2012; Robson, 2011; Miles and Huberman, 1994) provide a more straight-forward view and describe the theoretical framework as the set of beliefs, theories, concepts, assumptions, and expectations which inform and support the research. Miles and Huberman (1994) further elaborate by stating that the conceptual framework *"…explains, either graphically or in narrative form, the main things to be studied – the key factors, concepts, or variables – and the presumed relationship among them"* (p.18).

The theoretical framework in sub-Section 3.2 highlights the main theories which were used to focus the researcher's thoughts and conceptualise what would be done in the investigation. The researcher identifies a key concept, in Section 3.3, which narrows the focus and provides the basis for the actual methodological approach taken.

3.1.2 A quick note on nomenclature

Several sections of this thesis reference the scholarship of others (Arvantis and Loukis, 2009; Keil et al., 2001; Lucas, 2008; Su, 2008) and, in so doing, repeat the terms used by them. This may, at times, be confusing to the reader especially as it relates to the use of the abbreviation "ICT". For the references in this thesis, the researcher has chosen ICT to mean information and communication technologies, however, where the researcher has quoted

others, the term "ICT" might be interchangeable with "IT". In more recent

work, the term ICT replaces IT, "information technology" or 'information

technologies, (Kennewel et al., 2000), and ICT subsumes IT (Miranda, 2007).

Again, for the purposes of clarity and consistency, whenever the abbreviation

"ICT" is used throughout the remainder of this paper, it will refer to the term

"Information and Communication Technologies".

3.2 Theoretical Framework

The investigation undertaken for the thesis is, basically, the use of ICT in

agritourism to match supply and demand. The investigation focuses on an area

where two discrete research disciplines, agriculture and tourism, converge, as

well as the application of ICT to that converged area. Any theoretical

framework selected must therefore place the effect of ICT, applied to a single or

merged area, in primary focus.   At the basic level, this investigation fits into the

discipline of informatics which, according to Tolliver (2008), focuses on the

application of information technology in the context of another field; in this

case agritourism. Others (Fusco, Michael and Michael, 2010; Sawyer and

Tyworth, 2006; Sawyer and Tapia, 2007) recognise the study of informatics as

focussing on technology design, which considers the relationship between the

technology itself and its use in real-world settings.   Sawyer and Eschenfelder

(2002) define informatics as *"...the study of information content, representation,

technology, and the methods and strategies associated with it"* (p.432). Jarvinen

(2006), illustrated in table 2, provide a useful comparison between the

standard view of ICT as a set of tools and the socio-technical view articulated by

social informatics.

Although the researcher has chosen to focus on a definition of informatics which centralises the application of ICT to a particular domain, there is sensitivity to the existence of other definitions. Some definitions, especially in Europe, use the term "informatics" synonymously with all computer science disciplines (Dahlbom, 1996). The philosophical debate about the term "informatics" is not the focus of this thesis and will not form part of the future narrative. The theoretical framework uses the term "informatics" as a sub-discipline of computer science and not as its synonym.

TABLE 2 - CONCEPTIONS OF ICT IN ORGANIZATIONS/SOCIETY

Standard (tool) models	Socio-technical models
ICT is a tool	ICT is a socio-technical network
A business model is sufficient	An ecological view is also needed
One-shot ICT implementations are made	ICT implementations are an ongoing social process
Technological effects are direct and immediate	Technological effects are indirect and involve different time scales
Politics are bad or irrelevant	Politics are central and even enabling
Incentives to change are unproblematic	Incentives may require restructuring (and may be in conflict)
Relationships are easily reformed	
Social effects of ICT are big but isolated and benign	Relationships are complex, negotiated, multivalent (including trust)
Contexts are simple (a few key terms or demographics)	Potentially enormous social repercussions of ICT (not just quality of work life, but overall quality of life)
Knowledge and expertise are easily made explicit	Contexts are complex (matrices of businesses, services, people, technology history, location, etc.)
ICT infrastructures are fully supportive	Knowledge and expertise are inherently tacit/implicit
	Additional skill and work are needed to make ICT work

Source: Jarvinen (2006; p. 401)

Although this study finds a home in informatics as a general discipline, greater focus is provided by the theories used in social informatics - a sub-discipline of informatics or a replacement term for informatics. Social informatics, as a concept, emerged in the 1970s alongside the growing role of

ICT in society (Vehovar, 2006). An early definition describes social informatics as the interdisciplinary study of the design, use and effects of ICT, within the context of institutions and cultures (Kling, 1999). Supporting Kling, Vehovar (2006, p.76) states that social informatics is a body of research examining *"...social aspects of computerization including the roles of information technology in social and organizational changes, the uses of information technologies in social contexts and the ways that the social organization of information technologies is influenced by social forces and social practices."* More recent definitions describe social informatics as the relationship between information and communication technologies and the larger social context within which they operate (Fusco et al., 2010; Sawyer and Eschenfelder, 2002; Kling, 2007) and *"the interdisciplinary study of the design, uses and consequences of information technologies that takes into account their interaction with institutional and cultural contexts"* Kling (2007, p.205).

The theories presented in Chapter 2 point to the importance of social contexts to technology adoption. The theoretical framework's refinement is assisted by Vehovar (2006) who provides the following 3 broad directions which can be taken by social informatics (illustrated in figure 3.1):

1. **ICT's interaction with society**

   Which deals with personal computer use, human computer interaction (HCI) and the use and effects of ICT on the organisation and community.

2. **ICT applications in the social sciences**

   This is specific to the application of ICT to activities such as data modelling, social science information systems and software applications for business,

and information architectures for web sites and other applications for the

social sciences. A parallel set of applications, such as medical informatics

and agriculture informatics, can also be placed in this domain.

3. **ICT as a tool in social research**

   This uses ICT to study social phenomena and includes computer intensive

   methods for collecting, analysing and presenting research data.

The theoretical framework adopted for this thesis focuses on two of the

three broad directions of Social Informatics (fig. 11), namely: 1. ICT interactions

with society; and 2. ICT applications in the social sciences. A further refinement

may be in the field of agriculture informatics or the yet to be defined area of

agritourism informatics. The research investigates the personal use of

computers by actors in the agritourism sub-sector and the effects on the

organization with which these actors are associated. The research also

investigates some of the possible applications of ICT, other than the use of

personal computers, to the agritourism sub-sector itself. Although some data

FIGURE 11 - THE 3 DIRECTIONS OF SOCIAL INFORMATICS
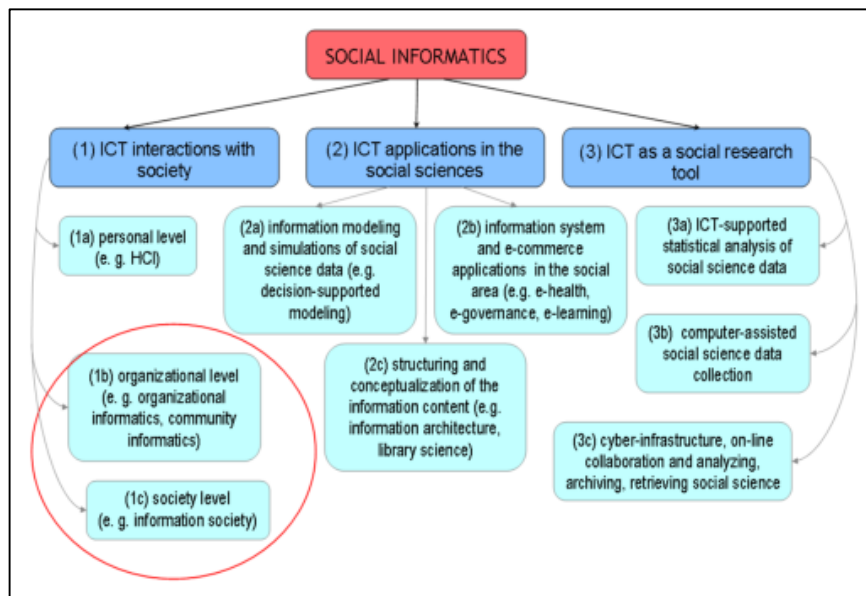
Source: Vehovar (2006, p.177)

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analysis was conducted using qualitative data analysis software, the third direction, that of ICT as a social research tool, this did not form part of the investigation.

A useful perspective has been provided by Sawyer and Escenfelder (2002) who highlight the problem solving orientation of social informatics, and allows researchers to direct social informatics at the organization, or at groups, in the form of organizational informatics. They (Sawyer and Escenfelder, 2002) define organizational informatics as *"...social informatics studies whose level of analysis is tied to formalized organizational or group boundaries"* (p.432). Sawyer and Escenfelder legitimize the researcher's application of social informatics to the organization or group - in this case farmers, hoteliers, restaurateurs, etc. - and indicate that organizational informatics is a subset of social informatics. However, for convenience, this thesis will use the term social informatics to denote both social and organizational informatics.

Social informatics is not a single theory, but rather several, often multi-disciplinary, theories used by researchers in the field (Kling, 2007; Sawyer and Eschenfelder, 2002; Vehovar, 2006). With social informatics, information is the main focus, not computation. However, although information is the main focus, this cannot be isolated from the focus on technology (Sawyer and Escenfelder, 2002). The social nature of informatics is also highlighted by 3 thematic findings, outlined by Sawyer and Escenfelder (2002, p. 438), which state that:

1. The use of ICT leads to multiple and sometimes paradoxical effects;
2. The use of ICT shapes thought and action in ways which benefit some groups more than others and these differential effects often have moral and ethical consequences; and

3. A reciprocal relationship exists between ICT design, implementation, use and the context in which these occur.

Social informatics makes use of the concepts of the IT artifact (fig. 12) and the IT nomological network (fig. 13) proposed by Benbasat and Zmud (2003). They describe the IT artifact as the application of IT to enable or support tasks that are within a structure (organization or group) and the structure is itself in a particular [social] context – this relationship is illustrated in Figure 3.2.

FIGURE 12 - THE IT ARTIFACT
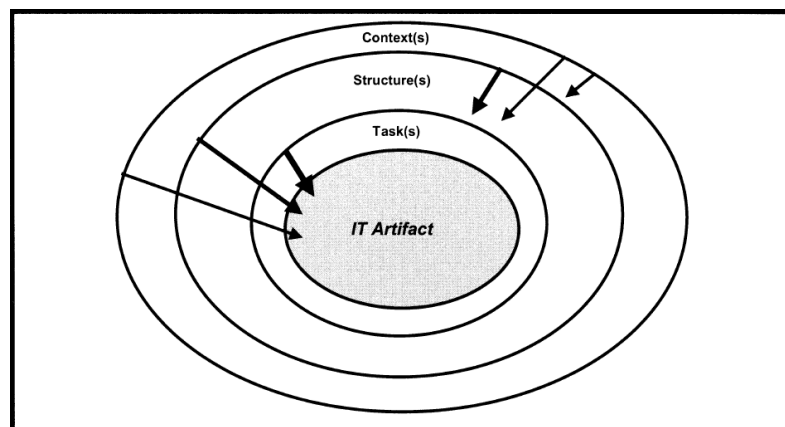
Source: Benbasat and Zmud (p. 2003, p.178)

Benbasat and Zmud go further to describe the inter-relationships among the IT artefact, the users and the impact of the use of these artefacts on the users (see illustration – Figure 13). According to Benbasat and Zmud, IT or ICT capabilities, whether managerial, methodological or technological, affect both

FIGURE 13 - THE IT ARTIFACT AND ITS IMMEDIATE NOMOLOGICAL NET
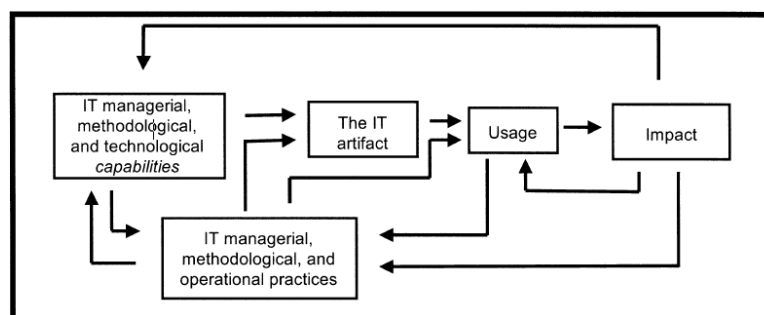
Source: Benbasat and Zmud (p. 2003, p.187)

the actual ICT used (the IT Artifact) and operational practices. The type of technology which affects the IT Artifact indirectly affects usage, similar to that articulated by the Diffusion of Innovations (DOI) theory, the Technology Acceptance Model (TAM), and the Updated Technology Acceptance Model (TAM2) discussed in detail in Chapter 2.

ICT or Technology use has an impact on both management and other capabilities as well as management and operational practices. This circular relationship, according Benbasat and Zmud, can be either vicious or virtuous depending on the point at which it begins and the extent of technology use at that point.

3.2.1 Key Concept

The researcher therefore focuses the investigation around the IT or ICT Artifact and nomological network previously identified. However, the key concept used to organise the research was adapted, as an Agritourism Innovation System, from the World Bank (2006) model for agricultural innovation systems. The details of the initial system was presented in Chapter 2. As with the World Bank (2006) model for agricultural innovation systems, discussed at length in the review of literature, the proposed agritourism innovation system has at its core, the creation, dissemination and management of information. In addition, it extends beyond information creation and dissemination, to include the variables affecting demand, and effective access to, and use of, the information disseminated.

Agricultural innovation systems demand a greater level of interaction among the domains than other theoretical models (Klerkx et al., 2012) and as

Rudgard et al. (2011) put it, ICT is ideally suited to facilitate this enhanced interaction and can expand cooperation, communication and innovation among these domains. The concept fits into the general social informatics theoretical framework, whereby, information is the primary focus alongside its facilitation by ICT.

The illustration (fig. 14) shows the adapted components of the model.

FIGURE 14 - PRELIMINARY JAMAICAN AGRITOURISM INNOVATION SYSTEM
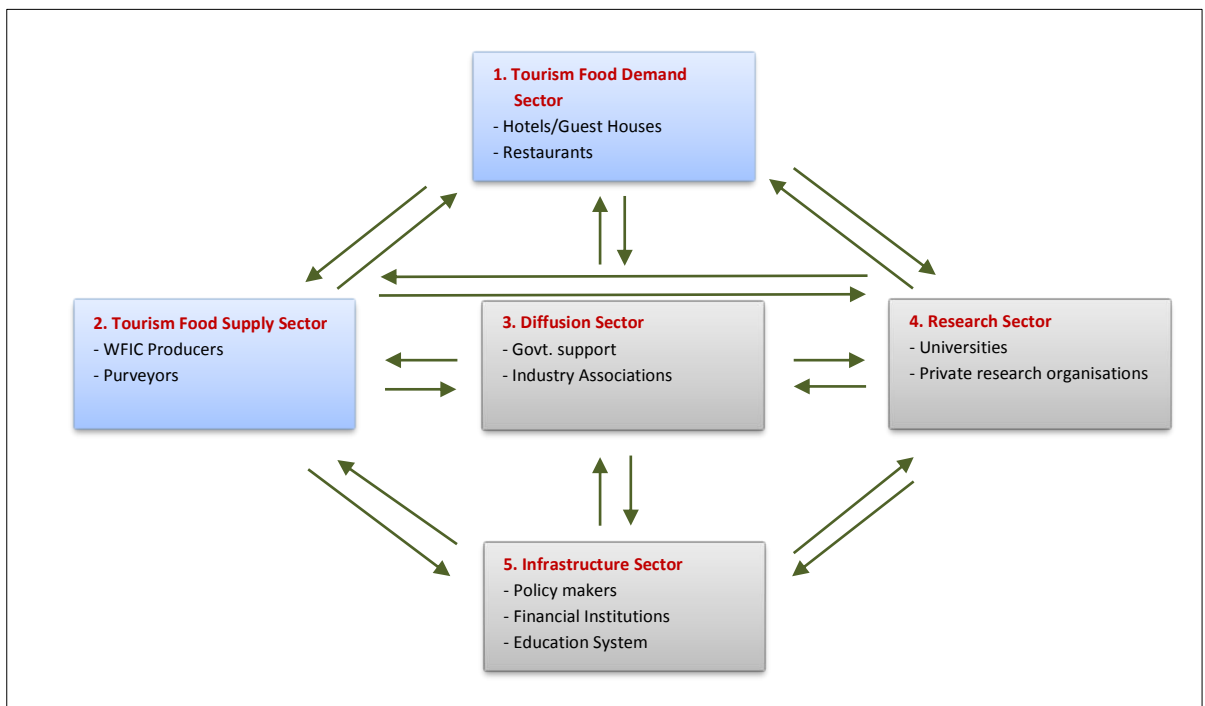
3.2.2 The key concept in detail – the Preliminary Jamaican Agritourism Innovation System

Like the initial AIS, the agritourism innovation system consists of 5 sectors. These sectors interact to meet the food demanded by the agritourism (Tourism Food Demand) sector. The interaction among these sectors, denoted by the arrows in the illustration (fig. 14), is the two-way flow of information

required to satisfy the needs of each sector. The preliminary Jamaican Agritourism Innovation System consists of the following 5 sectors:

1. **Tourism Food Demand Sector**

   This sector is similar to the Market/Demand sector (fig. 10) and consists of the entities that will use agricultural products to meet the needs of tourists and will include hotels, guest houses, other accommodations and restaurants. This sector will provide the market demand information to inform the production patterns of the Tourism Food Supply Sector.

2. **Tourism Food Supply Sector**

   This sector is similar to the Enterprise sector (fig. 10) and consists of those entities which provide the food demanded by the Tourism Food Demand Sector. The preliminary model includes the farmers (WFIC producers) and purveyors.

3. **The Diffusion Sector**

   This sector is similar to the Diffusion sector (fig. 10) and is responsible for the dissemination of information to those who need it. Although this sector has information dissemination as its primary responsibility, the other sectors can interact directly with each other in order to share information. In the preliminary Jamaican Agritourism Innovation System, members of this sector include NGOs, extension services, farmers and trade organizations, donors, and government.

4. **The Research Sector**

This sector is similar to the Research Sector (fig. 10) produces most of the knowledge to be used by the other sectors. In the preliminary Jamaican Agritourism Innovation System, members of this sector include research organizations, universities and colleges and private foundations or companies. Members of this sector will engage members of the other sectors through data collection and analysis, collaboration and knowledge access, and information dissemination.

5. **Infrastructure Sector**

This sector supports the process of information generation, transmission and use. In the preliminary Jamaican Agritourism Innovation System, this sector includes the education system, the financial system, transport and marketing infrastructure, and professional networks, including trade and farmer associations. The education system in the infrastructure is mainly focused on the training of workers for the sub-sector as opposed to conducting research.

3.3 Research Questions

The research outline focuses on the overall structure to be followed in order to answer the research questions. The critical question posed by this thesis is, in what specific ways can information and communication technologies be applied to the Jamaican Agritourism sub-sector in order to match farm output to market demand within the tourism sector? Several specific questions emanate from the more general one:

1. What is an effective agritourism model for Jamaica as perceived by selected players in the agritourism sub-sector?

2. What are the characteristics of the agritourism model identified by selected players as being effective for Jamaica?

3. To what extent has ICT been applied, in Jamaica, to the components of the agritourism model conceptualised from the theory?

4. How might ICT be best applied to agritourism in Jamaica?

3.3.1 The approach to conducting the research

Several considerations combined to inform the approach to answer the main and subsequent research questions. The first consideration is the fact that Jamaica is divided into 6 main resort areas (JHTA, 2013):

1. Kingston, in the south central to south eastern section of the island;
2. Port Antonio, on the eastern coast;
3. Ocho Rios, on the northern coast;
4. Montego Bay, in the north west;
5. Negril on the western coast; and
6. The South Coast.

Although there are undoubted synergies among the resort areas, the plan was to approach each discretely, with the hotels and restaurants in each resort area, grouped and investigated together. On the supply-side, the farms in each of these resort areas were to be approached in a similar fashion. This approach was selected for manageability even though it is recognised that due to the small size of Jamaica, at 10,991 square km, 146 miles long from east to west and 51 miles at its widest point, from north to south (JTB, 2012), and the relatively small size of each resort area, it is unlikely that hotels and restaurants in a particular resort area will only be supplied by farms in that area.

The establishments from which data were to be collected were selected from information obtained from the Offices of the Jamaica Tourist Board (JTB) in 2013. This information was aggregated from various affiliate institutions and accessed at the JTB Offices in Kingston, Jamaica during April 3 – 4, 2013. In Kingston, a total of 12 facilities (a combination of hotels and guest houses) were identified. The Kingston facilities were those present on the JTB's list of approved facilities all catering to tourists as well as locals. Preliminary investigations, during April 2013, found that at least 2 of the facilities might have been inaccessible; one was severely damaged by fire in March 2013 and was undergoing renovation at the time of the proposed data collection, while another had (in late 2012) undergone a change in ownership and management and was not amenable to participating in the research.

Of the 50 top restaurants in Jamaica, 26 (52%) are located in Kingston and of those located in Kingston, 9(35%) are affiliated with hotels (876Media, 2011). All 17 remaining restaurants were to be targeted (the others were to be included with the hotel/Guest House) and a member of the procurement team, preferably an Executive Chef or Food and Beverage Manager, interviewed. No data was located for the Jamaican (local) tourist visiting Kingston, therefore, the tourism data presented will reflect only foreign visitors. Additional research, outside the scope of this thesis, needed to be conducted to determine the profile of the tourist visiting Kingston.

Another consideration which informed the research approach is the impact of logistics and supply chain management. Belisle (1984) early identified consistency of supply and food quality as two of the factors, among others, which caused a significant proportion, between 50% and 80%, of the

food consumed by tourists to be imported. Others such as Hayle (2005),

Phillips and Graham (in Jayawardena, 2007), and Rhiney (2011) also cite

logistics and supply chain issues as factors contributing to 'food leakage'.

According to Esplana et al. (2007), the supply chain for the agritourism

industry has 5 components (fig. 15): 1. Input supply; 2. Production; 3.

Processing, 4. Marketing; and 5. Consumption.

FIGURE 15 - AGRITOURISM INDUSTRY SUPPLY CHAIN FRAMEWORK
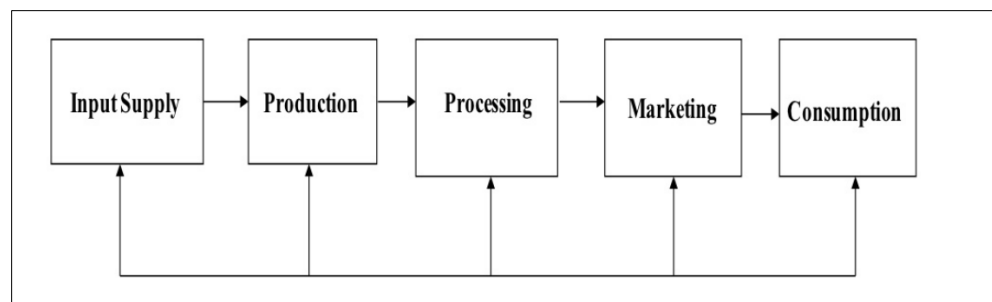
Source: Esplanada et al. (2007)

However, Esplana et al.'s (2007) framework references agritourism in

its broad sense and includes elements not considered during this investigation.

The research in this thesis restricts agritourism to food and other farm-based

commodities produced for the tourism sector, referred to as WFIC agritourism

by Philip et al. (2010). Esplana et al., also, includes farm based activities,

accommodation, and the farm itself as an attraction, which, again based on the

Philip et al (2010) WFIC agritourism definition , are not included in this

investigation. Subsequent references to agritourism will be WFIC agritourism

as defined by Philip et al.

Esplana et al.'s framework is, however, still valuable. Three of the five

components, namely, Input Supply, Presentation, a merger of "Production",

"Processing" and "Marketing" and Consumption, are of value (fig. 16).

FIGURE 16 - REVISED AGRI-TOURISM INDUSTRY SUPPLY CHAIN FRAMEWORK
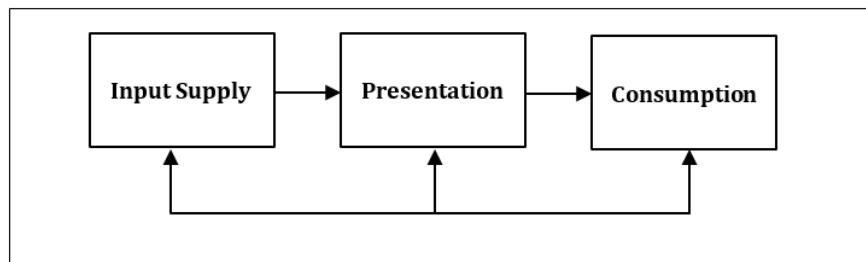
Source: Author (2013)

The rationale for merging Production, Processing and Marketing into Presentation was as a result of the Agritourism Innovation System conceptual framework adopted. This conceptual framework does not focus on the interactions within the production system, but rather between the production system and the other actors.

Using the modified framework provided by Esplana et al. (2007), the "Input Supply" subcomponent refers to agricultural products, specifically food and beverage; the "Presentation" subcomponent refers to the preparation, packaging, partial processing, and the serving of food to hotel guests; and the "Consumption" subcomponent refers to the purchase and ingestion of food by the visitor. All three components are included in the investigation.

Rhiney (2011) identified 7 input supply-side linkages, an increase over the 4 identified by Belisle and Hoy (1980). According to Rhiney, these linkages are:

1. Local purveyors/middlemen;
2. Small retailers and supermarkets;
3. Large wholesalers;
4. Market vendors;
5. Farmers;
6. Self-supply; and
7. Contract with individual organisations.

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Rhiney's study was however restricted to Negril, one of the six resort areas in Jamaica and therefore the linkages identifies by him may be different from those in the other five resort areas. Since it includes the perspectives of a wider cross-section of the population of interest, an investigation into the supply chain linkages in the five resort areas provides a better understanding of the entire sub-sector.

Although broader, and based on the concept of the AIS, the fieldwork was organized following Rhiney's (2011) structure, that is, grouping the subjects into one of two groups; the supply sector and the demand sector, with the intent to collect data from each group. Based on previous work done in the field of study (Belisle, 1983; Fleischer and Tchetchik, 2005; Hayle 2005; Rhiney 2009, 2011), the first step was organized to focus on determining the items demanded by the demand sector and how this demand is currently being satisfied. The next step was organized to focus on the supply sector. The Research Methodology, presented in Chapter 4, provides, among other things, the research methods used and their theoretical justification.

3.4 Summary

The research for this thesis was structured around some of the theories presented in the field of social informatics and is therefore located in that field. The research falls under the dual social informatics themes of the application of ICT in the social sciences and ICT's interaction with society (Vehovar, 2006). Key to these themes is the identification of the ICT Artifact, which is the actual technology being utilized, and how users interact with it, referred to as the nomological net (Benbasat and Zmud, 2003).

The ICT Artifact is placed in a context of the interaction among several individuals, grouped into sectors, and collaborating to provide an innovative good or service. This interaction is referred to as an innovation system. The Agricultural Innovation System model (AIS), later modified for the Jamaican context, to form the preliminary Jamaican Agritourism Innovation System, provided the right conceptual model on which to build the investigation. The AIS has several interactions, and it is the interaction between the supply and demand sectors which is of primary importance to this thesis. The supply/demand interaction was thought to consist of three components constituting this interaction: input supply, presentation: and consumption (adapted from Esplanada et al., 2007).

Data collection to investigate the three supply/demand components identified, was initially informed by the structure of the Jamaican tourism industry. The tourism industry in Jamaica consists of six resort areas extending across fourteen parishes. It was envisaged to independently collect data from both the supply and demand sectors. The justification for this organization was provided by Rhiney (2011), who used a similar structure, informed by Belisle and Hoy (1980), to collect data in one of the resort areas in Jamaica. However, whereas Rhiney only collected data from a single resort area, the researcher planned to collect data from all five. Chapter 4 provides the detailed Research Methodology followed for the data collection.

Chapter 4 - Research Methodology

4.1 Introduction

The three preceding chapters have, among other things, outlined the rationale for this study (Chapter 1); presented the relevant literature and outlined the critical elements and gaps (Chapter 2); and stated the theoretical framework and research context of the investigation (Chapter 3). In doing so, the important elements deserving of examination and the thought process followed in conducting the research have been highlighted. This chapter details the process undertaken to conduct the research, along with the associated theoretical and practical justifications. The chapter is organised into the following 6 sections using an amended structure from Denzin and Lincoln (2011):

i.   **The Researcher -** an identification of the possible biases of the researcher and the steps taken to minimize the effects of these on the investigation.

ii. **Theoretical Paradigms and Perspectives -** an explanation of the philosophical basis of the researcher's knowledge, along with an overview of how the subjects were viewed.

iii. **Research Strategies - t**he plan of action which directed the research effort and enabled the systematic conduct of the investigation.

iv. **Research Methods and Data Analysis - t**he details of the research methods used to collect data, an explanation of the process used to analyse these data, and the theoretical basis for the method of data analysis.

v.   **Limitations of the Investigation**

The investigation undertaken by this thesis was based largely on some of the theories used in the sub-discipline of social informatics. These theories included:

- those associated with technology acceptance by individuals; such as the **technology acceptance model** (Davis, 1986; 1989; Davis et al., 1989;), and the **theory of planned behaviour** (Ajzen, 1985; 1991);

- those associated with technology acceptance by organisations; such as the **Diffusion of Innovations Theory** (Chong et al., 2009; OECD, 2005; Rogers, 1995; Rogers and Shoemaker, 1971; Thong, 1999; Zmud, 1984), the **Technology-Organization-Environment (T-O-E) Framework** (Kuan and Chau, 2001; Sparling and Toleman, 2007; Tornatzky and Fleischer, 1990), and **Institutional Theory** (DiMaggio and Powell, 1983; Li, 2008; Scott, 2004; Scott and Christensen, 1995);

- **Agricultural Knowledge and Innovation Systems** (AKIS) (Assefa et al., 2009; Pant and Hambly-Odame, 2009); and

- **Agricultural Innovation Systems** (AIS) (Agwu et al., 2008; Rölin, 1990).

While each of the aforementioned theories influenced the direction of the investigation, the AIS was the most critical. The AIS has been modified to form an agritourism innovation system for the Jamaican context. It should be noted that the AKIS and AIS share several similarities and were developed around the same time (Klerkx, et al., 2012). The major difference between these two theories, according to Hall et al. (2006), and the reason the AIS was the preferred choice is, the AIS focusses more on the influence of institutions and infrastructure, and attempts to include all relevant organizations that

influence learning and innovation. The AKIS, on the other hand, tends to focus on a restricted set of actors and to suggest that the transfer of technology will flow from research to farmers. Given the dearth of information about the Jamaican agritourism space, it was decided that the investigation should not, in any way, seek to restrict what might be unearthed about the flow of innovation. Since it was unknown what direction the flow of innovation would take, a model that is sufficiently flexible to account for innovation that flows from any direction, within the model itself, rather than between two specific sectors, had to be selected.

Although the AIS was selected as the base model, there was no attempt to include all elements of the adapted AIS in the investigation. Instead, Esplanada et al.'s (2007) supply chain framework was used to restrict the investigation to 3 of the 5 sectors identified in the Agritourism Innovation System (adapted from AIS). The sectors that featured in the investigation were:

1. The Tourism Food Demand Sector;

2. The Tourism Food Supply sector; and

3. The Diffusion Sector.

Chapter 3 (Research Outline) provides details on the selection process and its rationale, as well as all the sectors of the adapted Agritourism Innovation System. Chapter 2 (Literature Review) provides details on the underlying theories, including the Agricultural Innovation System and Agricultural Knowledge and Innovation Systems.

4.1.1 Statement of the Problem

Leakage from the tourism industry robs small island developing states of much needed resources which could be channelled to sectors in the economy where the need is greatest. In the Caribbean, 14% of total GDP is derived from travel and tourism (WTTC, 2013a) while in Jamaica, the figure is 25.6% (WTTC, 2013b). Leakage is estimated to range from a low of 30% to a high of 50% (ECLAC, 2011, Oxford Economics, 2012, Ramjeesingh, 2008). Information and Communication Technologies have not yet been applied to the agritourism sector in small island developing states, the Caribbean, or Jamaica, in order to affect supply, or, to match existing or potential supply, with market demand.

It might be possible, with improved synchronisation among industry players to decrease the amount of leakage from the tourism sector. The use of information and communication technologies might be the best way to improve synchronization and reduce inter-sector inefficiency. Information and communication technologies have not yet been applied to the agritourism sector in small island developing states, the Caribbean, or Jamaica, in order to affect supply, or, to match existing or potential supply, with market demand.

4.1.2 Research Aim

The research is designed to identify the ICT solutions that can be applied to the Agritourism sector in Jamaica and the customizations necessary to ensure successful application. Following this a sustainable model for applying ICT to Agritourism in Jamaica, to match production to market demand in the tourism sector, may be developed. In so doing, leakage would be addressed.

4.1.3 Research Question

The critical question posed by this thesis is: In what specific ways can information and communication technologies be applied to the Jamaican agritourism sub-sector to match farm output to market demand within the tourism sector? Several specific questions emanate from the more general one:

1. What is an effective agritourism model for Jamaica as perceived by selected players in the agritourism sub-sector?

2. What are the characteristics of the agritourism model identified by selected players as being effective for Jamaica?

3. To what extent has ICT been applied, in Jamaica, to the components of the agritourism model conceptualised from the theory?

4. What model best suits the application of ICT to agritourism in Jamaica?

4.2 The Researcher

As an ICT practitioner since 1996, the researcher has worked in several sectors including government, the financial sector, Higher Education, and technology consulting and utilized various ICT. This experience provided the initial motivation to undertake this study and the impetus necessary to continue even in the face of the several challenges encountered over the period of the investigation. While the researcher's experience provided invaluable insight, it was recognised that this experience might also bias the researcher's outlook. One method used to mitigate the negative effects of the researcher's perspective was the input of a "critical friend", who is an experienced and qualified researcher in the field of qualitative methodologies. Another method used to reduce researcher bias was document analysis. Document Analysis was

also used as a means of data triangulation and is described in detail in Section 4.4.1.

A "critical friend" (or "critical colleague") is described as an individual, who asks provocative questions and facilitates the examination of data from a perspective other than that of the primary researcher (Costa and Kallick, 1993). Although the literature (Costa and Kallick, 1993; Foulger, 2009; Kember, et al., 1997; Koan, 2011) refers to critical friends in educational action research projects, the role of the critical friend provided the necessary objectivity and questioning perspective to help reduce researcher bias in this case. For the investigation in this thesis, the roles undertaken by the critical friend, with the support of the academic supervisor, were mainly that of research advisor and resource provider in the qualitative research domain. The critical friend was Dr Hixwell Douglas who obtained his Ph.D from the University of the West Indies in 2008. Dr Douglas used qualitative research, namely in-depth interviews, to conduct the investigation for his thesis.

As a research advisor or qualitative research coach, the critical friend provided useful guidance in several practical aspects of collecting qualitative data and specifically how to manoeuvre within the space where, often, a subject would have to be interviewed several times. This critical friend provided a useful sounding board and "shoulder" when difficulties were faced in the field and after the data were collected. As a resource provider, the critical friend often assisted in determining whether it made good research sense to pursue particular contacts depending on the quality of data that was already collected. The critical friend also assisted in determining the point of which data saturation (Guest et al., 2006; Bowen, 2004) was reached. It should be noted

that the use of the critical friend supplemented the feedback or member checking (Kaplan and Maxwell, 2005) that was used to rule out misinterpretation of the collected data. In addition, and of importance, the critical friend was familiar with the cultural nuances of Jamaica which affected data collection.

4.2.1 Research Ethics

Four ethical principles necessary for the proper conduct of research guided the ethical posture of the investigation (Lund Research, 2011). The principles were utilised to minimise the risk of harm (or discomfort) to the subjects of the research, with the overriding consideration being to ensure that there was little or no psychological distress or social disadvantage arising from the investigation. The principles utilised were:

i. ***Obtaining informed consent***

Informed consent means that a research subject acquiesces without being offered an undue inducement, or without being forced, tricked, or constrained, by the researcher in any way. The subject should be provided, in clear understandable language, with the information required to make a decision. Although the notion of obtaining informed consent seems confined to experiments and medical research (Benatar and Benatar, 1998; Faden et al., 1986), Boyce and Neale (2006) indicate that obtaining informed consent should also be practised by those who collect data using in-depth interviews.

For the investigation, each respondent indicated consent by completing a "Consent Form" approved by the University of

Manchester's Ethics Committee. Attached to the consent form was a "Participant Information Sheet" providing the background and rationale of the investigation, and the reason the respondent was chosen. In several instances, due to the level of education of the respondent, the respondent's unwillingness to read through the "Participant Information Sheet", or other factors, the researcher also provided the information orally. All of this was done before starting the device used to record the interview *(Appendix I contains the researcher's application for ethics approval. Copies of the Consent Form and Participant Information Sheet have been included in Appendix II.).*

ii. **Protecting anonymity and confidentiality**

Wiles et al. (2007) state that anonymity is used to operationalize confidentiality, thus anonymizing data is critical. This was, at times, difficult since field notes had to be synchronised with the recorded interviews using the name, location, interview date and the organization with which the interviewee was associated. However, to ensure confidentiality code names were used and a code sheet used as a key. Identifying names and locations were also redacted from the transcripts after analysis.

iii. **Avoiding deceptive practices**

Although some authors (Fielding in Gilbert, 2008) cite several cases where deception is justified or even unavoidable in order to obtain valid data, this investigation was conducted based on the tenets that deception, for whatever reason, is unacceptable (Bulmer in Gilbert, 2008). Although respondents' statements were recorded on an audio

device, there were times when the recording device was paused when it was recognised that a particularly sensitive matter was being discussed.

In addition, respondents were always informed that the interaction was being recorded and when the recording started and ended. Participants were also offered a copy of interview transcripts and recordings, and were asked whether they wished to have any section of the transcript redacted. Recordings were stored on encrypted storage and destroyed after being transcribed.

iv.   ***Providing the right to withdraw***

In addition to informing respondents that the interaction was being recorded, respondents were informed that they could choose to discontinue or have the recording turned off. This information was provided at the beginning of the interaction. Several participants opted to withdraw before the interview began, however, none withdrew while the interview was underway.

4.3 Theoretical Paradigms and Perspectives

This section outlines the ontological and epistemological underpinnings of this study and the justification of each perspective.

4.3.1 Ontological perspective

Ontology refers to the nature of the world in which we live and the section of it on which we choose to focus (Hirschheim, 1985). Grix (2002) clarifies what is meant by ontology by stating that it is the starting point for all research, out of which the epistemology and methodology, logically, flow. He goes further, by saying it is *"...the image of social reality upon which a theory is*

based" (p.177). Grix cites Blackie's (2000) definition indicating that one's

ontology are the *"claims and assumptions that are made about the nature of*

social reality, claims about what exists, what it looks like, what units make it up

and how these units interact with each other. In short, ontological assumptions

are concerned with what we believe constitutes social reality" (p.8).

Although Grix provides useful clarity for a researcher and is the

favoured authority for the investigation within this thesis, the directionality he

and other authors (Hay, 2007; Stoker and Marsh, 2002) state is the subject of

debate. For example, Bates and Jenkins (2007) cite several authors with an

opposing view. This other view (Shusterman, 1998; Smith and Welty, 1996)

contends that neither ontology nor epistemology precedes the other but both

are mutually interrelated and, some academics (Gregory, 2000), at times,

consciously conflate the two. For ease of organization, the investigation within

this thesis has chosen to adopt the Grix (2002) approach.

The two broad ontological positions which any researcher can adopt are

objectivism and subjectivism (Bryman and Bell, 2007; Grix, 2002). Objectivism

argues that social entities exists as external facts, or that social phenomena are

beyond the reach or influence of social actors. While subjectivism, often

associated with the term constructionism, social constructionism, or

constructivism (Bryman and Bell, 2007; Saunders, Lewis and Thornhill, 2007),

asserts that social phenomena and their meanings are created from the

perceptions and actions of social actors and are continually being influenced by

social actors. Bryman and Bell go further, they state that *"Constructionism also*

suggests that the categories that people employ in helping them understand the

natural and social world are in fact social products" (p.24).

The researcher functions from a constructivist ontology as he assumes that reality is able to be affected by various kinds of actors, who construct/perceive reality in a particular way. However, it does not mean that there is not an independent/objective reality on which these actors are acting.

4.3.2 Epistemological perspective

Epistemology is what constitutes acceptable knowledge in a particular field of study (Saunders, Lewis and Thornhill, 2007) and can also be viewed as how one acquires knowledge (Hirschheim, 1985). Several epistemologies could have been adopted as the basis of the investigation (Easterby-Smith, Thorpe and Jackson, 2007; Hirschheim, 1985; Saunders, Lewis and Thornhill, 2007):

i.   Positivism – authoritative data only emanates from that which can be objectively measured rather than being inferred subjectively through reflection or intuition;

ii. Realism – facts exists independent of the observer or that objects have an existence independent of the mind of the person observing these objects;

iii. Interpretivism – the researcher must understand the differences between the various social actors being studied and the circumstances affecting them in order to make sense of the data gathered during the investigation.

An interpretivist epistemology was employed during the research because it is *"...an epistemology that advocates that it is necessary for the researcher to understand differences between humans in our roles as social actors"* (Saunders, Lewis and Thornhill, 2007, p.106), it suited the research,

which included several sectors. The researcher is able therefore to interpret the social roles others play in accordance with the researcher's own meanings. Bryman and Bell (2007) recognises the need for the researcher to grasp the social meaning of particular actions and Klein and Myers (2001) state that an interpretive epistemology helps researchers in the information systems domain better understand human thought and action in social and organisational contexts.

The interpretivist epistemology, balances well with the constructivist ontology, and was the best choice because of the nature of the investigation undertaken.   Based on an interpretive epistemology, it is necessary for the researcher to interpret the current actions of subjects and craft meaningful recommendations from conclusions drawn from the data collected.

4.4 Research Strategies

A Research strategy is a general plan used to conduct an investigation or to answer research questions (Saunders et al., 2007). This section includes the research design, the methods of data collection, and data analysis.

4.4.1 Research Design

The Research design is the logical structure of the investigation. It should state the data required, the data sources, and how these data will answer the research question(s) (Jalil, 2013). Research design should ensure that the structure of the investigation will determine what evidence should be obtained to convincingly answer the outstanding question(s) (de Vaus, 2001). This section outlines the logical structure of the investigation that was used to answer the research questions.

There are several classification of standard research designs, however, there is no universal classification (Jalil, 2013). Some authors (Anastas, 1991; Shuttleworth, 2008; McNabb, 2009) use the nature of the research question to classify a research design, while others use the method of data collection as the classification mechanism. Jalil divides research design into three: 1. Experimental; 2. Quasi-experimental; and 3. Non-experimental. According to him, both the experimental and quasi-experimental designs uses two groups from the population, one to measure the effect of an intervention and the other as a control group. In respect of a non-experimental design, Jalil (2013) states that

> A non-experimental design does not compare one group
> with another but describes the relationship between an
> intervention (treatment) and its effects on the population of
> interest. Furthermore it may provide a rich understanding
> of the contexts, process, event, or situation and explain why
> results occurred, which may be essential for building result
> chains. Example of such design includes case studies,
> longitudinal studies, ethnographic studies etc. (p. 11)

The descriptive design takes a "what if" approach and data collection may be spread over a large geographic area (McNabb; 2009). The best description for the research design used in this thesis is a non-experimental descriptive design. The investigation in this thesis asks several 'what if' type questions and proposes answers to these based on the answers obtained. This investigation also seeks to garner a deeper understanding of the possible effects of ICT on the current business processes, of specific players in the Jamaican Agritourism subsector, towards future research or intervention.

Initially, the intent was to apply ICT to the entire agritourism supply sector, that is, all producers (farmers) providing food to the tourism sector. However, based on information from government reports and anecdotal information from the researcher's personal experience, the researcher decided to confirm whether investigating the entire sector was a plausible course of action. This therefore led to the investigation being conducted in two broad phases; a preliminary investigation (pilot study) and the final investigation. The preliminary investigation was designed to verify information obtained from the documents consulted and to fine-tune the research for manageability and focus. And the final investigation was designed to gather data from the identified target group.

4.4.1.1 Data Sources

Before beginning field-work, and at critical points during data gathering, based on information unearthed from respondents, an analysis of documents (or document analysis) was conducted to collect data about the local agriculture, tourism and ICT sectors. Document analysis is a systematic and structured way of reviewing and evaluating documents that contain data (text, images, etc.) that were recorded without the input or intervention of the researcher (Bowen, 2009). The document analysis conducted for this thesis used the guidelines of O'Leary (2004) which are presented in table 3.

TABLE 3 - STEPS IN DOCUMENT ANALYSIS

Plan	1. Create a list of documents to be explored. 2. If any documents are considered 'sensitive', seek ethics approval. 3. Do preliminary groundwork to determine whether they will be accessible. 4. Consider and plan for any translation needs. 5. If there are too many documents for analysis develop an appropriate sampling strategy.

	6. Consider what types of data you wish to gather from the documents.
Gather	7. Gather relevant documents. 8. Develop and employ a scheme for organizing and managing documents. 9. Make copies of original documents that can be annotated.
Review	10. Assess the authenticity and credibility of the 'text'. 11. Explore the 'agenda' of the document and look for biases.
Interrogate	12. Extract background information on author, audience, purpose, style. 13. Explore content 14. Look for 'witting' evidence (what the document is meant to impart) and 'unwitting evidence' (everything else you can glean from the documents).
Reflect/Refine	15. View document analysis as an iterative and ongoing process. 16. Reflect on any difficulties associated with gathering the data, reviewing the sources, and exploring the content. 17. Modify the plan based on your reflections. 18. Gather, review, and interrogate additional documents as needed
Analyse Data	19. Conduct data analysis using the most applicable techniques

Source: O'Leary (2004, p.179)

While the researcher was guided by the steps in table 3, some documents which were not a part of the initial list were included in the document analysis. These documents were previously unknown to the researcher and were added only after being mentioned by respondents during interviews. The inclusion of additional documents is justified by several authors (Eisner, 1991; Labuschagne, 2003; Corbin and Strauss, 2008), who indicate the iterative nature of document analysis and its use as a form of data and method triangulation.

Another source was data that were collected from respondents through surveys (in the preliminary investigation) and in-depth semi-structured interviews (in both preliminary and final investigations). Sections 4.4.2 and 4.4.3 provide details on the both investigations.

4.4.2 Preliminary Investigation

Before delving into the heart of the investigation, exploratory research, in the form of a pilot study, was conducted with two major objectives:

1. to determine the current and potential level of ICT access and use among the participants within the agritourism sub-sector in Jamaica; and

2. to inform future research for the final thesis investigation.

Exploratory research is often used to clarify one's understanding of a problem, especially if one is unsure of the nature and extent of the problem (Saunders et al., 2007). The preliminary investigation was conducted in 2 phases:

- Phase 1 (2009 and 2010) – to verify the structure of the sector and determine final target group; and
- Phase 2 (2011) – to determine the crops produced and the current and potential use of ICT by farmers.

4.4.2.1 Preliminary Investigation – Phase 1

Phase 1 utilized a qualitative research strategy and was based on an interpretivist epistemology and a constructionist ontology. Since the literature concerning the use of ICT in the Jamaican agricultural sector is limited, qualitative research methods, namely, in-depth and executive interviews, were utilised to refine research questions and to fine-tune the direction of future research. In addition, a fair amount of time was spent wading through artefacts in order to refine the research questions that formed the basis of Phase 2 of the preliminary investigation as well as the final investigation.

According to van't Riet et al. (2001), qualitative research is primarily inductive and exploratory in its procedures, where questions of 'why' a particular variable (or set of variables) that impact the situation being studied are asked. Mays and Pope (2000) state that a qualitative design does not provide quantified answers to research questions but contributes significantly to concept development and can assist in giving meaning to social phenomena

within their natural context. According to Longhurst (2009), the in-depth, semi-structured interview involves verbal interchanges where the interviewer attempts to elicit information from the interviewee by asking questions. Although the interviewer prepares questions around specific themes, semi-structured interviews usually unfold in a conversational manner and offer the interviewer the flexibility to explore topics in as much depth as he or she wishes. The semi-structured in-depth interview provides flexibility to pursue any individual detail arising in each interview, while also ensuring that the predominant focus of the interview is not lost (Bibby, 2006). Semi-structured interviews were used extensively throughout the research, in both preliminary and final investigations, to pursue several overarching themes.

For Phase 1 (preliminary investigation), two general themes were pursued:

1. The perception of ICT among the sub-sector players; and

2. The current level of ICT access across the industry (all players).

In order to understand the two general themes, information about the following were obtained, the:

- educational level of farmers;
- level of technology acceptance and use;
- size of land-holdings;
- current markets and future market prospects.

This then led to a number of more detailed questions to:

1. verify the size and breakdown of the Jamaican Agricultural sector;
2. gauge the level of training that farmers possess;
3. understand what the term "ICT" means to the players in the sector;
4. determine the level of access to ICT that farmers have;
5. determine how trainable the participants in the agricultural sector in respect of using ICT are;

6. ascertain the single piece of technology that would provide the greatest impact on business practices.

Phase 1 (preliminary investigation) targeted persons in Government, the non-government support sector, and the farming community. In order to fully explore the two general themes and answer the more detailed questions, there was need to:

1. explore the structure of the sector, especially since the most recent agricultural census was done in 2007;

2. determine the policy direction of the government;

3. determine the crops produced, to whom these are sold, what proportions are sold to which markets, and why;

4. determine, from an insider perspective, the challenges faced by farmers generally; and

5. determine the current use of ICT and the attitude of players to its future use.

For Phase 1, a total of seven in-depth semi-structured interviews were conducted over a three month period from November 2009 to January 2010. In order to gather preliminary data on the farming community, two interviews were conducted, during November 2009, with persons who worked with farmers (one worked with large farmers and the other with small farmers). These data provided useful information for the next set of interviews to be conducted – this time with the technocrats in the Agricultural sector. In January 2010, four senior persons from the Ministry of Agriculture and one from an Agricultural development agency were interviewed. These persons

were chosen based on their knowledge of the sector and its players, as well as their knowledge of current and future government policy for the sector.

The two preliminary interviews, with persons who worked with or were close to the farmers, were conducted within two weeks of each other, largely due to the unavailability of interviewees within the same day or week. These respondents provided information on the farmers and enabled the fine-tuning of questions for the subsequent interviews with technocrats in the sector. The five final interviews (of personnel within the agricultural ministry and an agricultural development foundation) were then conducted over a two month period at the convenience of the interviewees.

4.4.2.2 Limitations – Preliminary Investigation - Phase 1

The entire Phase 1 was conducted over a three month period and encountered several problems:

i. **Access to interviewees**

The initial research plan was to conduct semi-structured interviews with ten people in the Ministry of Agriculture and Fisheries and five among other players in the sector. Several persons were unable to shift their schedules to accommodate a face-to-face discussion – some wanted to complete the interview by email or telephone. While not averse to either technology, the researcher preferred the flexibility and naturalness of a face-to-face interaction in order to receive the depth of information required and for maximum flexibility.

ii. **Forthrightness of interviewees**

After the first two interviews in the Ministry of Agriculture and

Fisheries, it was recognized that it was better to record information long-hand than electronically. Persons refused to be forthright while the session was being recorded, often, looking pointedly at the recording device before providing a seemingly prepared answer. This situation changed once the researcher began recording responses in a notepad without the presence of a recording device. One big disadvantage of long-hand recording is that it affects the natural flow of conversion and does not capture information in a comprehensive manner.

iii. **Reluctance to provide details**

Much of the information pertinent to the agricultural sector is unwritten; which is why this method (semi-structured, in-depth interviews) was chosen in the first place. However, some government employees were unwilling to provide artefacts – even those containing supposedly public information – instead choosing to direct the researcher to the most senior person in the division. This proved challenging for the interview schedule as often the most senior person was too busy to be interviewed.

iv. **Incompatible expectations**

Although the researcher stated the amount of time required for the interview when the initial arrangements were being made, several respondents indicated – in the middle of the interview – that they had other engagements and wondered how much longer the interview would take.

4.4.2.3 Methodological Insights – Preliminary Investigation - Phase 1

Regardless of the problems encountered, the interviews were very valuable and provided information about the structure of the farming sector, especially the smaller holdings. In addition to information on the structure and practices of members of the farming community, the interviews also provided information about the mind-set of the Ministry of Agriculture and Fisheries, and the support systems available to farmers and farming communities. Much of the information about the mind-set of the Ministry is unwritten and had to be inferred from responses provided. Useful insight was also obtained concerning undocumented information about past events and the evolution of the sector.

The informal nature of the interviews also allowed respondents, sometimes after an initial period of apprehension, to relax and share information about unwritten agendas and politically sensitive issues. Some interviewees provided personal opinions about some sector participants as well as current policy directions, which they asked not to have included in the transcript. No transcripts were produced for phase 1 of the preliminary investigation. The unofficial information assisted the researcher to improve the wording of questions in order to side-step future research hurdles.

4.4.2.4 Preliminary Investigation - Phase 2

Phase 2 of the preliminary investigation was guided by the findings from Phase 1 and took the form of an exploratory survey (Easterby-Smith, 2008) using a convenience sample (Teddie and Yu, 2007). Easterby-Smith describes an exploratory survey as one that does not start with a hypothesis but rather with a large number of questionnaires from which issues may be discerned. Phase 1 provided valuable information which indicated that it was not useful to

include all segments of the agritourism sub-sector, especially from the supply side since not all actors had the capacity to use ICT in their operations. Some, due to limitations such as illiteracy, the subsistence nature of their operations, and the market for which their crops were produced, excluded them from the study. Instead of using a large number of questionnaires, this phase, based on the insight from phase 1, used a survey instrument that covered a diverse set of areas from which the issues could be discerned. Survey data were collected using a face-to-face interview mode, which, according to several authors (de Leeuw, 1992; Fontana and Frey, 1994; Smith, 1987), is one of the oldest data collection techniques and is highly flexible and reliable

The survey instrument used (included as *Appendix III)* contains a total of 31 questions and was divided into three major sections:

1. **Background Data** – 7 questions covering the farmer's age range, farm location and size, and ownership and management structure.
2. **Farming Operations** – 8 questions focussing on the age of the farming operations, items farmed, target market and production patterns.
3. **Current use of Information and Communication Technologies** – 16 questions focusing on ICT, such as, the respondent's definition of ICT, current use, and attitude towards future use.

A total of 31 farms were selected from 5 of the 14 parishes across Jamaica. The farms were selected due to their proximity to key tourist destinations and represented each of the 6 resort areas except Negril. The return trip to/from Negril is about 8 hours by vehicular transport. This proved difficult for the researcher who did not have sufficient funding to undertake the

journey. In addition, the limited amount of time available to the researcher also prevented the trek to Negril. Table 4 lists the parishes and resort areas in which farms were surveyed. Figure 7 is a map of Jamaica illustrating the relative locations of the parishes. .

TABLE 4 - PARISH LOCATIONS OF SURVEYED FARMS (PHASE 2 - PRELIMINARY INVESTIGATION)

Parish	Resort Area
1. Portland	Port Antonio
2. St Andrew	Kingston
3. St Ann	Ocho Rios
4. St Elizabeth	South Coast
5. St James	Montego Bay

FIGURE 17- MAP OF JAMAICA ILLUSTRATING RELATIVE LOCATIONS OF THE 14 PARISHES
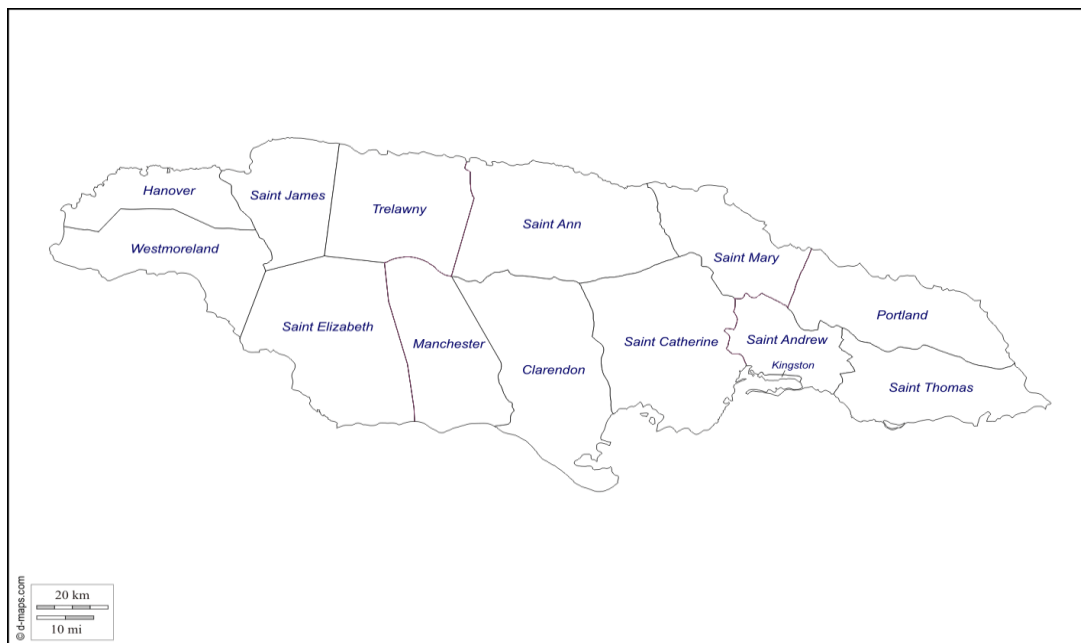
Source: d-maps.com (2013)

In some parishes, St James, Portland and St Elizabeth, due to time and accessibility constraints, the survey was administered face-to-face by agents of the Jamaica Agricultural Society (JAS).

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The findings of the preliminary investigation are detailed in Chapter 5 – Research Findings; however, the following is a summary of the two phases.

- Laymen (farmers) and technocrats alike had similar perceptions of the meaning of ICT, and both groups had a grasp of the meaning consistent with the theory.

- On the downside, it was confirmed that most of the farmers in the agricultural sector operated on small holdings, were difficult to organize, and were largely uneducated. Although uneducated, many farmers could read and write at a basic level.

- Several systemic challenges exist in the agricultural sector. These include limited access to technology by the average farmer, with only medium to large farmers having access to computers on a large scale.

- While the average farmer has a cell phone, s/he only uses it to make and receive calls and, in most cases, does not have a data plan - due mainly to the cost of such plans. However, most farmers use pre-paid mobile plans, which allow them to send and receive SMS messages at a nominal cost.

- Although there was little technology support available to the farmers, the Government farmer support organization (the Rural Agricultural Development Agency or RADA) provided its field officers with data enabled cell phones. The intention was that these devices would be used to access information online, as needed, when the field officers visited farmers. However, due to the cost associated with these data plans, several of these RADA devices were not being used as intended.

– From the Government side, the investigation found that there was a plan
to use ICT to improve agricultural marketing, or market intelligence, by
eliminating what is referred to as "information asymmetry" – the
information about the price at the retail site as opposed to the price at
the farm-gate. In furtherance of this goal, the Ministry of Agriculture
implemented a Market Information System (the Jamaica Agricultural
Market Information System) and a Business Information System (the
Agri-Business Information System or ABIS).

4.4.3 Final Investigation

The final investigation was conducted over a sixteen month period, April
2013–August 2014 across several sites in several Jamaican parishes. Data were
collected using semi-structured in-depth interviews based on several themes
(shown in Appendices VI and VII).

4.4.3.1 Selection of Sites for Final Investigation

Jamaica is divided into 6 main resort areas (JHTA, 2013):

1. **Kingston**, in the south central to south eastern section of the
   island;
2. **Port Antonio**, on the eastern coast;
3. **Ocho Rios**, on the northern coast;
4. **Montego Bay**, in the north west;
5. **Negril** on the western coast; and
6. **The South Coast**.

(Table 11 lists the parishes in each resort area)

The initial research plan (outlined in Chapter 3) was to select respondents from
each of the 3 identified sectors to be investigated in the agritourism innovation
system (Tourism Food Demand; Tourism Food Supply; and Diffusion). The
plan was to approach each resort area separately, group the hotels and

restaurants in each resort area and investigate these as a block. On the supply-side, the farms in each of these resort areas were to be approached in a similar fashion. Since the participants in the diffusion sector were headquartered in Kingston, the plan was to approach them as a block after approaching the other two sectors. Since the main research method for data collection was in-depth interviews, iterative validation, using subsequent respondents to verify data collected from previous ones, was the main method selected. The intention was to use respondents from each block of interviews during the Final Investigation to interrogate and confirm what was received from those done before.

The entities from which data were to be collected were selected from information obtained from the Offices of the Jamaica Tourist Board (JTB). This information was aggregated from various affiliate institutions and accessed at the JTB Offices in Kingston, Jamaica during April 3–4, 2013. In Kingston, a total of 12 facilities (a combination of hotels and guest houses) were identified. The Kingston facilities were those present on the JTB's list of approved facilities, all catering to tourists as well as locals. Preliminary investigations, during April 2013, found that at least 2 of the facilities were inaccessible; one was severely damaged by fire in March 2013 and was undergoing renovation, while the other had (in late 2012) undergone a change in ownership and management.

Of the 50 top restaurants in Jamaica, 26 (52%) are located in Kingston and of those located in Kingston, 9(35%) are affiliated with hotels (876media, 2011). All 17 remaining restaurants were to be targeted (the others were to be included with the hotel/guest house segment) and a member of the procurement team, preferably an executive chef or food and beverage manager, interviewed.

What unfolded during actual data collection was different from the initial plan outlined in Chapter 3. Since the researcher was based in Kingston, data collection began in the Kingston resort area. Several in-depth interviews were done with representatives (chefs and purchasing agents) from two prominent Kingston hotels and representatives from the diffusion sector, namely the Ministry of Tourism and Entertainment (MOTE), the Tourism Product Development Company (TPDCo) and a major project sponsored by the MOTE. These interviews provided useful information that led to the modification of the original research plan.

The results of initial interviews pointed the researcher to an umbrella group for hotels and restaurants (in the Tourism Food Demand Sector). This group provided information pertinent to several tourism resort areas and also to several players in the Tourism Food Supply Sector. The researcher, after analysing the results of the initial interviews, decided that it was no longer necessary to visit all the resort areas. This was so because the purchasing for hotel chains operating in the resort areas (except Port Antonio and the South Coast) was done from a single location. It was decided to gather data for these hotel chains through the central purchasing units. However, for two of the resort areas, Port Antonio and the South Coast, the tourism product offered was more customised and thus, in order to fully understand these resort areas, hotels/restaurants in these areas had to be visited. Table 5 details the coverage of all six resort areas across Jamaica and Appendix IV has a map of Jamaica providing detailed locations of the parishes and towns in each resort area.

TABLE 5 - TOURISM DEMAND SECTOR SITES SELECTED

	Interviewee	Resort Area represented
1	HR	Kingston
2	S	Kingston
3	KS	Kingston
4	CM	Ocho Rios, Montego Bay, Negril, The South Coast
5	ES	Ocho Rios, Montego Bay, Negril, The South Coast, Kingston
6	A	Port Antonio
7	DH	Port Antonio
8	FL	Port Antonio
9	SL	Port Antonio
10	WG	Port Antonio
11	CM	The South Coast
12	JH	The South Coast
13	ML	The South Coast
14	SB	The South Coast
15	SC	The South Coast

The initial set of interviews also led to a changed view of the Tourism Food Supply sector. The emanating data indicated that agricultural produce was procured from anywhere it could be sourced once the acquisition cost and delivery timeframe were reasonable. This meant that, although suppliers were resident in particular resort areas, their location was of little significance except in times of natural disasters. The researcher then amended the plan to visit suppliers in all resort areas recognising that a deep understanding of the issues being investigated could be gained by visiting a strategic few. Thus, for the supply side (The Tourism Food Supply Sector) the main issue was selecting participants rather than sites.

Fifteen in-depth interviews were conducted at Tourism Food Demand Sector sites (see table 6), four from the Tourism Food Supply Sector and three

TABLE 6 - RESPONDENTS BY SECTOR - FINAL INVESTIGATION

Sector	# of Respondents
Demand	15
Supply	4
Diffusion	3
	22

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from participants in the Diffusion sector. In total, twenty two in-depth interviews were conducted over the 16 month data collection period.

4.4.3.2 Selection of Participants

Selecting participants from the demand sector was far easier than for the supply sector. Demand sector participants were either chefs or those in charge or procurement, as identified by the owner or manager of the entity visited. In some instances, the owner of the entity undertook the role of either chef, procurement manager, or both. Therefore once the site was selected, participant selection was fairly straight-forward.

For the supply sector, the process was more involved. While the definition used for SMEs (Christodoulou, 2009; EC, 2005; Hauser, 2004; IfM, 2002) can be applied to the agricultural sector generally, there is no specific definition for SMEs involved in agricultural production. The IFC (2011) has proposed a useful illustrative framework for segmenting primary agricultural producers into different categories. The IFC framework, which can be usefully applied to WFIC Agritourism in Jamaica, segments farms into four categories: 1.) Large farms; 2.) Medium-sized farms; 3.) Commercial small holdings; and 4.) Semi-commercial small holdings.   The IFC then includes only commercial small holdings and semi-commercial small holdings in its definition of Agricultural SMEs. Subsistence farmers are excluded.

The IFC states that medium sized farms are those with between 20 and 500 hectares under production, an annual net income of between 0.9 and 1.9 times that of a skilled labourer in that region, and which generate meaningful income from farming. Large farms produce and market their output in a

professional manner, employ staff, are more than 500 hectares in size, and have

net income after costs of roughly two times the annual earnings of a skilled

labourer in that region.

In the Jamaican situation, farms are grouped in a different manner to that

stated by the IFC and therefore the SME definition for farms would, of necessity,

be different than that articulated by the IFC. In the Jamaican situation, farm

size ranges are as follows: 1.) under 1 hectare; 2.) 1 – 5 hectares; 3.) 5 – 50

hectares; 4.) 50 to less than 200 hectares; and 5.) 200 or more hectares

(STATIN, 2007). No commensurate data were found for income or the number

of persons employed and therefore the SME definition for the Jamaican

situation would only include farm size. The foregoing means that all farms in

Jamaica, except those within group 5 (200 or more hectares), fall into the SME

group.

Combining the IFC framework and the STATIN (2007) grouping (table 7),

farms from 50 to 199 hectares match the research criterion for medium-sized

farms. The most recent Census of Agriculture (STATIN, 2007) shows 270

medium-sized farms. For small farms, the relevant band is that of "1 to under 5

ha" (table 7). However, from the preliminary investigation, the researcher

concluded that only the larger farms in the Jamaican context, that is, those in

TABLE 7 - THE JAMAICAN AGRICULTURAL SECTOR SEGMENTED BY SIZE

Farm Size	Number of Farms		Area of Farms	
	Total	% of total	Total	% of total
Under 1 ha	151,929	75.73	47,712	14.64
1 to under 5 ha	43,731	21.80	86,011	26.40
5 to under 50 ha	4,543	2.27	50,783	15.59
50 to under 200 ha	270	0.13	25,449	7.81
200+ ha	140	0.07	115,854	35.56
All Farms	**200,613**	**100.00**	**325,810**	**100.00**

Source: Statistical Institute of Jamaica (2007)

the "5 to under 50 ha" band would have the capacity to use ICT. Further, the researcher thought it prudent to target the upper segment, those farms above 20 hectares, of that group.

To select participants, the researcher then approached the Ministry of Agriculture and Fisheries (MOA) for a list of farmers in this category. There was, however, massive inaccuracies in the list provided by the MOA. Several of the farmers and/or farms on the list did not exist or the names of the farmers associated with some farms were different from what was provided by the MOA. In addition, and more serious, was that preliminary checks undertaken before visiting the locations, revealed that land holdings were far smaller than what was stated on the MOA list. This meant that the selection criteria had to be modified as farms in the 20 to 199 hectare band were difficult to locate.

The foregoing led the researcher to use snowball or chain-referral sampling to select participants and collect data. Snowball or chain-referral sampling is discussed in detail in Section 4.5 (Methods of Collection and Analysis). Tedlie and Yu (2007) provided guidance in the form of a mixed methods typology. They place the options for data collection into four broad categories:

1. Probability sampling – mainly used in quantitative research studies and involves the selection of a fairly large number of respondents from a population in a random manner;

2. Purposive sampling - mainly used in qualitative research studies and in which respondents are deliberately selected based on information they can provide to answer the research question;

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3. Convenience sampling – respondents are selected based on accessibility and willingness to participate in the study; and

4. Mixed method sampling – respondents are selected using both probability sampling and purposive strategies.

Each of the four broad categories, as illustrated in fig. 18, consists of several sampling methods.

Tedlie and Yu also state that purposive sampling techniques are primarily used to select respondents *"...based on specific purposes associated with answering a research study's questions"* (p.78).

4.5 Research Methods and Data Analysis

The investigation used a mixed method approach and was divided into two sections, the preliminary investigation (which had two phases) and the final investigation. Several methods, both qualitative and quantitative, were considered before document analysis, interview, and survey were selected as the research methods for data collection. For the preliminary investigation, phase 1 utilised qualitative methods, namely, the in-depth semi-structured interview and executive interview. While phase 2 (preliminary investigation) used a fact finding (exploratory survey). Both phases used a sample of convenience to select respondents.

The final investigation utilised qualitative methods - document analysis and in-depth semi-structured interviews. Document analysis was undertaken using the modified O'Leary (2004) framework, whilst the in-depth semi structured interview method used sequential sampling, specifically a purposive sample, using a chain referral (snowball) method to select participants.

FIGURE 18 - OPTIONS FOR COLLECTING DATA DURING THE INVESTIGATION

Taxonomy of Sampling Techniques for the Social and Behavioral Sciences

I. Probability Sampling
- A. Random Sampling
- B. Stratified Sampling
- C. Cluster Sampling
- D. Sampling Using Multiple Probability Techniques

II. Purposive Sampling
- A. Sampling to Achieve Representativeness or Comparability
- B. Sampling Special or Unique Cases
- C. Sequential Sampling
- D. Sampling Using Multiple Purposive Techniques

III. Convenience Sampling
- A. Captive Sample
- B. Volunteer Sample

IV. Mixed Methods Sampling
- A. Basic Mixed Methods Sampling
- B. Sequential Mixed Methods Sampling
- C. Concurrent Mixed Methods Sampling
- D. Multilevel Mixed Methods Sampling
- E. Combination of Mixed Methods Sampling Strategies

Source: Teddie and Yu (2007, p. 78)

4.5.1 Credibility of Findings

The credibility of the research depends on the actions taken to ensure that findings are valid, reliable and replicable. Validity is whether the findings are true and certain (Guion, 2002).

> "True" in the sense of your findings accurately reflecting the real situation. "Certain" in the sense of your findings being backed by evidence.

> "Certain" means that there are no good grounds for doubting the results; i.e. the weight of evidence supports your conclusions. (p.1)

The concept of reliability is mainly concerned with testing whether the research is of a good quality. In quantitative research, good quality is determined by whether research results can be reproduced using a similar methodology (replicability), while in qualitative research, good quality is achieved when the researcher can attain a deeper understanding of the issue being investigated (Golafshani, 2003). For the investigation in this thesis, in order to ensure credibility, the researcher embraced all 3 concepts of validity,

reliability and replicability. The researcher does, however, recognize the opposing view of some authors (Guba and Lincoln, 1994; Healy and Perry, 2000; Stenbacka, 2001) who indicate that these concepts are not fit for qualitative research and might be misleading.

Since the investigation involved both quantitative and qualitative methods, the concepts of validity, reliability and replicability were approached differently for each paradigm. For the quantitative component of the investigation (preliminary, phase 2), the researcher pilot tested the survey instrument among a small group of 5 farmers. These farmers included part-time farmers, who were employed to the Ministry of Agriculture and Fisheries, and the University of the West Indies. Although this test group were not full-time farmers, they were selected as representatives of the population to be studied, for the pilot testing of the instrument. However, since for the survey (used in the preliminary investigation, phase 2), respondents were selected using a sample of convenience, the researcher recognizes that the findings might be difficult to replicate.

For the qualitative component of the investigation, the researcher used triangulation and member checking to ensure credibility. Triangulation is using another source as verification of the data collected or of other methods. Guion (2002) describes five types of triangulation:

1. Data triangulation – the use of different sources of information;
2. Methodological triangulation – the use of multiple methods (qualitative and quantitative) to study the issue;

3. Theory triangulation – the use of multiple perspectives to interpret data;

4. Investigator triangulation – the use of several investigators to research an issue; and

5. Environmental triangulation – the use of different locations or other key factors related to the environment in which the investigation was conducted.

For the investigation in this thesis, data triangulation, methodological triangulation, and investigator triangulation were used in the final investigation. Data triangulation took the form of concurrent triangulation (Creswell, 2003), where some of the responses of earlier respondents were integrated into the questions posed to later respondents to verify authenticity. Since several sectors were targeted, the responses from one sector was used to triangulate those from another. Methodological triangulation was employed through the use of two different qualitative methods, in-depth semi-structured interviews and document analysis, to collect data on the different sectors in the industry. Investigator triangulation was employed through the use of a "critical friend" to discuss both the data and research methods used during the investigation.

Member checking, the other approach used to ensure credibility of qualitative data, was used in a manner similar to data triangulation. However, member checking was far more involved as the themes generated from some interviews were shared with other respondents for their detailed feedback. In addition to validating the themes, member checking was also used to refine and

validate the model derived from the data gathered. The model was progressively elaborated, beginning with the first set of interviews until it was refined, based on the feedback received, and further validated by subsequent respondents. Each iteration, saw a fine-tuning of the model, until finally there was nothing more to change. The model was then finalised.

4.5.2 Data Management methods

Data management is the set of activities that convert the data collected into more manageable units that are more easily analysed (Knafl and Webster, 1988). For the preliminary investigation, the following data management techniques were used:

i. **Phase 1**

   Data were collected using interviews. These were not recorded electronically but rather by long-hand in a note book. The themes from these notes were then compiled into a thematic table, with the theme in one column and a code for the respondent in another.

ii. **Phase 2**

   Data were collected using a survey. Survey instruments were collected and photocopied to ensure that there was a backup. The data from each instrument were then entered into SPSS for analysis.

For the final investigation, data management was far more involved. Data were collected using interviews and document analysis. For the interviews:

i. Data were collected electronically using a recording device. Each interview was saved to an encrypted external hard drive and to a laptop PC.

ii. Initial themes were extracted into the researcher's field notebook adjacent to the field notes

- (Field notes were integral to the data gathering process due to the iterative nature of interviews. Some persons were interviewed several times)

iii. Interviews were then transcribed (over the course of several months). Three copies (1. laptop; 2. external hard drive; and 3. cloud) of each transcript were saved.

iv. Transcripts were then exported to NVivo for analysis

Note: Some recordings were analysed, to identify themes and trends, by NVivo without being transcribed.

4.5.3 Data analysis

Data analysis converts data into several thematic and relevant components, which facilitate the extraction of meaning (Knafl and Webster, 1988). For the research in this thesis, since the data were collected using mixed research methods, depending on whether it was the preliminary or final investigation, several methods were used to conduct data analysis. For the preliminary investigation, phase 1, which included in-depth and executive interviews, thematic analysis was used to analyse the data. For phase 2 of the preliminary investigation, SPSS was used to generate both descriptive and analytical statistics.

For the final investigation, the research methods were in-depth semi-structured interviews and document analysis. Data analysis began from the first set of interviews, with a preliminary scan to identify obvious themes in the data collected and to modify the questions used during interviews. Final, more detailed analysis, at the end of data collection, utilised the following four steps modified from Simon (2011):

Step 1- Open Coding – organizing the data into a broad set of themes (non-hierarchical codes)

Step 2- Categorisation of Codes - renaming, merging, and clustering related codes into a more meaningful set of codes in order to make sense of how the various components relate to each other and to facilitate deeper analysis to address the research question(s).

Step 3- Detailed Coding – analyzing the reorganised codes and re-coding them to sub-codes so as to better understand the meanings embedded therein.

Step 4 - Data Reduction – comparing and relating to the results of document analysis and literature based themes to arrive at a final framework on which to report findings.

Step 5– Writing analytical memos to narrow content to manageable proportions and create findings from which conclusions, a refined framework and implications may be crafted.

NVivo was used to assist in organizing the interview transcripts and recordings of the data collected during the final investigation, and produce themes. While NVivo was used to manage, organise, and illustrate the coded data, the vast majority of the analysis was done by the researcher who had to interpret the data organized by NVivo.

4.5.4 Data Presentation

Chapter 5 presents, analyses, and discusses the research findings. Presentation of the research findings takes a holistic approach and, often, does not differentiate between the preliminary and final investigations. The findings from each investigation is inserted, juxtaposed (Chenail, 1995; Sandelowski and Barroso, 2007) at the most appropriate place in the discussion. Data are presented in tables and figures, and where appropriate, vignettes (Burnard et al., 2008; Hughes, 1998) are used to both present verbatim data and highlight a particular finding.

4.6 Limitations of the Investigation

Several factors limited the investigation presented in this thesis. While these factors limited the fluid progression and breadth of the investigation, they did not affect the understanding required to answer the main and supplementary research questions. The limitations highlight the need for further research in the area of ICT in Jamaican Agritourism.

The first limitation is the lack of accessible, credible, and sufficient written information about the agritourism sector, the use of ICT in Jamaican agriculture, the farming community, and previous interventions. Much of the written information had to be unearthed during fieldwork and caused several

delays to the data gathering process. Data gathering took an inordinately long time (over 3 years) as a result.

Another limitation is the insufficiency of the financial resources of the researcher. Although Jamaica is relatively small, many of the farms are located in inaccessible areas that require four-wheel transportation and hours to reach. For phase 2 of the preliminary investigation, the researcher had to seek the intervention and assistance of the Jamaica Agricultural Society (JAS) in order to access some farms. In some cases, personnel from the JAS were the ones actually administering the survey to farmers. These combination of factors led to a relatively low number of questionnaires (31) being completed over a 4–6 week period. Several questionnaires had to be discarded due to being incomplete.

On the social side, the limitations emanated from a culture of secrecy and/or mistrust. This culture was manifested in every sector studied during the investigation but was more sophisticated in the Tourism Food Demand Sector. For members of the diffusion sector, which included public sector workers (civil servants or those on government sponsored projects) as well as NGOs, there is a culture of non-disclosure. The culture of non-disclosure was evident especially among those in the public sector. Some respondents were reluctant to provide answers and only did so after the researcher sought clearance from a superior. This delayed the data collection and caused the researcher to, sometimes, interview the same person more than once. Several times during interviews, respondents refused to provide details "on the record" and were only comfortable providing information that was not being recorded electronically.

A significant limitation is the generalizability of the results of the investigation. This limitation is a result of the specific focus on Jamaica and the nature of the research question. This limitation is also the result of the qualitative nature of the methods used and the aim of understanding a phenomenon and providing a solution to that phenomenon rather than applying a solution, or generating a theory, for external application.

4.7 Summary

The research into the Jamaican agritourism sub-sector for this thesis was divided into two segments – a preliminary investigation and a final investigation. The preliminary investigation was further divided into a first phase, which used interviews to collect data, and second (final) phase where questionnaires were used for data collection. The final investigation utilized in-depth semi-structured interviews and document analysis. Document analysis was used to both triangulate data and supplement what was unearthed from interview respondents.

Research participants were selected using several techniques. For the preliminary investigation, respondents were selected based on convenience, while for the final investigation, snowball sampling was used after selecting from an initial list provided by the support agency for farmers. The data collected were analysed using software, such as SPSS and NVivo, and manually, using thematic analysis. Although several limitations, such as lack of resources to visit all areas and lack of cooperation from some respondents, affected the study, these did not prevent the researcher from forming a full understanding

of the sub-sector. The presentation, analysis and discussion of the findings are

in Chapter 5.

Chapter 5 – Presentation, Analysis and Discussion of Findings

5.1 Introduction

Chapter 4 provided a detailed account of the research, including the ontological and epistemological perspectives of the researcher along with the research methods used. This chapter will present an analysis and discussion of the data unearthed during the research. The data discussed in this chapter were collected in two distinct but related investigations: a preliminary investigation, using semi-structured executive interviews, and an exploratory survey; and a final investigation, using in-depth semi-structured interviews and document analysis. Both investigations were conducted to answer the main research question and supplementary questions stated in Chapter 1. The details of, and justification for, each method was presented in Chapter 4.

Although the investigations were conducted sequentially, the discussion of the findings presented in this chapter will take a holistic approach, with the findings from each investigation inserted at the most appropriate place in the discussion. In addition to juxtaposing the results from the various research methods used, the discussion is juxtaposed with the data excerpts (vignettes) used to illustrate results. This form of juxtaposition is given credence by several authors (Chenail, 1995; Sandelowski and Barroso, 2007) and is recognised as key to producing a paper which can be easily followed by the reader.

The critical question posed by this thesis is, "in what specific ways can information and communication technologies be applied to the Jamaican agritourism sub-sector in order to both increase farm output and match farm

output to market demand within the tourism sector?" Several supplementary questions emanate from the more general one:

1. What is an effective agritourism model for Jamaica as perceived by selected players in the agritourism sub-sector?

2. What are the characteristics of the agritourism model identified by selected players as being effective for Jamaica?

3. To what extent has ICT been applied, in Jamaica, to the components of the agritourism model conceptualised from the theory?

4. How might ICT be best applied to agritourism in Jamaica?

In order to answer these questions it was imperative, as an important first step, that the researcher understand the sector and how technology is viewed by the players in it. Following that, an understanding of the potential use of ICT is critical.

The discussion in this chapter is organised as follows: Section 5.1 introduces the chapter and provides an overview of its contents; Section 5.2 discusses the structure of the Jamaican agritourism sub-sector; Section 5.3 discusses how demand is satisfied by the supply sector; Section 5.4 discusses the issues, in the form of the main themes, unearthed from respondents; and Section 5.5 discusses the current use of ICT in the sub-sector. The final section, Section 5.6, discusses the findings in relation to the potential future use of ICT by the participants in the sub-sector.

5.1.1 Setting the context

The discussion in this chapter will use certain keys terms that are used differently in the general literature, but have been adapted to the Jamaican

context. These terms will be introduced here before the main discussion begins. One of the terms frequently used throughout this chapter is "resort area". In the Jamaican context, according the government representatives from the Tourism Product Development Company (TPDCo) and the Ministry of Tourism and Entertainment interviewed, the term "resort area" is used as a marketing term to divide the island into 6 regions, which are each marketed separately to different market segments. This usage is somewhat different from the definition in the literature. Although the literature does not define "resort area", it defines a resort as a location where the offerings (products and services) are largely focused on visitors (Gordon and Goodall, 1992; Inbakaran and Jackson, 2005).

Although all of Jamaica has been divided into 6 resort areas, as is illustrated in table 11, which includes all 14 parishes, tourism is not the main industry in all of these areas. In fact, as verified by interviews with a TPDCo representative, several parishes, or areas within parishes, that are included in a resort area, are not a part of the tourism industry. That is, these areas are not listed as tourist destinations. However, the places within the resort area which are a part of the industry, adopt the tourism marketing strategies used for the resort area in which they are located.

5.2 Structure of Jamaican agritourism

Agritourism, as discussed in detail in Chapter 2, refers to the sub-sector where agriculture and tourism intersect (Lakovidou, 1997; Sharpley and Sharpley, 1997; McGhee and Kim, 2004; Kuo, 2006; Koc, 2008; Phillip et al, 2010). According to what was unearthed from the research, in Jamaican agritourism, farms, either directly or through third-party providers known as

purveyors, supply agricultural produce to hotels and restaurants catering to tourists. Only a small number of farms, perhaps two or three of the total farm population, provide farm tours and none, based on the data collected, provide accommodation to tourists. According to the most recent census of Agriculture (STATIN, 2007), the total number of farms in Jamaica is 200, 613 with the vast majority (151, 929) being below 1 hectare or 2.4 acres. At the time of the data collection (2012/13), plans were underway to offer tourist accommodation at one farm as part of an initiative to link, or increase the link between, local agriculture and the tourism industry.

The type of agritourism in Jamaica corresponds to the definition of Working-Farm-Indirect-Contact (WFIC) agritourism identified in Phillip et al.'s (2010) agritourism typology and stated as the focus of this study in Chapter 2. According to Phillips et al., in WFIC agritourism there is minimal integration of agriculture with the tourism product and the focus is on the use of the agricultural products of the farm, such as the growing of food for restaurants or hotels for tourists' consumption, as opposed to utilising the actual farm for accommodation or tours.

Based on the data collected from those interviewed in the final investigation, the food supplied to tourists is procured from the general agricultural sector, with restaurants and hotels competing, either directly or through a third-party, with the general population for supplies. There are, however, some specialised crops, such as some types of culinary herbs, which are not consumed by the local population and are produced in small quantities, by specialist growers, specifically for the tourism sector. Phase 2 of the preliminary investigation, during which survey interviews with farmers on 31

farms across 5 parishes were conducted, provided some indication, as seen in table 8, of the customers to which agricultural produce was directly supplied. The information in the table corroborates the view of those interviewed, showing that only 14% of the farmers surveyed sold produce directly to hotels and restaurants.

Table 8 - Breakdown of Customers for Farm Produce

		Responses	
		n	Percent
Current Purchasers	Directly to end Consumer	13	26.0%
	To Supermarket/Retailer	11	22.0%
	To agri-processor	4	8.0%
	To intermediary	15	30.0%
	To Hotel, Restaurant, etc.	7	14.0%
	Total	50	100.0%

Source: Data collected during phase 2 of the preliminary investigation

Note: Some respondents supplied to multiple purchasers. This accounts for the n=50 as opposed to the true sample size (n) of 31

To summarise, according to the data collected, Jamaican agritourism does not typically include farm stays or activities that integrate the visitor into the work activities of the farm. Jamaican agritourism is typified by the provision of food to the tourism sector and a limited number of farm tours. In addition, similar to other consumers, Jamaican hotels/restaurants source most of their agricultural produce from the general agricultural sector.

5.2.1 The Demand Sector

Data collected from those interviewed in the final investigation, triangulated against documents analysed from the Jamaica Tourist Board

indicate that on the demand-side, there are two types of restaurants *(see fig.19 for illustration)*:

1. those associated with an establishment providing accommodation where tourists can stay overnight *(referred to as accommodation-based)*; and

2. those which are independent, that is, not associated with an accommodation.

Accommodation-based restaurants normally adopt the rating of the establishment with which they are associated and are normally managed as a part of the accommodation's overall management structure. On the other hand, independent restaurants, which are normally operated by a company or individual, are not associated with an accommodation and, therefore, do not benefit from the management support provided by any accommodation. Independent restaurants can be placed into two groups:

1. Formal dining; and

2. Informal dining.

As is illustrated in figure 19, formal dining restaurants include: fine dining; casual dining; and quick service restaurants (QSRs), while informal dining restaurants include Cook shops and Rest Stops. A Cook shop is a restaurant operated on a very small scale, usually from the front/back of someone's home or shop. Most of a Cook shop's customers are local, however, depending on the resort area in question, tourists also purchase from these.

A Rest Stop is a cluster of independently owned and operated, small, food establishments (or a single establishment), located adjacent to a major

roadway or tourist attraction and approved by the Ministry of Tourism. Rest

stops are patronised by both locals and foreigners in similar proportion to the

numbers visiting the general area where these are located. However,

depending on the resort area, most overseas tourists that visit Rest stops may

do so as part of a group organised by a tour company. These organised tours

are conducted during set hours and the Rest stops are often informed of the

schedule before-hand. Therefore, while the menu does not change, the food

offered to the group may be of a higher grade, and pricier, than that offered to

locals. Although the items in these Rest Stops are procured from the same

sources as other items, they often attract a higher price due to their higher

quality.

FIGURE 19 – Jamaican Agritourism Demand Sector (Partial)
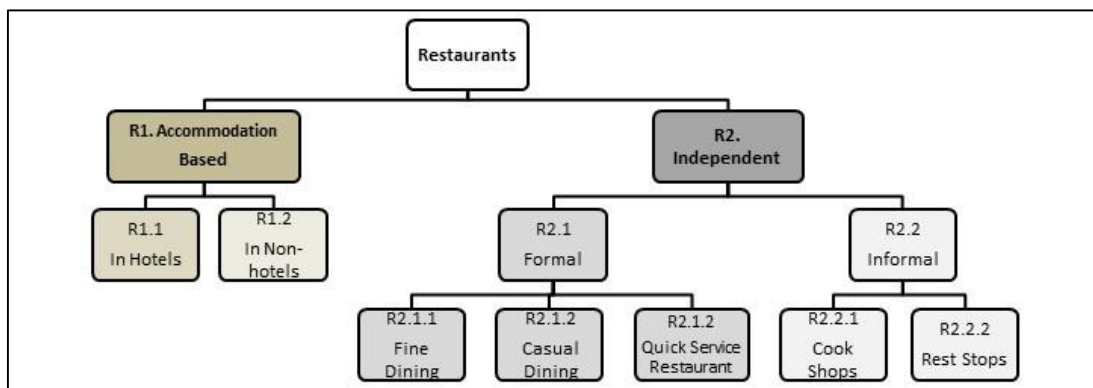
Source: Data collected during final investigation

Based on results obtained from in-depth interviews with

representatives from TPDCo, all restaurants associated with an accommodation

are regulated by TPDCo and the Ministry of Health. However, independent

restaurants are only regulated by the Ministry of Health to ensure compliance

with health and safety standards. The general view from some of those

interviewed in the demand sector, and corroborated by respondents from the

Ministry of Tourism, is that only the fine-dining restaurants and established

QSR chains, whether locally or foreign owned, pay close attention to the quality (consistent taste, better graded ingredients, consistent menu) and the diversity of their menus.   Table 9 provides a summary of the findings in respect of the types of restaurants operating within the Jamaican agritourism demand sector.

TABLE 9 - SUMMARY OF JAMAICAN RESTAURANTS BY TYPE

Restaurant types	Brief Description	Some Features
Accommodation-based	Restaurant associated with an accommodation (hotel, Guest House, etc.)	– Adopts the rating of the accommodation – Benefits from management structure of the accommodation

Independent	Not associated with an accommodation	– Has to put in place its own structures
		– May benefit from external management system if part of a chain or franchise
		– May be one of the following:
		  o Formal
		    ▪ Fine-dining
		    ▪ Casual dining
		    ▪ Quick Service
		  o Informal
		    ▪ Cook Shop
		    ▪ Rest-stop

Source: Data collected during final investigation

After examining documents obtained from TPDCo and reviewing the data collected from a respondent representing the umbrella organization for accommodations in Jamaica, the researcher found, as illustrated in figure 20, that accommodation-based restaurants are located in two types of accommodation:

1. hotels; and
2. non-hotels.

Non-hotels, as the name suggests, includes all accommodation that are not classified as hotels such as private homes, apartments, guest houses and villas. Although the government registers and produces a list of establishments registered as hotels and non-hotels, except private homes, some accommodations are not registered, but are known to the government. These unregistered accommodations do not appear on the government produced list but appear on the list of the umbrella organisation for accommodation known as the Jamaica Hotel and Tourist Association (JHTA).

FIGURE 20 – The Jamaican Agritourism Accommodation Structure
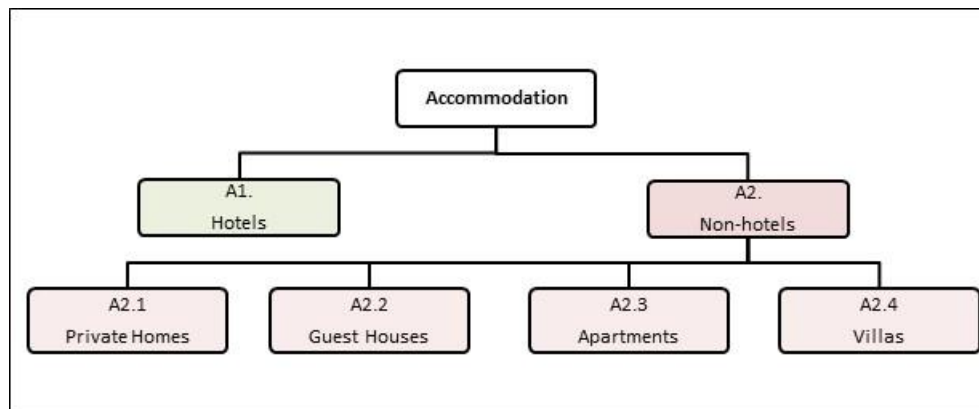
Source: Data collected during final investigation

5.2.2 The Supply Sector

The most recent agricultural survey (STATIN, 2007) indicates that approximately 97% of Jamaican farms are 5 hectares (≈12 acres) or less and that most (≈76%) are less than 1 hectare (≈2.5 acres). Based on the results of the interviews conducted with respondents from the demand sector and the support (government) sector, most of the produce sold to restaurants are supplied by small farms ranging from approximately 1 to 15 hectares (≈2.5 to ≈37acres) under production. Importantly, based on what was unearthed from members of the farming community, although the land under production for

most of these farms is similar to that stated by the demand and government sectors, farmers, even on the smaller plots, tended not to cultivate all the land available to them. When queried as to the reason for not cultivating all the available land, interviewees indicated that due to the costs (especially for labour) associated with farming all the available land, it was more beneficial to not produce on all the land available. However, based on some of the sentiments expressed by those interviewed, the researcher formed the view that the reason for the sub-optimal land use was one of improper planning. Improper business planning seemed to limit the extent to which farmers were able to financially justify larger cultivations than the current ones.

A critical piece of information gleaned from the interviews is the presence and important role of intermediaries (middle-men) to the supply chain. In addition to the farmers themselves, these middle-men, known as purveyors, act to consolidate the agricultural produce of several farmers in order to satisfy the demand from the hotels/restaurants. Interestingly, these purveyors operate both in the demand-sector and supply-sector depending on the view of the observer. To the farmer, the purveyor operates in the demand-sector as it is the purveyor who purchases the items produced by the farmer. However, from the perspective of the hotelier/restaurateur, the purveyor

FIGURE 21 – PURVEYORS IN THE SUPPLY/DEMAND INTERACTION

145
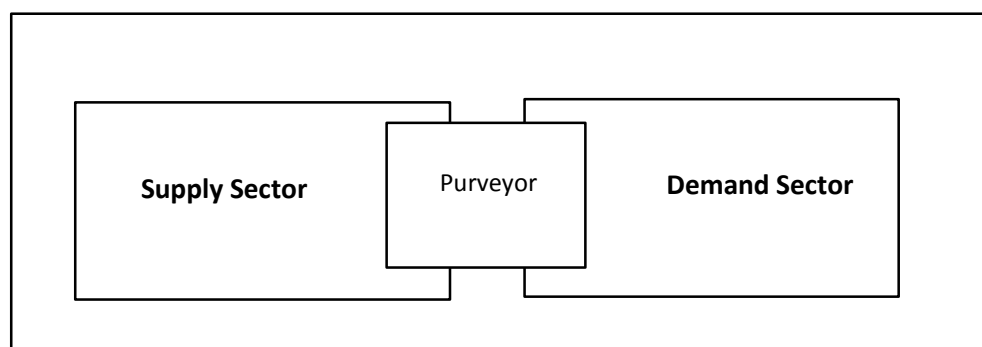
operates in the supply-sector, since it is the purveyor who supplies the agricultural produce demanded by the hotelier/restaurateur. Figure 21 illustrates the relationship between the supply sector and demand sector, and how purveyors are positioned in the interaction.

Based on what was unearthed from those interviewed, and this traversed the entire data corpus, purveyors operate throughout the island but mostly supply larger properties or those which are part of a hotel chain. In fact, the hotel chains take most of their produce from purveyors and rarely, if ever, interact with farmers directly. Vignette 1, from a discussion between the researcher and the representative of a large hotel chain, provides a sample of the data provided in respect of how purveyors are utilised by some hotels.

VIGNETTE 1 – Interaction between researcher and representative of a large hotel chain describing the use of purveyors in the supply chain for his hotel chain

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Researcher: *You were saying that you go through the purveyors when there is a shortage for fruits and vegetables.*

C.M: *Well we go to purveyors here for fruits and... for everything that we purchase.*

Researcher: *For everything... so you don't do any direct purchasing?*

C.M: *For food?*

Researcher: *For food, yea we're talking about food.*

C.M: *No.*

...

C.M:*...No. no we don't bring anything in. We don't bring anything in from overseas for that and we... what we've done is we, for want of a better term, we outsource. So we have a purveyor who we go to him specifically for say 70% of our produce – fruits and vegetables – and we give him that list, because one, he will be able to provide the quantity that we need - consistently good supply, quality and he has the capacity to go the length and breadth of the island to find whatever it is from the farmers and sell to us. So for most of our produce we don't go directly to the farmers anymore.*

(The above exchange was corroborated by the largest purveyor in Jamaica along with several farmers.)

Smaller hotels and non-hotels source from farmers directly. These smaller properties source from a small number of farmers who also act as purveyors, and directly from the local market.

5.3 Satisfying the demand

Determining the structure of the demand sector and how demand is currently being satisfied proved challenging. This challenge resulted from, in some instances, the reluctance of those representing hotels to provide fulsome information and in other cases the absence of data *(these issues are discussed in Section 5.4 - Main Themes)*. However, the challenges notwithstanding, the researcher was able to get a good understanding of how demand was being satisfied. Based on what was unearthed during the interviews and documents analysed (Deslandes, 2008; Seepersad and Ennis, 2009), which were written for the Ministry of Agriculture's Marketing department, the interviewer was able to determine the following. The items demanded by restaurants vary based on several factors. For accommodation-based restaurants, the first and most important factor influencing demand is the resort area in which the accommodation is located, followed by the type of accommodation, then thirdly, by the clientele to which the restaurant is catering. For independent restaurants, the only factor of importance is the type of restaurant *(R2.1 and R2.2 in fig. 19)*. Although three factors were identified for accommodation-based restaurants *(R1 in fig. 19)*, the first factor (resort area) influences the other two factors (accommodation and clientele).

Several tourism types, dictated by the market segment being targeted by tourism operations in a resort area, were identified as currently being practiced in Jamaica *(see table 10)*.   Of note is that the tourism types identified do not represent all the tourism products (accommodation, attractions, etc.), but rather the majority of the products offered by those in each resort area. Based on a review of the literature (Boyer, 1982; Hall and Weiler, 1992; Chu and Choi, 2000; Yavas and Babacus, 2005; Tomothy and Boyd, 2006), the researcher has determined that there are two basic tourism types, business and leisure. Based on the data collected during the final investigation, the researcher found that leisure tourism could be further broken down into additional, leisure-related, tourism types. Table 10, summarizes the types of tourism identified as being practised in Jamaica and table 11 summarises the type of tourism practised by each resort area broken down by parish. The tourism types identified in table 10 are not new and have been identified and defined in the literature - the definitions are inserted further in the discussion. However, it is the researcher, based on the analysis of the data collected who has chosen to group the non-business tourism types under leisure. In addition to this grouping, the descriptions in table10 are a combination of that provided by the literature and what the researcher was able to discern from the data collected.

TABLE 10 - TOURISM TYPES IDENTIFIED IN JAMAICA

Tourism Type	Description
Business Tourism	Focuses on travellers visiting a destination for a short time, usually less than two weeks, to conduct business or to attend meetings or conferences. This tourist spends most of their time outside the hotel and consumes local cuisine.

Tourism Type	Description
Community Tourism	Visitors try to integrate with members of the local population by staying in locations that are not purpose-built for visitors and immerse themselves in the lives of locals, including consuming local cuisine. These visitors sometimes stay for extended periods, some as long as several months.
Cultural and Heritage Tourism	Persons visit the destination mainly to view sites specific to the heritage of the location and to gain an experience indigenous to the local setting. These visitors do not necessarily integrate into community activities but participate in activities staged for their benefit. Their stay is normally two to three weeks.
Ecological (Eco-tourism)	Visitors travel to areas that are considered "natural" and which strive to maintain balance among all elements of the ecosystem. These visitors normally stay for two to three weeks.
Resort Tourism	Caters to all the needs of the visitor in a single location or at a single property. This visitor normally spends two or more weeks at a location and, where the location is "all inclusive" consumes all, or most, of the tourism products (meals, entertainment, etc.) at the property. Where the property is not "all inclusive", the tourism products are consumed in close proximity to the property, often, as organized by the place of stay.

TABLE 11 - TOURISM TYPES BY RESORT AREA

Resort Area	Parishes (Places) included	Tourism Type
Kingston	Kingston	Business
	St Andrew	
	Port Royal	Cultural heritage
	St Catherine	Cultural heritage, Business
Port Antonio	Portland	Ecological
Ocho Rios	Trelawny (East)	Resort
	St Ann	
	St Mary	
Montego Bay	St James	Resort
	Trelawny (West)	
Negril	Westmoreland (East)	Community, Resort

	Hanover	
South Coast	Clarendon	Ecological, Community
	St Elizabeth	
	Manchester	
	Westmoreland (West)	

The Kingston Resort Area

The data collected from the final investigation indicate that business tourism predominates in the Kingston resort area with a small amount of cultural and heritage tourism in the town of Port Royal, a small town on the outskirts of Kingston, and in the adjoining parish of St Catherine. Vignette 2, between the researcher and the Executive Chef at a hotel-based restaurant in Kingston, provides a sample of the data unearthed about the type of tourism mostly found in the Kingston resort area. Nicula and Elena (2014) describe the business tourist as a visitor who travels mainly for the purposes of work or for an organised event, such as a conference, on behalf of themselves or an organisation, the primary aim of which is non-recreational. Based on the data collected during the final investigation, the definition of business tourist found in the literature is similar to that used in Jamaica.

For the Kingston resort area, the established hotels are located in the parishes of Kingston and St Andrew with only one small hotel in Port Royal and none in St Catherine. *(Table 11 contains the list of parishes per resort area.)* While establishments exist with the title "hotel" as a part of their name, these are normally Guest Houses and motel type accommodations. Motels are not included in the Jamaican agritourism structure illustrated in figure 19. In the Jamaican context, motels are normally establishments, which rent rooms by the hour for purposes other than an overnight stay. Based on the data unearthed during the final investigation, in Jamaica, a typical business tourist visits a hotel

for less than two weeks, spends most of their time outside the hotel and

consumes local cuisine.

> **VIGNETTE 2** – *Interaction between the researcher and an Executive Chef, with wide-ranging experience across several parishes and restaurants, currently working at a hotel-based restaurant in Kingston, describing the type of tourist who visits the Kingston resort area*
>
> **Researcher***: These business persons are normally people from abroad or people from Jamaica?*
>
> **K.S***: You get a mixture.*
>
> **Researcher***: Right, right, right. Because I'm looking at tourism, I want to explore the business people some more before I move on.*
>
> **K.S***: Before I move on though, the hotel, I know you mentioned tourism, and once you're speaking of hotels, then tourism comes into play. Well most of these hotels, in Kingston on a whole, I think they mainly cater for business people, like people who come in to have small meetings and expats who come up to Jamaica to conduct business. They stay for a week, conduct their business, and then go home.*

The cultural and heritage tourist, as opposed to the business tourist,

is a leisure traveller interested in immersing himself in the culture of the

location being visited (TIES, 2015). The aim of this tourist is to visit sites

specific to the heritage of the location, eat the food and gain an experience

indigenous to the local setting. The data collected during the final

investigation revealed that both the business and cultural and heritage

tourist consume a similar cuisine as is illustrated in vignette 3 between

the researcher and a chef at a hotel-based restaurant in Kingston.

> **VIGNETTE 3** - *Interaction between the researcher and an Executive Chef, with wide-ranging experience across several parishes and restaurants, currently working at a hotel-based restaurant in Kingston, describing the preferred cuisine of the business tourist*
>
> **Researcher***: So do you find the expats prefer the eggs and the pancakes and all these kind of things?*

K.S: To be honest, they go for the Jamaican foods. Because we do offer them pancakes from time to time, but you don't have people asking for it so much. What we do, on the buffet though, we have an egg station that is where one would order scrambled egg or an omelette, but at the same time, they're really enjoying the Jamaican [food]. The steam callaloo, the ackee and saltfish. Coming up in the feedback that we get, breakfast, as a matter of fact, is one of the most mentioned, that people really enjoy. Not to say the rest of the food...on average, breakfast is one of the main [ones], and [it] is strictly Jamaican apart from the eggs, you know the omelettes and such...

Based on data gathered from interviews, during the final investigation, along with that from an analysis of documents, which were drafted for a government initiative to increase the linkages between local agriculture and tourism (Deslandes, 2008), it was noted that the hotels in the Kingston Resort area source food from purveyors and farmers (some of whom are themselves purveyors) from across the island (St Elizabeth, Manchester, Westmoreland) on a weekly basis. Interviewees indicated that suppliers have a set day when they take produce to the hotel/restaurant and are normally provided with a demand-list via telephone or, if available, by email. Interviewees stated that most farmers produce a combination of plant and livestock. This is similar to the findings from phase 2 of the preliminary investigation, as illustrated in table 12, from a sample of 31 farms across 5 of the 6 resort areas in Jamaica. Appendix IV provides details on the crops produced.

TABLE 12 - BREAKDOWN OF AGRICULTURAL PRODUCTION FROM A SAMPLE OF FARMERS SPECIFIC PARISHES

Produce				
	Frequency	Percent	Valid Percent	Cumulative Percent
Field crops only	5	16.1	16.1	16.1
Livestock only	8	25.8	25.8	41.9
Both Livestock and Field crops	18	58.1	58.1	100.0
Total	31	100.0	100.0	

Port Antonio and the South Coast Resort Areas

The data collected from those interviewed, namely from the umbrella body for accommodations in Jamaica and from the Ministry of Tourism, indicate that the main tourism type practiced in the resort areas of Port Antonio and the South Coast, is, eco-tourism. The International Ecotourism Society define ecotourism as *"...travel to natural areas that conserves the environment, sustains the well-being of the local people, and involves interpretation and education"* (TIES, 2015). The data reveal that Port Antonio and the South Coast have mostly non-hotel accommodations, mainly villas, and visitors normally utilize the services of a housekeeper/cook to prepare food. Accommodations are normally small, with most not exceeding 15 rooms, having a single restaurant and almost exclusively supplying Jamaican food to their guests. Several of these properties do not provide the full set of meal services – breakfast, lunch and dinner – typical of accommodations in the other resort areas. These properties, often, make special arrangements, at the request of the guest, to provide meals for guests. The food consumed by villa occupants is normally provided as a part of the package and is normally procured from the local agricultural produce market and not from purveyors. For the Guest houses and small number of hotels, procurement is normally done through small purveyors, who are often themselves farmers, or from the local agricultural produce market, especially in instances where food items run out. Table 13 provides a purveyor typology, as discerned by the researcher, for Jamaican agritourism.

TABLE 13 - PURVEYOR TYPOLOGY FOR JAMAICAN AGRITOURISM

Purveyor Type	Organization	Sourcing	Delivery	Infrastructure
Small	Sole trader and active Farmer	Own farm and farms in close proximity to owner's farm	Island-wide	• Basic transportation/ delivery • No Refrigeration (storage, transportation) • No island-wide delivery in close time-frame
Medium	• Small private company • 10 – 20 employees • Family-owned and managed	Farms Island-wide	Island-wide	• Good transportation/delivery network • Refrigeration available (storage, transportation) • Capacity to deliver island-wide simultaneously or in close timeframes
Large or Specialist	• Large (medium-sized), publicly traded company • More than 100 employees • Professional Managers • Access to resource persons	• Farms Island-wide • Farming Cooperatives • Internationally	• Island-wide • Nearby Countries	• Good transportation/delivery network • Refrigeration available (storage, transportation) • Capacity to deliver island-wide simultaneously or in close timeframes

The Ocho Rios and Montego Bay Resort Areas

Interviewees, specifically representatives from the JHTA and a large

hotel chain, as well as government documents (Commonwealth Secretariat,

2002; PIOJ, 2012) analyzed during the final investigation, indicated that the

resort areas of Ocho Rios and Montego Bay are dominated by the larger hotels,

several of which are all-inclusive. The type of tourism practiced in these two

areas may best be described as resort tourism. While the literature does not

provide a definition of resort tourism, it describes a resort as a location or

property where services are geared toward fulfilling the needs of the visitor

and where the quality of service is largely consistent (Gordon and Goodall, 1992; Inbakaran and Jackson, 2005). Resort tourism as used in this thesis means the type of tourism that seeks to cater to all the needs of the visitor in a single location or at a single property.

Interviewees indicated that the properties which practice resort tourism procure mainly from large or specialist purveyors. These purveyors are typically well established, often publicly traded companies that operate across the island. Large or specialist purveyors typically source agricultural produce both locally and abroad, and provide other non-food products to the demand-sector. In Kingston, where business tourism predominates, and Negril, where the tourism type is a mixture of community and resort tourism, procurement is done from both small and larger purveyors. *(Table 13 summarizes the types of purveyors identified from the research.)*

An analysis of the interview data collected during the final research phase indicates that purveyors can be broken down into three groups:

1. small-sized purveyors;
2. medium-sized purveyors; and
3. large or specialist purveyors.

Small-sized purveyors are usually farmers, operating as sole traders, selling agricultural produce to both accommodation-based and non-accommodation-based restaurants. The produce sold to these restaurants are normally a combination of those the sole trader produces him/herself and that procured from fellow farmers in the vicinity of his/her farm. The sole trader (and farmer) normally produces specialized crops on land holdings between 1 – 5 hectares and supplement their production, in order to meet the demand, by

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purchasing similar agricultural items from neighbouring farmers. The sole

trader also includes items from neighbouring farmers that they do not produce

but with which they are familiar, i.e., have first-hand knowledge of how these

are grown, in their product offering to restaurants.

The distance between the restaurant and origin of the sole trader does

not matter, however, the sole trader only procures for resale from other

farmers in relatively close proximity to his/her farm. The small-sized purveyor,

often, does not have refrigeration to either store or transport produce and

therefore delivers produce close to the date on which these were harvested.

Hotel chains and larger individual properties, usually those catering to the

resort tourist type, typically do not procure from small purveyors. Vignette 4,

from a representative of the hotels, describes what a purveyor is.

VIGNETTE 4 – *Data gathered from a representative of the hotels.*

> **E.S:** *Many of the hotels will use the word purveyor, because in many*
> *cases, it's not the actual person going out in the field or has a small*
> *holding, who is actually coming to your doorstep. It really is either*
> *somebody, that a couple of them work together and have transport*
> *that is good, or somebody who is a middle-man who goes and finds it*
> *and who has made a business out of finding the different farmers who*
> *produce…*

Medium-sized purveyors are normally small companies, family-owned

and staffed, with between 10 to 20 employees, capable of supplying several

resort areas simultaneously or within close timeframes. These companies are

normally owned by former farmers with experience in farming a variety of

crops and livestock, who have decided to enter purveying full-time. Medium-

sized purveyors typically source agricultural produce from across the island

and have the refrigeration and other infrastructure required for storage and

transportation. These purveyors supply both accommodation-based and

independent restaurants island-wide and include all tourism types. However, a notable exception are the properties and restaurants operating in the areas where ecological tourism dominates. These properties do not normally procure from medium-sized purveyors and only do so in periods of crisis. Medium-sized purveyors purchase from all farmers, irrespective of farm size and location, and tends to travel to the source of the agricultural produce irrespective of its location.

Large or specialist purveyors are often larger, publicly traded companies that started operations procuring exclusively for the tourism industry, or as food traders in the local market and have diversified into tourism. In addition to food, large or specialist purveyors provide a wide variety of supplies to both accommodation-based and independent restaurants, sourced from both local and overseas suppliers. Large or specialist purveyors are (companies) normally run by professional managers who have access to resource persons with a background in agriculture. These companies are not focused on sourcing in Jamaica but rather from anywhere with the best price for agricultural produce. As is illustrated in vignette 5 from an interview between the researcher and a representative of a large or specialist purveyor, collected during the final investigation, the large or specialist purveyor views agricultural produce as a commodity which should be procured from the most cost-effective source.

> **VIGNETTE 5** – *Data gathered from a representative of a large or specialist purveyor*
>
> One of the things that I have said to small agricultural players is, don't go to a hotel and say you're Jamaican producing the best ginger, the best potato on a Jamaican farm with Jamaican labour, and providing a Jamaican experience. That's rubbish. It has no role to

play when you're going into that market. What you should be saying is that *"my product is not only a good product but the way in which I present this product saves you time, because I have now graded, washed, peeled and vacuum sealed to save you time, than having 5 people sit down by a pipe around the back of the hotel, washing, cutting, peeling and all those things."* So your value proposition is about that.

5.4 Main themes

Several themes emanated from the data gathered during interviews during the final phase of the research. These themes represent the issues faced by those operating in the Jamaican agritourism sub-sector, specifically the supply chain for agricultural items. The themes, which provide useful insight into Jamaican agritourism, are discussed in sub-Sections 5.4.1 to 5.4.8 and some represent confirmation of what was unearthed by previous researchers in the field (Belisle 1984, Hayle, 2005; Meyer, 2006; McBain, 2007; Deslandes, 2008; ITC, 2010; Rhiney, 2009, 2011). Table 14 lists the themes identified and matches them with the relevant sectors. The sectors (namely, the supply sector and the demand sector) emanate from the modified agritourism innovation system model used as the theoretical framework for conducting the investigation. The theoretical framework is described in detail in Chapter 3 (Research Outline).

TABLE 14 - MAIN THEMES FROM RESPONDENTS

Theme	Demand Sector	Supply Sector
Culture	X	X
Trust	X	X
Lack of information	X	X
Logistics and distribution	X	
Consistency		X
Pricing		X
Quality		X
Variety		X

5.4.1 Culture

Culture emerged as a major underlying theme highlighted by both the supply and the demand sectors. According to respondents, many of the current challenges being faced by Jamaican agritourism stem from cultural practices, some of which are long-standing, some recent, that are present in both the agricultural and tourism sectors. In the agritourism supply sector, some of these practices are entrenched in the older farmers who, according to STATIN (2007), dominate local agriculture. Although younger farmers also follow these cultural practices, some of these younger farmers seem more willing to adjust their behaviour. The general sentiment, expressed largely by those in the demand sector, is that farming, even for those using it as their only source of income, is not viewed as a business. Therefore, the discipline required by persons doing business is often absent. Vignette 6 provides several examples of this view expressed by respondents.

VIGNETTE 6 – *Some views expressed by interview respondents concerning **culture***

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1. ***B.S:*** *I think we have adopted into our culture, a reticence to move forward*
   ...
   A lot of the farming is done by people who perform this sort of habitual act, this is how it was always done, this is how you do it. And this is what lettuce is and this is what you plant. And that is not lettuce.
   ...
   And the second thing is I just think there is an aahmmm...a lack of entrepreneurial skill in the mix as far as supplying the hotel sector's needs in Jamaica.

2. ***L.F:*** *What we have in Jamaica is a culture where our businesses, agriculture businesses and some of the small businesses do not know how to organize themselves and be entrepreneurial, they don't have the business sense to take on certain things and approach things with sense. See, until that changes, we are going to always have these issues...*

> *I wouldn't say it is a culture problem for Jamaica but it is something that we need to look at seriously and it is something that we have to educate these farmers, about business, they have to understand that. Listen, you have to approach this thing as if you are in business and you have to understand that the hoteliers are in business. This is your potential market you know.*

3. ***DL:*** *There are cultural changes which are also going to be part of this. And culture can be massaged into the right behavioural patterns….*

> *When was the last time you saw a farmer who probably did those things considered in modern times to be something that was considered a good, lively, honest, opportunity. Those are the types of things - and once again that is where the culture comes into play…*

Interestingly, although several government documents and persons interviewed from both the government and the demand sector (hotels and purveyors), stated that most farmers were aged 65 years and older, the findings from the preliminary research did not match this. Phase 2 of the preliminary research targeted 31 farms across 5 parishes representing 5 of the 6 resort areas in Jamaica, except Negril. Those findings, illustrated in table 15, albeit from a small sample of convenience across a subset of parishes in the tourism belt, indicated that most farmers providing food for the tourism sector are between 35 and 44 years old. In fact, 90% of those surveyed were 64 years and below. Although the survey results are not generalizable, due to the small sample size and non-representative nature of the sample, the results may be viewed as indicative of the current farming community which supply the tourist market.

If the views of those who state that most farmers are over 65 years are to be believed, the indication from the data is that the average age of farmers producing for the tourism sector is decreasing. Given the changing nature of the supply sector (farmers), based on the data collected from the 31 farms, against what was stated by players in the demand sector and government, it

might be useful to consider that the current and future players may be less

resistant to changing current practices. Also, this indicative shift in the farming

demographic might signal the opportunity to educate members of the supply

sector about good business practices and technology use.

TABLE 15 - AGE RANGES OF FARMERS SAMPLED (PRELIMINARY INVESTIGATION, PHASE 2)

	Age	Frequency	Percent	Valid Percent	Cumulative Percent
Valid	25 and Under	2	6.5	6.7	6.7
	26 – 34	2	6.5	6.7	13.3
	35 – 44	12	38.7	40.0	53.3
	45 – 54	5	16.1	16.7	70.0
	55 – 64	6	19.4	20.0	90.0
	65 – 74	2	6.5	6.7	96.7
	No Response	1	3.2	3.3	100.0
	Total	30	96.8	100.0	
Missing	System	1	3.2		
Total		31	100.0		

5.4.2 Trust

The results of the interviews with all sectors indicate that both farmers

and hoteliers/restaurateurs distrust each other. Further analysis leads the

researcher to conclude that this distrust is due largely to several issues that

have occurred over the years between both groups. On the supply side, the

farmers interviewed complain of untimely and sometimes inadequate

payments, from the hotels/restaurants, for produce supplied to the demand

sector. The farmers also claim that hotels, especially the larger properties,

often drive the price down and do not pay the agreed price for produce supplied, within the agreed timeframe. On the other hand, the hotels, based on information from gleaned from a representative of a large retail chain and that from a representative of a hotel umbrella group, claim that farmers do not abide by the stipulated payment terms and often turn up at the hotel/restaurant for payment outside the stated timelines. In addition, the hotels claim that farmers expect cash on delivery which, often, does not match with the cash flow of the hotel.

According to respondents from the demand sector, another trust issue stems from farmers who, in the past, did not honour their contracts to provide agricultural produce, at the initially set prices, over the duration of the contract. Hoteliers/restaurateurs and purveyors complain that they often enter into medium term contracts with farmers only to have farmers sell to the highest bidder after providing one or two harvests. The analysis of the data gathered reveals that this issue arises from the farmers' perception of the spread between the price being paid to the farmers and the income derived from those selling rooms and associated tourism products. Based on what was discerned from the data collected from the supply sector, the farmers contend that since tourism products are sold in a hard currency (e.g. US dollar and Pound Sterling), when the Jamaican dollar depreciates against these currencies, hotels/restaurants that price their offerings in hard currency gain a windfall. The farmers contend that their costs, which are in Jamaican dollars and driven by several imported inputs, rise when the Jamaican dollar depreciates and, hence, the initial Jamaican dollar price should also rise to cover these costs. Vignette 7, which provides extracts from interview transcripts with members of

the supply sector, illustrates, in the words of members of the farming

community, the view some farmers have of hoteliers and restaurateurs.

VIGNETTE 7 – *A sample of some of the views of farmers and how*
these relate to "trust" as major theme

1. **D.L:** *public sector doesn't trust the private sector and vice versa - public*
   sector thinks private sector wants everything from the government for
   free, private sector believes that the public sector has other motives. And
   then the farmers in between don't trust any of them. So you have a
   problem. You have a deficit of trust even within the farmers' own
   communities.

2. **P.A:** *I have spoken to couple farmers who have said to me that contract*
   farming to them, represents a solution but the challenge is that they tend
   to break their contracts because in times of scarcity, the prices on the
   external markets are higher. The hoteliers say the same thing, they say
   "listen, we don't trust these people to abide by their contracts."

3. **D.F:** *Personally, for me, mi naah nuh [I have no] confidence inna [in] the*
   tourism market. That is my personal opinion. I don't have no confidence
   in it. As a child I grew up seeing my parents producing on the farm and
   selling to the hotel sector, and I'm not impressed. (1) You supply the
   goods week 1; you supply the goods week 2, you supply the goods week
   3,you supply the goods week 4, When you ask the purchasing officer if
   you can collect a cheque for week 1, him sey "I'll see what I can do". If
   you persist, then [it] is a next supplier [that is selected]. My experience
   that. So I'm not sold at all on them.

5.4.3 Lack of information

Another strong theme emanating from the data is the issue of lack of

information. This issue affects both the supply and demand sectors. While it

might seem straight-forward that the quantities demanded per time-frame is

known and documented, several interviewees, except those from the very large

hotel chains were unable to say definitively, or provide a good approximation of

the quantities demanded of specific products, for longer than a month. None,

including the larger properties, admitted to doing demand forecasting for more

than several weeks, with the smallest properties determining demand on a

weekly basis.

In addition to insufficient demand forecasting, those interviewed were unable to state what items were being produced by the farming community and when these items were on the market. Hoteliers and restaurateurs seemed unable, except in a general sense due to their knowledge of the seasons when certain items mature or ripen, what quantities were expected to be reaped during particular times of the year. Hoteliers and restaurateurs rely heavily of the weekly agricultural data, outlining quantities and indicative farm-gate prices, published online or via email multi-cast by the government authority – the Rural Agricultural Development Authority (RADA). Although the use of technology by the demand sector and the government is laudable, it does not go far enough in facilitating demand-side planning and hoteliers/restaurateurs cannot plan for more than one or two weeks the expenditure that they will make on food. When food is scarce, the hotels/restaurants find out only a few days before the beginning of the shortage and thus find it difficult to make alternative arrangements, such as importation to minimize cost.

On the supply side, farmers state that they do not have a good understanding of the products demanded by the demand sector. According the farmers, while it might be a challenge, they can produce most of the items demanded, however, they do not know what these items are. One interviewee, an agent of RADA, insisted that the climate and soil type of Jamaica is so diverse that all type of fruits and vegetables can be grown in Jamaica. While that view might be hyperbolic, it does strengthen the argument raised by farmers that a greater variety of items can be produced for the tourism sector, if the farming community knows what is being demanded.

The researcher formed the view that insufficient effort was being expended to collect medium to long-term data, both from the demand and supply sectors. In several instances the researcher was informed that the demand for produce would be unknown because the occupancy is unknown. When probed about past trends in occupancy for specific timeframes or seasons, respondents indicated that they did not possess historical information and that the information was not collected, or it was collected and had not been organized for analysis or analyzed. In some instances, the information might exist from the government, but neither the demand nor supply sector knew about it. Vignette 8, from an interview with a government representative, collect during the final investigation, illustrates an instance where the information exists but is unknown to one of the sectors.

> **VIGNETTE 8** – *Comments from a government representative working with the programme to link tourism and agriculture in Jamaica*
>
> **L.R.**: *So there is an understanding that these systems exist but I don't think on the demand side, the hoteliers may be or are fully aware of what is out there and even for the person supplying these things, probably don't know that [The Ministry of] agriculture captures this information and that it is in their best interest to ensure that this information is on the system…*

The issue of lack of information is intensified by information hoarding. While the term "information hoarding" was not used by any respondent, the researcher was of the view, based on the attitude of some respondents and the answers received to some questions, that information was not being readily shared among players in the sub-sector and in some cases with the researcher. The researcher is of the firm view that while in some cases there may be a genuine lack of information, there are times when information, such as future demand (items and the associated quantities) is not transmitted from the

demand to supply sectors. Information dissemination to relevant parties is

therefore also highlighted as a major concern.

5.4.4 Logistics and distribution

A major issue which was identified several decades ago by Belisle

(1984) was logistics and distribution. This issue is prominent in all the studies

read by the researcher and was also prominent in the investigation for this

thesis. Not only was logistics and distribution raised in the context of the

physical infrastructure, e.g. the transportation network, that would support

distribution, but also in the context of information flow. A large part of the

logistics and distribution discussion, as illustrated in vignette 10, is that of

consolidating supply. While most large properties purchase from purveyors,

some properties still purchase directly from farmers and are challenged by

fragmentation. Vignette 10 however speaks to the additional issue of

procurement planning in Jamaican agritourism.

> *VIGNETTE 10 – Comments from a representative the umbrella group for hotels*
> _____
>
> *E.S.: We have accommodation of all sizes, so a very large property which is what a lot of the new investment coming into Jamaica have been, you know, 400, 500, 600, 1,000 rooms coming in, they can't efficiently operate by buying from a group of small farmers, unless there is one person that has pulled it all together, so that they need to be able to place an order for, hypothetically, 500 lbs of carrots every Friday. We don't want to have to go… it would not be economical or efficient for them to go to 10 small farmers and buy 50 lbs each.*

As illustrated in Vignette 11, from the perspective of a government

representative working on a project to link local agriculture and tourism, the

problem is larger than one of consolidating a set of small farmers. According to

interviewees, the logistics and distribution challenges lead to inefficiencies

which manifest themselves in higher prices for local agricultural produce and supply inconsistency.

5.4.5 Consistency

This theme was raised by respondents in the demand sector and purveyors, and was highlighted as one of the major contributors to food leakage. Some respondents from the larger hotel properties indicated that this challenge was the main reason they discontinued working directly with farmers altogether and worked with purveyors only. One large purveyor indicated that the administrative overhead required to engage some farmers was too costly both in terms of time and money. And that it was cheaper to import given the issues present. Vignette 11, from respondents representing several sectors in the Jamaican agritourism system, illustrate the challenges resulting from inconsistency of supply.

week and you make some sort of formal arrangements with them and when you go to the farmer to get that hundred kg the same farmer would probably want to tell you that I don't have the hundred kg because I sold it to Mr. J yesterday

C.M:... there are certain standards and protocols regarding the quality of the products that we use. We put a lot of these products on our buffet line so it's there on display for our guests to see, so the quality must be there to keep up with our standards.

2. *E.S: ...some issues are more relevant to some of our members and some issues relevant to other members, but they affect a cross-section. One would be consistency of supply of various items, so the ability to always have the amount of carrots, tomatoes, throughout the year, of the standard [items] that we would always need...*

   The second issue would be pricing... One would expect that there would be some price fluctuation but not radical changes or major fluctuations. There should be some relative band that the various items are in that is more predictable, and that is important to us because there is a tap on what we are able to sell or use, so on the cost/expense side, you can't have one minute something is $100 a kg and the next minute its $250 a kg, as an example, alright?

   The third issue would be the availability of certain items that may be, not necessarily max use items, but are still needed as part of the tourism

3. *DL: If you were to source [locally] just to be a good Jamaican company, the price point, vis-a-vis the quality and transparency and consistency of delivery, is a problem.*

4. *E.S: The broad issues would be as follows: Consistent quantity at a consisitent price.*

An analysis of the data reveals that consistency has two components:

1. consistency of supply; and
2. consistency of quality.

Those in the demand sector contend that when a farmer initially begins to supply agricultural produce, that farmer will provide the requisite quantities demanded. However, this may not be sustained over time or during certain seasons, or where, understandably, there is a drought or natural disaster. While natural disasters are understandable, those in the demand sector contend that they cannot run their operation based on seasonality, which is often compounded by farming practices. One

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contributor to the consistency of supply is logistics and distribution (mentioned in Section 5.4.4).

Consistency of quality is the other component of consistency and this, according to the data, is also affected by supply and logistics. Consistency of quality is much more subjective and range from product aesthetics (the look and feel of a product), to spoilage. According to several respondents, one of which is a former Director of Tourism, product aesthetics becomes important, because most Jamaican tourists emanate from North America, namely the United States, where the consumer tends to focus on product appearance. Vignette 12 contains some of the comments from one respondent.

> *VIGNETTE 12 – Comments on supply consistency, specifically, product aesthetics*
>
> *B.S.:…Then there are other things like quality control, and standardization of size, etc. The hotel sector is very finicky. Our bananas are now up to international standards, at least the ones from Jamaica Producers, those are as good as any Chiquita's you can get. Appearance is everything. Now the carrots that you get in a supermarket in Florida's Publix, hardly look real. They're so clean and uniform in shape, and all that sort of thing. You know what our carrots look like here in Jamaica. They taste very good. I eat them as snack, just peel them and eat them, but they look unusual.*

In addition to product aesthetics, product deterioration, such as wilting or spoilage on either extremes of a continuum, is the other dimension to quality consistency. Often, small purveyors do not transport produce under the optimum conditions and this causes the produce to deteriorate during transportation. This deterioration, as is illustrated in vignette 12, by the Executive chef at a large accommodation-based restaurant in Kingston, adds to wastage and increases the cost of food.

> **KS:** *…we're not one of those restaurants that just take anything mediocre. We pay the money for it once it's the best.*
>
> **Researcher:** *So how do you guarantee that the quality that you get from the farmers now? Because much of the complaints I've been getting is that sometimes the farmers bring the thing to you, and by the time it comes, because these people are coming from Westmoreland, Manchester, St. Elizabeth, by the time it comes, it mash up. How you deal with that?*
>
> **KS:** *You know, over the years, we just stick to one supplier, and to be honest he does a good job. Well, the one who supplies us with the melon, his thing is more upscale. So I think he brings his stuff nicely in crates, but we don't have much of that problem. Is just recently, we had some problems with some broccoli, nice broccoli you know, but guess what, the lady who was supplying us, she brought it in a vehicle that was a bit warm.*

5.4.6 Pricing

In addition to the issue of consistent pricing, already discussed in respect of consistency, pricing emerged as a specific theme. From the supply side, some farmers were of the view that the tourism sector, mostly the large properties and large purveyors, were not prepared to pay a fair price for agricultural produce. The farmers stated that, since these players had the option to import, sometimes at a cheaper price, they used this to lower the price paid to local farmers. This, incidentally, was also raised in response to why farmers break contracts and sell to the highest bidder after one or a couple harvests (see 5.4.1 Culture).

On the demand side, from the hotels/restaurants, the argument being put forward is that farmers and sometimes small purveyors, do not have a system for pricing agricultural produce. The claim is that suppliers price their offerings based on their observation of occupancy levels and some other factors, rather than looking at the price of inputs and adding a margin to that. Those in the demand sector contend that often their income is fixed and they

cannot change their cost structure mid-stream, especially if customers have pre-paid for their rooms – this normally happens in the all-inclusive and resort-type properties.

This disconnect between the views of the demand and supply sectors might be remedied if information on the business process of each sector is shared. Based on analysis of the interview data collected in the final investigation, the researcher is of the view that, currently, each sector is only seeing the issue from their perspective and information should flow between the sectors to change points of view. However, the issue of trust may be a hurdle that must first be overcome in order to implement a workable solution.

One respondent, who represents a large hotel chain operating across Jamaica, stated that his entity uses the services of a medium-sized purveyor to supply agricultural produce to all hotels in the chain. In order to ensure that the prices paid to the purveyor are fair, the purchaser compares the prices charged by the purveyor with those published by the government and then add a markup for transportation and administrative expenses. Vignette 13 provides additional information.

> **VIGNETTE 13** – *Comments on price paid for agricultural produce supplied by a medium-sized purveyor to a large hotel chain*
>
> _____
>
> **C.M:** *… we go online, we looked at what RADA is saying in terms of the farm gate pricing…*
>
> **Researcher:** *the JAMIS [Jamaica Agricultural Market Information System], the JAMIS helped you…?*
>
> **C.M:** *Yes as a matter of fact I do a report every Monday that compares everything that we buy to JAMIS.*
>
> **Researcher:** *Right.*
>
> **C.M:** *And we said this is what we are going to do --- all we are going to pay you for is the storage, the transportation… the additional from*

what JAMIS' price is. The storage, the transportation… it's a markup that we both agreed on that we are comfortable with. … if the markup price is not clear it is 12% on everything that JAMIS says we should be paying for these products.

Researcher: *Eh well there is still some amount of variability in pricing because, I am very familiar with JAMIS and, the prices there still vary because JAMIS doesn't control the prices at the price point, the only thing it does is convey information. How do you then budget for the price of for example, a pound of tomato when that price can vary at the farm gate itself?*

C.M: *What we do is … because based on what we see with farm gate, we realize that it varies. The variation I see is based on the region that is really in… because they are getting those prices from the field from the farmers and then they put it back together. So it will vary. We are comfortable with the fact that even if we weren't buying from Mr. X [named withheld] the price per region would also vary, because what the Ocho Rios region would be paying from the farmers in Ochi would be different from what the Whitehouse region is getting from the farmers in Whitehouse. So when you are looking at our market list price index it would vary, that is what we wanted to avoid. We wanted to feel comfortable to say we are willing to pay … if what is coming from the field is $200 per pound for tomatoes, we are willing to settle at… and another area is $198 per pound and another area is $210 we are willing to settle at $205…*

Researcher: *So you average them… a weighted average…*

C.M: *yes, a weighted average and I'm gonna pay you sir $205…*

Researcher: *plus markup, transportation…*

C.M: *…plus whatever the markup is which we believe that we are comfortable with and when we do that, that is it.*

5.4.7 Quality

Quality also emerged as a theme distinct from that of consistency of quality mentioned in Section 5.4.5. Interestingly, this theme had both positive and negative dimensions. The positive dimension surrounded the issue of taste. Jamaican farm produce was viewed as being superior in taste to those imported and were the preferred choice of chefs. The sentiment was that Jamaican produce required less seasonings and condiments to enhance the taste and were seen as being more flexible, that is, capable of being added to more dishes, than the imported produce *(see vignette 14)*.

The negative dimension to quality concerns both the appearance of the products and the presence of insects and spoilt pieces. The prevailing sentiment, from the hoteliers interviewed, is that for those produce, which will be displayed, "appearance is everything". They state that while Jamaican produce taste better, they do not compare to those imported in terms of looks. Vignette 15 contains both positive and negative comments from two respondents, both of whom work with the government's Ministry of Tourism and entertainment.

> *Researcher: But the primary concern is not really the taste, is more the look?*
> *KS: I think it's the look most of the time.*

As illustrated in vignette 16, chefs also complain about the amount of wastage indicating that, especially for some vegetables, a fair amount of the product is lost due to spoil pieces or insect infestation. In addition to the cost incurred due to the shrinkage of the amount ordered and re-ordering to get the requisite quantity, preparation becomes time consuming.

VIGNETTE 16 – *Comments on the amount of spoilage of some Jamaican agricultural vegetables*

1. *KS:… Sometimes the quality that we get locally (apart from this lady, she is one of the best I've gotten locally), it has a lot of worms, and there's a lot of waste at the end of the day, because you have to cut out the worms or throw it away, or stuff like that…*

2. *K.S:…For example, like romaine lettuce, we got some the other day. It's a very popular dish, that's the Caesar Salad, and the romaine lettuce is the bulk of the ingredients and the dressing. When you add that dressing to it, it just whither away, because it is almost like that, it don't hold up. That's the local one.*

   The imported one now, the fine one, that one is very bulky and any chef would love to use that. And any chef, that's a chef, don't want to use anything that looks too puny. They like to use rich stuff. That help[s] him, and that also is a connection with the chef and the food, because if you get any carrot that looks puny, you know, it affect[s] your work, you start to feel like you're wasting your time. But then you get a nice big carrot, you know, it give you the vibes, say "yes man, you know the outcome of this food!" You know?

5.4.8 Availability and variety

Availability and variety also surfaced as another major theme. There were mixed views on this theme with some respondents, mainly those from RADA and the farming community, expressing the view that all the products required by the tourism sector were capable of being grown in Jamaica. This view was, however, not shared by those from the demand sector. The argument mounted by the demand sector was that the diverse and sophisticated nature of Jamaican tourism necessitates catering to diverse global

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tastes. Certain items are not grown in Jamaica, due to soil types, etc., and certain sea food are not found in Jamaican waters. In addition, one example cited by a respondent from the Ministry of Tourism is that of Serrano ham. According to the respondent, this type of ham is protected by geographical indications (a particular type of intellectual property protection), which prevents any other ham being referred to by that name. The respondent further stated that some hotel guests, especially those from Europe, ask for this item by name.

> **VIGNETTE 17** – *A representative of the hotels commenting on the variety of agricultural products required by the tourism sector*

1. **E.S:***…Now, the challenge is, if you think of the international tourism product that we have, and the fact that Jamaica's tourism competes internationally, there are items that are considered to be part of what we should have to offer our guests which we simply do not produce here in Jamaica…. Guests are expecting to have a wide cross-section of approved vegetables, starches, etc, that we produce. So for example, if we need to use romaine lettuce, do we produce enough here? You have to literally look at each agricultural item and find out whether we produce the quantities we need out here, because we can't do without it if we are to have a Caesar Salad, as an example. Our culinary herbs that are used to cook with, cilantro is another one, parsley, celery. You have to look at what our agricultural base generally is. Remember its very small-farmers oriented, so we can produce them in the quantities and at the right price point. So from a simple perspective, yes, I think we basiscally consume as much as is available out here, which I know is running contrary to what everybody else always says, okay, but when its really broken down, we are.*

   …If you then put the basket as being everything that we need to have an internationally recognized, first class, competitive tourism product, you may get a different… particularly when you get into… okay, we can't just have, for example, our local fish, you know, on the menu, let's go away from fruits and vegetables now.

   People are still going to expect that we should have salmon, that we'll have a variety of shrimp, okay. That's not here. Some of the types of beef, some of the types of cold cuts. We have our basic, what we would have for Christmas, etc. ham. But if you're dealing with European clientele, they are accustomed to different types of ham and pork type cuts, prosciutto and all the rest of it. Do we produce that? We don't and if we do produce it, like we're starting to produce a little bit of chorizo, but its not as much as we need to have produced, and is it at the standard for persons who really like chorizo, which is a kind of sausage, and that's what they want. We can't make our tourists for example… alright, we all love jerk sausage, but that may not be what they like.

5.5 The Current use of ICT in the demand/supply interaction

Based on the data collected in both the preliminary and final investigations, the use of ICT varies by sector and is dependent on the size and sophistication of the operation, especially in the supply sector. Of note, as was first seen in the preliminary investigation and confirmed in the final investigation, is that, in general, respondents had a good understanding of what ICT means and the technologies included.

5.5.1 The Current ICT use in the supply sector

During the phase 1 of the preliminary investigation, the perception of those interviewed was that, in general, the farming community, the majority of the Jamaican agritourism supply sector, was largely uneducated, but literate, and did not have access to ICT, aside from cell phones. The view, some of which emanates from and is consistent with the Jamaican agricultural survey (STATIN, 2007) indicate most of the farmers operated on small holdings, were difficult to organize, and were largely uneducated. Although uneducated, the farmers could read and write at a basic level.

While the average farmer owned a cellular telephone, sometimes two, he only used this to make and receive calls and, in most cases, did not have a data plan - due mainly to the cost of such plans. However, most farmers used pre-paid mobile plans which allow the farmer to send and receive SMS messages at nominal incremental cost. The view of the farmer was shared by some respondents in the final investigation. The comments of one such respondent, a former Director of Tourism interviewed during the final investigation, is shared in vignette 18.

Tables 16 to 18 provide a useful summary some of the data collected during phase 2 of the preliminary investigation and show the information and communication technologies used by a sample of 31 farmers in 5 of the 6 resort areas. While the sample size is small, the data indicate that among the cohort selected, which includes farmers supplying to the tourism sector, more than half actually own (61.3% - table 16) and use (54.8% - table 17) a personal computer. In addition, one-third (33.3% - table 18) have internet access, either through a smart phone or personal computer, and are actually using the internet. In addition, almost one third (32.3% - table 18) currently use software in their farming operations. In table 18, business productivity software refers to software such as a word processing software (e.g. MS Word), a spreadsheet software (e.g. MS Excel) and other such software used to create documents or presentations, or manipulate numbers. While the researcher cannot generalize from the data, they provide a starting point for further investigation (as was done during the final thesis investigation), and a basis for stating that some members of the current Jamaican agritourism supply sector are using ICT in their operations.

TABLE 17 - PROPORTION OF A SAMPLE OF JAMAICAN FARMERS WHO **OWN** A PERSONAL COMPUTER

	Frequency	Percent
Yes	19	61%
No	12	39%
Total	**31**	**100%**

TABLE 16 - PROPORTION OF A SAMPLE OF JAMAICAN FARMERS WHO **USE** A PERSONAL COMPUTER

		Frequency	Percent	Valid Percent
Valid	Yes	17	54.8%	85.0%
	No	3	9.7%	15.0%
	Total	20	64.5%	100.0%
Missing		11	35.5%	
Total		**31**	**100.0%**	

TABLE 18 - ICT CURRENTLY USED BY A SAMPLE OF JAMAICAN FARMERS

		Responses		
		n	Percent	Percent of Cases
Current ICT Use	Cell Phone (calls only)	8	26.7%	26.7%
	Cell Phone (SMS and Internet)	6	20.0%	20.0%
	Computer - Internet Access	4	13.3%	13.3%
	Inventory Mgmt. App.	1	3.3%	3.3%
	Business Productivity software	5	16.7%	16.7%
	Agriculture Software	4	13.3%	13.3%
	Fax machine	2	6.7%	6.7%
	Total	**30**	**100.0%**	**100.0%**

During the final investigation, one member of the farming community whose holdings were approximately 15 hectares indicated sophisticated use of ICT. In addition to using a PC to access the internet to conduct research, this particular farmer utilized business productivity and agricultural software as well as video surveillance technologies. Vignette 19 shows a part of the discussion between the interviewer and the respondent.

Researcher: All right, so we're going to look at technology in three layers. The first layer is to look at what you're using now in terms of technology, on the farm. And we're talking about information and communication technology now, not necessarily farming technologies right, but ICT. You right now, you're producing 30-40 acres, so roughly half of your land is under production or is about to become under production. What technologies are you using to assist, because this is a business place, what do you use in terms of ICT. Now, when I say ICT, I'm talking about telecommunication technology like a cell phone, etc., etc. and your computer, your pc, your printer.

DF: Well me [I] have all a [of] dem [them]. I have all of them.

Researcher: What do you have? Give me an idea.

DF: Mi have cell phones. Mi have copy/fax machine and laptop and desktop computer, and mi have a....

Researcher: Your cell phone, is it a Smart phone or is it just...

DF: Blackberry mi have.

Researcher: Ok, so it's a Smart Phone.

DF: Yeah.

Researcher: And do you use that Blackberry to check emails and browse the web, or you...

DF: Yes man. Well I have Wi-Fi on my Blackberry, but mi use mi desktop more.

Researcher: All right. So you have several cell phones.

DF: Yeah man.

Researcher: So let's talk about your PC. Your PC, you have you say a desktop?

DF: Mi have desktop and mi have laptop.

Researcher: You have a laptop?

DF: Yeah man

Researcher: How many desktops? 1, 2 3?

DF: I have two...well, is really 1 1/2, because one has a little bit of old age damage, one in recent times.

Researcher: And how many laptops?

DF: One. I have a tablet on order, but it don't get here yet.

Researcher: On order? Okay. No problem, no problem. And you say you have a fax machine?

DF: Yeah man. Printer, copy, fax.

Researcher: That's a multi-function device?

DF: Yeah man. An all-in-one. Print, copy, fax. Colour printer too.

Researcher: Ok. What else do you have? In terms of technology?

DF: Surveillance cameras, mi have intercom, motion-vibration contacts.

Researcher: Ok. And, your desktop and laptop, the PC's, do you have specialized software on them that you normally use to manage your business, or you just use like Microsoft Office?

DF: Just use Microsoft Office.

Although, in general, based on government data and that from some respondents, the use of ICT by Jamaican farmers is limited to the cell phones, there are notable exceptions to this. Of those, from phase 2 of the preliminary investigation, who admitted to owning a personal computer *(see table 19)*, a significant number use this PC for conducting business activities. ***Note:*** *the data in table 19 has multiple responses, therefore, since responses are not mutually exclusive, a respondent might use a PC for several activities.*

TABLE 19 - CURRENT PC USE AMONG A SAMPLE OF JAMAICAN FARMERS

		Responses		Percent of Cases
		N	Percent	
Current PC Use	Browsing (fun)	7	18.4%	36.8%
	Word Processing	4	10.5%	21.1%
	Browsing (business)	9	23.7%	47.4%
	Accounts	4	10.5%	21.1%
	Production and data storage	6	15.8%	31.6%
	Goods inventory	6	15.8%	31.6%
	Other	2	5.3%	10.5%
	Total	38	100.0%	200.0%

5.5.2 Current ICT use in the other Jamaican agritourism sectors

During phase 1 of the initial investigation it was discovered that government's Rural Agricultural Development Authority (RADA) provided its field officers with data enabled cell phones. The intention was that these devices would be used to access information online, as needed, when the field officers visited farmers. However, due to the cost of these data plans, several of these RADA devices were not being used as intended at the time of data collection. From the Government-side, phase 1 of the investigation found that there was a plan to use ICT to improve agricultural marketing, or market intelligence, by eliminating what is referred to as "information asymmetry" – the information about the price at the retail site as opposed to the farm-gate. In furtherance of this goal, the Ministry of Agriculture implemented a Market Information System (the Jamaica Agricultural Market Information System) and a Business Information System (the Agri-Business Information System or ABIS).

The data, from interviews (in both preliminary and final investigations) and documents analyzed during the final investigation, indicate that the use of ICT in the supply sector, including purveyors, was fairly widespread. For the larger accommodation properties, sophisticated enterprise-wide systems are being used to manage all aspects of their operations, including that of their restaurants. The use of ICT by large or specialized purveyors is similar to that of the larger hotels and restaurants. Of note is that some large or specialist purveyors interface with the procurement system of some of their customers and run fairly sophisticated inventory management systems as evidenced in vignette 20, an extract from the interview with the representative of a large or specialist purveyor.

D.S.:…We have one of the most sophisticated warehouses in Jamaica right now, totally electronic. I can go on my computer and I can tell you down to which shelf, how many cases of beans are in the warehouse, when it came in, expiration date, when I need to get it out by.

RESEARCHER: Is this the same system, that you indicated earlier, which integrates into the customers' inventory systems. Is that the same system?

D.S.: Yes. That's one of them.

RESEARCHER. How many enterprise-wide systems like that do you run?

D.S.: Three.

RESEARCHER: What do they do?

D.S.: Inventory Management. Which includes everything from stock, in-bound, out-bound, expiration dates, you name it. SKUs, literally everything that you need to know about a can of beans.

RESEARCHER: So that's one system?

D.S.: Yes. The second system allows us visibility into some of our customers' own inventory. This then triggers orders.

RESEARCHER: And the third?

D.S.: The third one is more of the logistics on the ground. So, once it's outbound, then we're able to manage where we are.

While larger demand sector entities use ICT with a fair amount of sophistication, the same cannot be said of those entities that are small or medium-sized. The researcher is of the view that all entities have the basic ICT elements in place, namely, personal computers and basic business productivity software, printers, and internet access. However, based on the data from the respondents associated with small and medium-sized entities, these elements were not integrated into the business process and were not used efficiently. In some instances, and even in the case of a large hotel, data had to be entered into one system after printing the output from another.

Based on an analysis of the interview data, purveyors, including the large and specialized ones, did not interact with farmers, even those with access to technology, electronically. The data indicates that the extent of the electronic interaction was via sending an email with a list and quantities of items to be supplied to the farmer. In most cases, this information was transmitted by telephone. This was also the practice of the smaller properties.

5.6 Potential future use of ICT

After analyzing the data from both phases of the investigation, the researcher is of the view that several challenges exist in the Jamaican agritourism space, especially the supply sector, specifically farming community, which may require significant effort to realize the ICT potential. The data, however, also indicates that there is great interest from the farming community, as indicated by the survey of 31 members of the community in phase 2 of the preliminary investigation, in learning more about the use of ICT to benefit their operations and how other players are currently using it.   Tables 20 to 22 show that most farmers answered positively when asked whether they are of the view that ICT can improve their business operations, whether they should make greater use of ICT, and whether they would like to learn what others are doing.

TABLE 20 - RESPONSES FROM A SET OF 31 FARMERS TO THE QUESTION, "DO YOU THINK USING ICT IN YOUR FARMING OPERATIONS CAN IMPROVE YOUR BUSINESS?"

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	21	67.7	67.7	67.7
	No	10	32.3	32.3	100.0
	Total	31	100.0	100.0	

TABLE 21 - RESPONSES FROM A SET OF 31 FARMERS TO THE QUESTION, "DO YOU THINK YOU SHOULD MAKE GREATER USE OF ICR IN YOUR FARMING OPERATIONS?"

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	22	71.0	71.0	71.0
	No	9	29.0	29.0	100.0
	Total	31	100.0	100.0	

TABLE 22 - RESPONSES FROM A SET OF 31 FARMERS TO THE QUESTION, "WOULD YOU LIKE TO KNOW MORE ABOUT HOW FARMERS OUTSIDE JAMAICA ARE USING ICT TO IMPROVE THEIR BUSINESS?"

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Yes	24	77.4	77.4	77.4
	No	7	22.6	22.6	100.0
	Total	31	100.0	100.0	

The responses in tables 20 to 22 indicate that at least some members of the Jamaica agritourism supply sector have a positive attitude towards ICT use in their business operations. While the researcher cannot generalize about the entire Jamaican agritourism supply sector, the responses provide a basis for future research and for ICT planning.

Chapter 6 which presents the refined Jamaican agritourism innovation model will provide greater details on the potential future use of ICT in Jamaican agritourism.

5.7 Summary

This chapter presented an analysis and discussion of the data collected during the investigations conducted for this thesis. The discussion began with the data unearthed about the current structure of the Jamaican agritourism sub-sector (5.2) and the issues concerning current market demand and its satisfaction (5.3).

The main themes identified from the data were presented in Section 5.4. These were organized into the sectors (whether supply or demand, or both) on which these themes had the most effect. The data, presented and discussed in Section 5.5, shows that the use of ICT varies by sector and is dependent on the size and sophistication of the operation, especially in the supply sector. This section provided an overview of the current use of ICT in both the supply and demand sectors. The final section which presents and discusses the findings, Section 5.6, outlines what was unearthed about the potential future use of ICT.

The data unearthed about the structure of the Jamaican agritourism sector will inform the Jamaican agritourism innovation system model presented in Chapter 6. While the rest of the findings will form the basis for the recommendations to be presented in Chapter 7.

Chapter 6 – Proposed Model for the use of ICT in Jamaican agritourism

6.1 Introduction

The preceding chapter detailed the findings from the research investigation into Jamaican agritourism, specifically the components which affect the supply of food to accommodations and restaurants in the tourism sector. In this chapter the researcher proposes and discusses a model formulated, based on a combination of the research findings and the literature, to increase collaboration and information sharing among the participants in the Jamaican agritourism sub-sector. This is the key contribution of the research to the field.

The model presented in this chapter is a modification of the agriculture innovation system (AIS) model from the literature. The AIS model (fig. 14) was the basic theoretical/conceptual framework used to structure the investigation and data collection. The model presented in this chapter will be referred to as the "Jamaican Agritourism Innovation System model" (JATIS). However, for easy reference, and before presenting the details of the JATIS, the theoretical framework, presented in full in Chapter 3, is summarized in Section 6.2. A review of the literature informing the theoretical framework can be found in Chapter 2.

6.2 The initial Agriculture Innovation Systems Model

The investigation of ICT use in Jamaican agritourism falls within the broader realm of social informatics – examining the uses of information technologies in social and organizational contexts (Vehovar, 2006). Since the type of agritourism practised in Jamaica was identified as Working Farm Indirect Contact (WFIC) agritourism, where there is little or no interaction between the tourist and farm, but

rather the products of the farm being consumed (Philip et al., 2010), a proxy for the use of technology in Jamaican agritourism, used in this thesis, is technology use in general agriculture.

Using innovation, specifically the use of ICT, in agriculture, is the result of multiple interactions among a diverse set of actors. These actors are organised into groups, or sectors, with interaction taking place among the groups or sectors (Klerkx et al., 2012). The World Bank (2006) defines an innovation system, the structure describing the interaction among these groups or sectors, as:

> ...a network of organizations, enterprises, and individuals focused on bringing new products, new processes, and new forms of organization into economic use, together with the institutions and policies that affect their behavior and performance... It extends beyond the creation of knowledge to encompass the factors affecting demand for and use of knowledge in novel and useful ways. Inherent in the discussion about innovation in agriculture is the recognition that, while the adoption of technology is critical, the interaction among sectors is very important. (pp. vi – vii)

Several authors (Hall et al., 2006; Vellema 2008; Sanginga et al., 2009; Pant and Hambly-Odame 2009) provide contextual information about Agricultural Innovation Systems (AIS) compared to other approaches to applying technology to agriculture. The AIS approach is the only one, which truly integrates the various areas involved. Agwu et al. (2008) provides an adapted view of agricultural innovation systems by clarifying the role of each sector and the level of interaction among them.

The research findings indicate that the Jamaican agritourism environment is similar to the AIS model illustrated by several authors (Agwu et al., 2008; Rajalahti, Jannsen and Pehu, 2008; World Bank, 2006). The system is comprised of two key

sectors, the supply and demand sectors, along with supporting sectors, which provide research and infrastructure, and a sector which coordinates or diffuses information among the sectors in the system. However, the Jamaican agritourism environment includes certain anomalies, specifically related to how the supply and demand sectors interact, which differentiates it from previous models. Hence, the need for a modified model.

6.3 The agritourism model for Jamaica – the JATIS

Two of the supplementary research questions (p. 20) focussed on identifying an effective agritourism system for Jamaica and determining the components of that system. Although the findings determined that the Jamaican agritourism sub-sector shares a similar structure to that identified in the initial AIS model and the theoretical framework (fig. 10 and fig. 14), an important difference is that the Jamaican agritourism sub-sector contains a critical component missing from the traditional AIS model. Different from the previous models is the role of purveyors. Purveyors are the middle-men operating in the supply chain, purchasing from farmers to supply accommodations and restaurants.

In the Jamaican context, purveyors play a critical role. Aside from providing a single point of contact between the members of the demand sector and the many farmers who supply agricultural produce, purveyors, especially the large ones, add value by packaging agricultural products in easy to use formats for larger hotels and restaurants. However, the major contribution of purveyors is the provision of a consistent supply of agricultural produce, at a stable price, in a convenient manner, to accommodations and restaurants. Those value-added benefits were identified among the major themes from the data collected.   In fact, some large

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accommodations use purveyors almost exclusively to supply agricultural items. On one hand, from the perspective of the accommodations and restaurants, purveyors are seen as suppliers. However, on the other hand, when purveyors purchase agricultural produce from farmers, the farmers view them as a part of the demand sector.

The supply/demand interaction which forms one component of the JATIS (fig. 22), has similar information flows as in other AIS models. However, a critical difference, as depicted by the thicker arrows in figure 22, stage 1 of the supply/demand interaction, is the quality of information exchange between purveyors and accommodations and restaurants. The researcher defines information quality, using what was unearthed from the findings, as a combination of several components such as timeliness, accuracy, availability, and completeness.

FIGURE 22 - SUPPLY/DEMAND INTERACTION (STAGE 1)
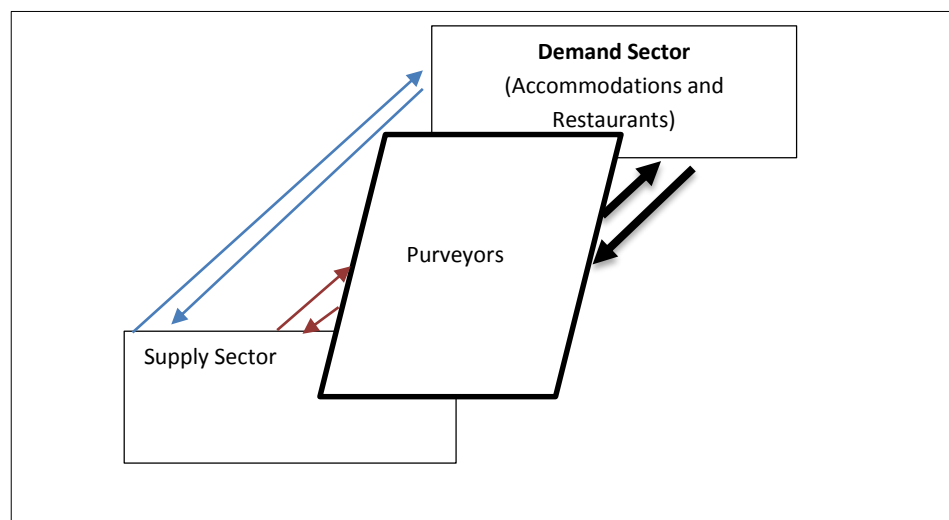
Due to the level of technology employed by purveyors, accommodations and restaurants, the information exchange between purveyors and the demand sector is of a fairly high quality. Although stage 1 (fig. 22) provides a general picture, the supply/demand interaction can be further refined to show the interaction among

the different types of restaurants and accommodations, and purveyors. Stage 2 (fig. 23) provides such a refinement.

FIGURE 23 - SUPPLY/DEMAND INTERACTION (STAGE 2)
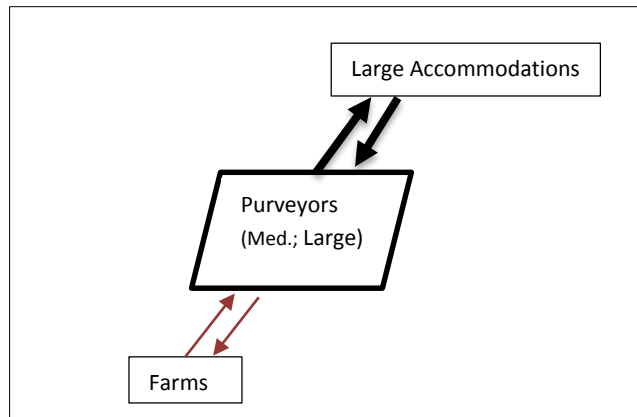
In addition to classifying accommodations and restaurants, the findings uncovered the presence of several types of purveyors (table 13). As stated in Chapter 5, accommodation-based restaurants are managed as part of the accommodation with which they are associated (future references to accommodations, in this thesis, will include accommodation-based restaurants). In stage 2 of the supply/demand interaction (fig. 23), a refinement of stage 1, large accommodations have little or no direct interaction with farmers and utilize purveyors, almost exclusively, to supply agricultural produce. In addition, these large accommodations rely on medium-sized and large/specialist purveyors and do not use small purveyors as suppliers. This exclusive use of medium-sized and large purveyors, by large accommodations, excludes small purveyors from the demand/supply interaction. This is replicated by formal dining establishments *(see fig. 19, for an illustration of the types of restaurants)*. The purveyors and large accommodations in stage 2 of the supply/demand interaction (fig. 23) use ICT extensively to exchange high quality information.

The farms (farmers) in stage 2 are in a similar position to their position in stage 1 with, typically, only a few farms using ICT in their business interactions. Although table 17 shows that ≈ 55% of the 31 respondents, from phase 2 of the preliminary investigation, indicated that they use personal computers, the final investigation, which utilized in-depth semi-structured interviews, provided clarity. It was uncovered that, while the farmers who own or have access to PCs used these regularly, this use was not business related.

Stage 2 of the supply/demand interaction still does not address farmers' use of ICT to do business and is a representation of the situation which currently operates. Some purveyors state that the status quo should remain or be expanded to include them exclusively supplying accommodations of all sizes. These purveyors posit that all interaction between the supply and demand sectors should be done through medium-sized and large purveyors. In the current dispensation, small purveyors are not a part of the more lucrative supply/demand interaction with large accommodations. If one were to adopt the position articulated by the purveyors who state that the status quo should remain or that the supply/demand interaction should be expanded to the exclusion of small purveyors, then small purveyors would forever be left out of a lucrative market. Excluding small purveyors is not a position which the researcher agrees with.

To expand the supply/demand interaction, specifically between all the members of the supply sector and large accommodations and restaurants, and to increase ICT use among farmers, the JATIS proposes the final stage (stage 3) of the supply/demand interaction; the addition of a Link Sector (fig. 24). This sector would subsume purveyors and include, among others, entities, owned by farmers, acting on behalf of the farms. As figure 24 illustrates, all interaction between the Tourism

Food Demand sector and the Tourism Food Supply sector would be intermediated by the Link Sector. The proposed Link sector is not a homogenous group. It consists
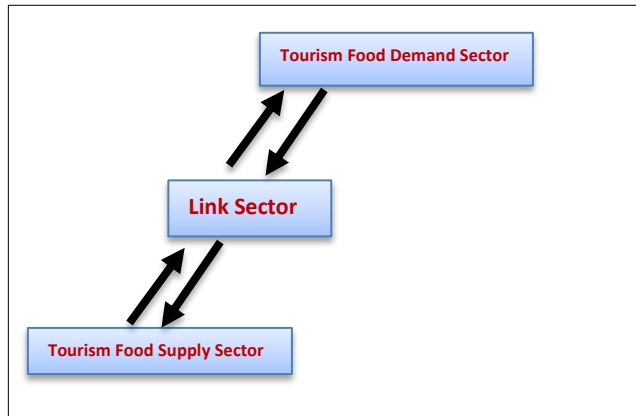
of purveyors, purveyor groups, and farm groups. Stage 3 is a modification of what has been suggested by purveyors and it widens the supply/demand interaction as well as addresses issues of poor business practices and inadequate information collection and dissemination.

By adding the Link Sector, the model seeks to simultaneously address the business-related issues as well as the increased use of ICT. The Link sector will provide the much needed support services, such as market research, price determination, etc., from the business side, and from the ICT side, provide the support to, and build the capacity of, the Tourism Food Supply Sector required for it to take advantage of ICT. The ICT services provided by the Link Sector will enable participants who currently lack capacity to obtain the necessary skills or assistance to utilize ICT. Increased ICT use will therefore result from these additional persons adopting and assimilating the technology into their business activities. The following provides additional information about the components of the Link Sector:

- **Purveyors and Purveyor Groups**
  - It is unlikely that medium-sized and large purveyors will relinquish their current status, therefore, the model proposes the formation of purveyor groups consisting of small purveyors. Each purveyor group would operate in the geographical region where the farms/farmers constituting the group reside. The medium-sized and large purveyors would compete with purveyor groups instead of with individual small purveyors. The current structure for medium-sized and large purveyors would remain unchanged.

- **Farm groups**
  - The model proposes the formation of farm groups consisting of farms in a particular geographic region. Farm groups would compete with purveyor groups, and individual medium-sized and large purveyors to supply the demand sector directly.

Members of each group in the link sector will join together, to compete as a group, to supply the demand sector. It is envisaged that groups can more effectively compete than individual small players. This competition, in addition to driving prices down and promoting efficiency in order to remain competitive, should equalize technology use. The expectation, based on institutional theory (discussed in Chapter 2, pp. 49), is that each group, driven by external pressures to compete, would copy the best practice of the other groups. As stated in Chapter 2, *"The act of copying the actions of other industry participants leads organisations [groups] to adopt similar technologies to a point where all organisations are using similar technologies"* (p. 49).

As the Link Sector illustration (fig. 25) shows, three conceptual links would be involved in the interaction between the Link Sector and the rest of the market. The three conceptual links are:

1. The link between the Farm Groups and all external entities, such as actors in the demand sector (hotels, restaurants, etc.) and other participants in the system, such as government or funders. Conceptually, external entities can also be actors from Purveyor Groups, and Medium to Large Purveyors. To ensure simplicity, all entities external to the Farm Groups have been grouped under "Outside Interaction".

FIGURE 25 - Link Sector (Supply/Demand Interaction - Stage 3)
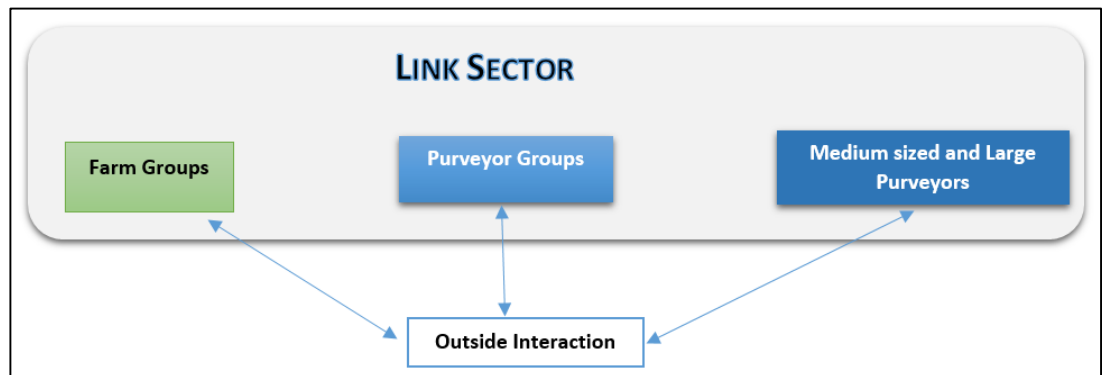
2. The link between Purveyor Groups and external entities. Similar to the previous link, these entities include actors in the demand sector (hotels, restaurants, etc.) and other participants in the system, such as government or funders. Again, conceptually, external entities can also be actors from Farm Groups, and Medium to Large Purveyors.

3. The link between Medium-sized and Large purveyors and external entities. Similar to the previous two links mentioned these entities include actors in the demand sector (hotels, restaurants, etc.) and other participants in the system, such as government or funders.

Again, conceptually, external entities can also be actors from Farm Groups, and Purveyor Groups.

The three conceptual links proposed by the model imply a greater amount of administrative overhead than if there were a single link. However, the use of ICT to conduct this interaction would almost entirely eliminate any additional administrative overhead. The use of basic ICT elements, such as email or other 'push' mechanisms, or the use of data repositories, discussion groups, other 'pull' technologies are possible options. ***Note:*** *The conceptual links are broken out into the actual links is the subsequent discussion (fig. 27).*

Since the model proposes the creation of farm groups, a further refinement is the interlinking of these groups using ICT (fig. 26). It is proposed that each farm group would share data with the other groups. This proposal is discussed in detail later in the document. Further, a single group, perhaps the group representing the most farms, would be designated as the primary farm group and be responsible for coordinating information dissemination among the groups.

FIGURE 26 - INTERACTION WITH AND BETWEEN FARM GROUPS
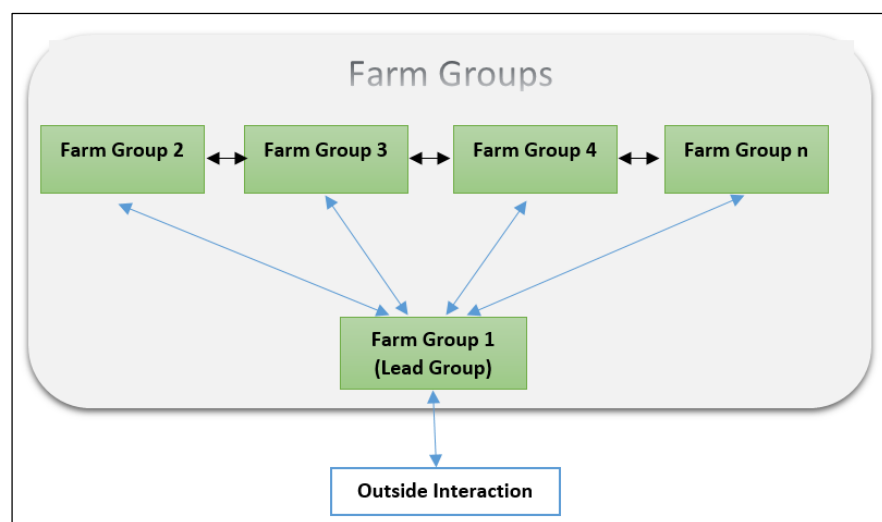
At first it might seem counterintuitive that Farm Groups, which are competing for the same market, would collaborate and share information. However, the model recognizes that the farms within each Farm Groups will be located in relatively close proximity to each other. And based on the data collected, many of these farms produce a similar crop or livestock due to the similar conditions and soil types in a particular region. Therefore it is unlikely that any Farm Group will be able to provide the variety of items sought by the demand sector. The Farm Groups collaborating means that demand which cannot be met by one Farm Group might be met by another. Without this collaboration, unmet demand from the small farms within the Farm Groups will be filled by purveyors. This will result in either importation or a lowering of the farm-gate price since purveyors tend to buy low and add their margins in order to sell at a competitive price to the hotels. Collaboration among the Farm Groups is symbiotic as each benefits over time.

Similar to farm groups, the model also proposes the creation of purveyor groups. However, the refinement proposed for farm groups might not work in the same way it does for purveyor groups. Although small purveyors, which would comprise the purveyor groups, tend to source produce from farms in close vicinity to their operations, there might be overlap in the areas from which agricultural produce is sourced. When overlap occurs, two or more small purveyors may be direct competitors, sourcing produce from the same farm(s). If head-to-head competition occurs between purveyors, the likely result is unwillingness to share information. The model therefore proposes that an external intermediary be inserted in the Purveyor Group, as lead conceptual purveyor, to disseminate information to group members. Figure 27 shows the full Link Sector.

When all the components of the Link Sector have been inserted (fig. 27), the difference between the current structure and the proposed one is the inclusion of two additional inks, one with farm groups and the other with purveyor groups. The current structure, depicted by the four right-most arrows and the box titled "Medium-sized and Large purveyors" would remain unchanged.

Although the supply/demand interaction proposed by the JATIS model provides a useful structure to facilitate optimal interaction using ICT as a tool, it recognizes the inherent challenges identified in the research findings. Mechanisms will have to be formulated to address the several possible countervailing issues currently affecting the sub-sector. The issues concerning trust and culture will still need to be examined and possible solutions presented in order to for the model to be successful. As stated earlier, one strategy might be the moderation provided by a member of another sector acting as an intermediary for purveyor groups. This external intermediary might be a member of the government, such as the Rural Agriculture Development Authority (or other government entity), or a representative from the research sector, such as academia. Both government and academia fall within different sectors of the model and will be dealt with in the ensuing discussion.

FIGURE 27 - LINK SECTOR SHOWING ALL COMPONENTS
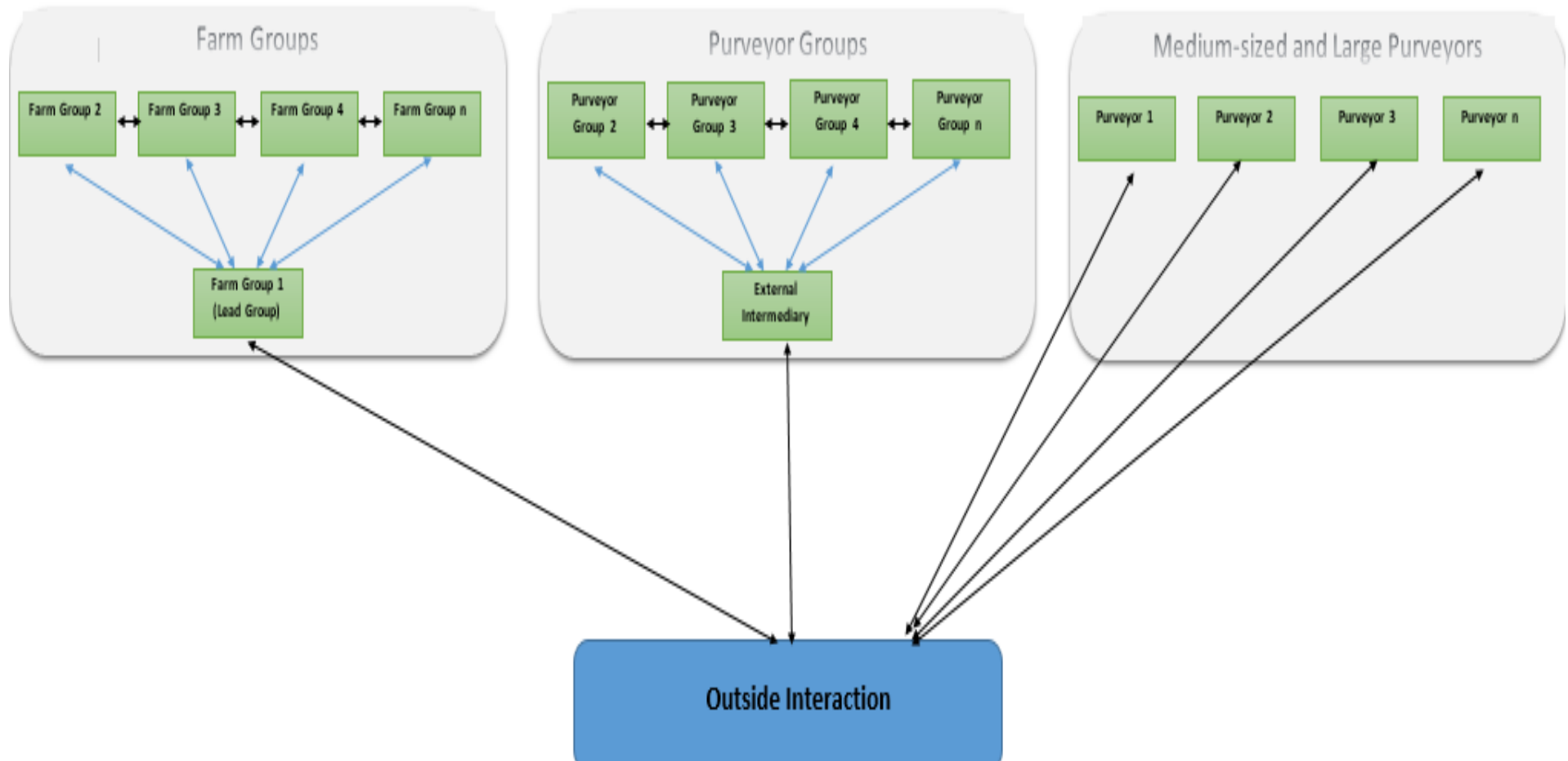
To be competitive, farm groups and purveyor groups must add similar value to that currently provided by purveyors. According to the research findings, although purveyors tend to buy at the lowest price and add their margin before selling to hotels and restaurants, they add value by packaging agricultural produce in a presentable manner and insulating their customers from issues of inconsistent quality and scarcity. However, the purveyors themselves are faced with these issues when they become customers of the farmers. Farm groups, which the model proposes to be cooperatively owned and operated, will be expected to adopt strategies to tackle the aforementioned, and other, issues.

Each farm group would act as the agent of farmers and not impose a margin for profitability thus allowing farmers a greater share of the profit. The funding for these farm groups would be provided by the farmers themselves or through assistance from financial institutions (located the infrastructure sector; fig. 28). A possible hurdle is the start-up funding required by these farm groups. A possible solution is grant funding, facilitated by the government, through the drafting and management of grant proposals.

From the research findings, both the large hotels and purveyors complained that farmers tended to be disorganised and utilized poor business practices. In addition, the findings indicate that there was little support to facilitate them learning to use technology or to effectively integrate technology into their operations. As stated in the Unified Theory of Acceptance and Use of Technology (UTAUT), discussed in Chapter 2, facilitating conditions have a significant impact on actual technology use. The model presents the supporting framework required for the successful introduction of ICT, however, to make the model work, a mechanism to get the actor to utilize ICT, or increase ICT usage for productive purposes, has to be included.

Two major contributors to the problems in the sub-sector are insufficient information and inadequate communication of the available information to the necessary stakeholders. To address these, the model proposes that both farm groups and purveyor groups implement data repositories and a system to collect, store and share the information within the groups. The various components of the proposed system to collect, store and disseminate information is discussed in the following paragraphs.

Beginning with data collection, the researcher is in agreement with e-agriculture (2012) which states that data collection requires methodical planning and coordination in order to ensure that the correct data are accurately captured. The model proposes that the coordination would be undertaken by staff in the administrative office of each farm group and initial planning be done by an external consultant or entity. In addition, in order to minimize error, the model recommends that data collection utilize ICT tools to capture data instead of capturing by pen and paper then entering into the repository. ICT tools such as mobile phones and tablets, applications which create digital surveys, and software which allow a user to upload data to storage in real-time are possibilities. The farmers already have access to cell phones which can be used to send and receive SMS messages for simple data collection, however, more sophisticated devices might be required to collect complex data. The collection of more sophisticated data will also require input from the research sector. However, where data cannot be provided via direct data interchange as recommended, staff in the administrative office of the farm group might have to collate information collected directly from farmers and enter these into the repository. *(Appendix IX has a list of applications which facilitate data collection from farmers.)*

Once data have been collected, the second component, storage, will need to be tackled. Although the storage component is presented after data collection, both components work simultaneously since the collected data will have to be stored immediately in order to ensure it is not lost. The model proposes that each farm group will have an administrative office with at least one computer with internet access and at least one printer. The computer in the administrative office will act as the hub for data collected, however, the model proposes that these data will then be uploaded to the permanent repository at a cloud provider.

The model further proposes that access to these data be similar to that used by Bangladesh (Sadek, 2015) where the agriculture knowledge bank is accessible through mobile and web applications via a knowledge portal. Information sharing, the third component, might be facilitated by developing applications to automate the dissemination of information to the various stakeholder farms and farm groups via web services. For basic information such as yield times and harvest quantities SMS might be used to disseminate information. The model proposes that applications be developed to aggregate data in real time and that stakeholders can remotely view these data via web dashboards.

The model also proposes the following interventions, adapted from Besha et al. (2009), the FAO (2013), IICA (2006), and from the researcher after analysing the findings:

1. **Providing external ICT support to farmers**

   a. This ICT support should begin with the most frequently used technology, the cell phone or smart phone, and extend to supporting productivity software (e.g. MS Office or equivalent), or

other similar, possibly open source, software used by farmers and small purveyors.

b. Training farmers and small purveyors to use ICT devices to interact with other group members via email or SMS messages. Although many of the smaller farmers are illiterate or semi-literate, solutions exist that can allow these persons to effectively use smart phones. Friscira, Knoche and Huang (2012) developed and successfully tested an SMS application called "EasyTexting" which allows illiterate people to send and receive SMS messages. According to Friscira, Knoche and Huang, who created three prototypes and two studies before finalizing the design:

> ...evidence that using touch-screen phones does not represent a cognitive problem for illiterate users but only a problem in terms of lacking confidence or technological literacy. We found promising first evidence that illiterate users can use text messaging in conjunction with audio, text and visuals when initial training is provided. (p.9)

c. Business-related services designed to improve business practices, such as contract negotiation and the importance to adhering to contract terms and conditions should also be provided.

2. **Sensitizing farmers and small purveyors on the benefits of ICT**

a. Much of the literature (Davis, 1989; Iddings and Apps, 1990; Kuhlman, 2006; Rogers, 1995) indicate that perception of the benefits of using ICT is a key ingredient in ICT adoption and

subsequent use. Many farmers and small purveyors will have to be convinced that using ICT is not only easy but beneficial to them. The model proposes that sensitization sessions, on a group-by-group basis be conducted by facilitators, possibly from the research sector, government sector or the group members themselves, to state the benefits of using ICT to the farm or for interacting with other members of the system. Persons successfully sensitized in one group may then be proponents of ICT use for another group. The Diffusion of Innovations (DOI) theory (Rogers, 1995) states that one of the main drivers of acceptance is the experience of the innovators and early adopters of the technology.

3. **Establishing user groups for each farm group**

   a. In addition to training, support groups can assist with confidence and competence building in the use of ICT. Existing social relationships among members of the group should be leveraged to assimilate ICT use in everyday interaction.

4. **Providing information repositories for group members**

   a. Hoteliers and restaurateurs seemed unable to ascertain, except in a general sense due to their knowledge of the seasons, when certain items mature or ripen, what quantities were expected to be reaped during particular times of the year. Implementing information repositories would assist with this challenge. These information repositories would consist of consolidated data from each farmer, through each farm group, available to the demand

sector, the government (diffusion sector) and the research sector. The lead group (see fig. 27) would be responsible for collating this information and for making it accessible to other sectors. Cloud technology could be used to store and disseminate this information.

The preceding recommendations are also in line with the cognitive instrumental processes stated in the Updated Technology Acceptance Model (TAM2). As TAM2 states, it is important for the potential user to be able to compare the benefits of using the technology with they need to get their work done. TAM2 describes this comparison as cognitive instrumental processes and lists them as: job relevance; output quality; result demonstrability; and perceived usefulness *(Section 2.2.1.2 provides additional details)*.

In addition to the preceding recommendations, targeted to the farmers and small purveyors through the respective groups proposed by the JATIS, there are some recommendations which target the larger players. The findings indicate that there was insufficient demand forecasting by the accommodations and restaurants. Although the use of technology by the demand sector and the government is laudable, it does not go far enough in facilitating demand-side planning and hoteliers/restaurateurs cannot plan for more than one or two weeks the expenditure that they will make on food.

Data collection mechanisms should be instituted, at both government entities and the hotel umbrella group, or the hotels themselves, to capture information on seasonal demand for specific agricultural produce. This information may then be compared to the data provided by the link sector to determine what items and quantities are available in what locations during set times of the year. In addition to

facilitating demand forecasting, this is also one component to address the logistics issue raised in the Findings.

The model envisages that the information collection, storage and dissemination mechanisms for the hotels and government are similar to that of the farmers. The problems of insufficient information and inadequate communication of available information also plague the hotels and government. Similar to what was stated for the farmers, data collection for the hotels and government requires methodical planning and coordination by a designated entity. The designated entity for the government may be the ministry responsible for agriculture and for the hotels, the designated entity would be the tourism umbrella group.

Much of the data stored in the data repository of farmers, through the farm groups, should be accessible to the hotels and government through the same avenues. The model proposes that data interchange between the farmer repository and the databases of the hotels and government be enabled. Once the data is available, there is little need for human intervention. The data can be shared between systems using automated schedules to move data from one system to the other, or where acceptable, views of the data from one system to the next.

The model proposes a two-way flow of information with each sector sharing information with the other sectors as necessary. Where data interchange is insufficient or encounters problems, technical or otherwise, the dashboards from the data repositories available to the farming community should also be made available to both the government and hotels. Additionally, the government or research sector should produce mash-ups to display data from several sources in a single location accessible via the web.

Figure 28 provides an illustration of the complete JATIS model. The JATIS modifies the traditional AIS model, specifically that proposed by Agwu et al. (2008) which formed the basis of the conceptual/theoretical framework (fig. 14). The JATIS inserts the critical Link Sector through which the interaction between the supply and demand sectors pass. In the AIS, all other sectors interacted with the Tourism Food Supply sector to collaborate and share information. Also, previously, purveyors were included in the Tourism Food Supply sector, however, the JATIS replaces "Tourism Food Supply" with "Farmers" and includes purveyors in the Link Sector. Before, the AIS consisted of 5 sectors:

1. Tourism Food Demand;

2. Tourism Food Supply;

3. Diffusion;

4. Research; and

5. Infrastructure.

However, the JATIS has 6 sectors:

1. Tourism Food Demand;

2. Link Sector;

3. Farmers;

4. Diffusion;

5. Research; and

6. Infrastructure.

FIGURE 28 - THE JAMAICAN AGRITOURISM INNOVATION SYSTEM (COMPLETE)
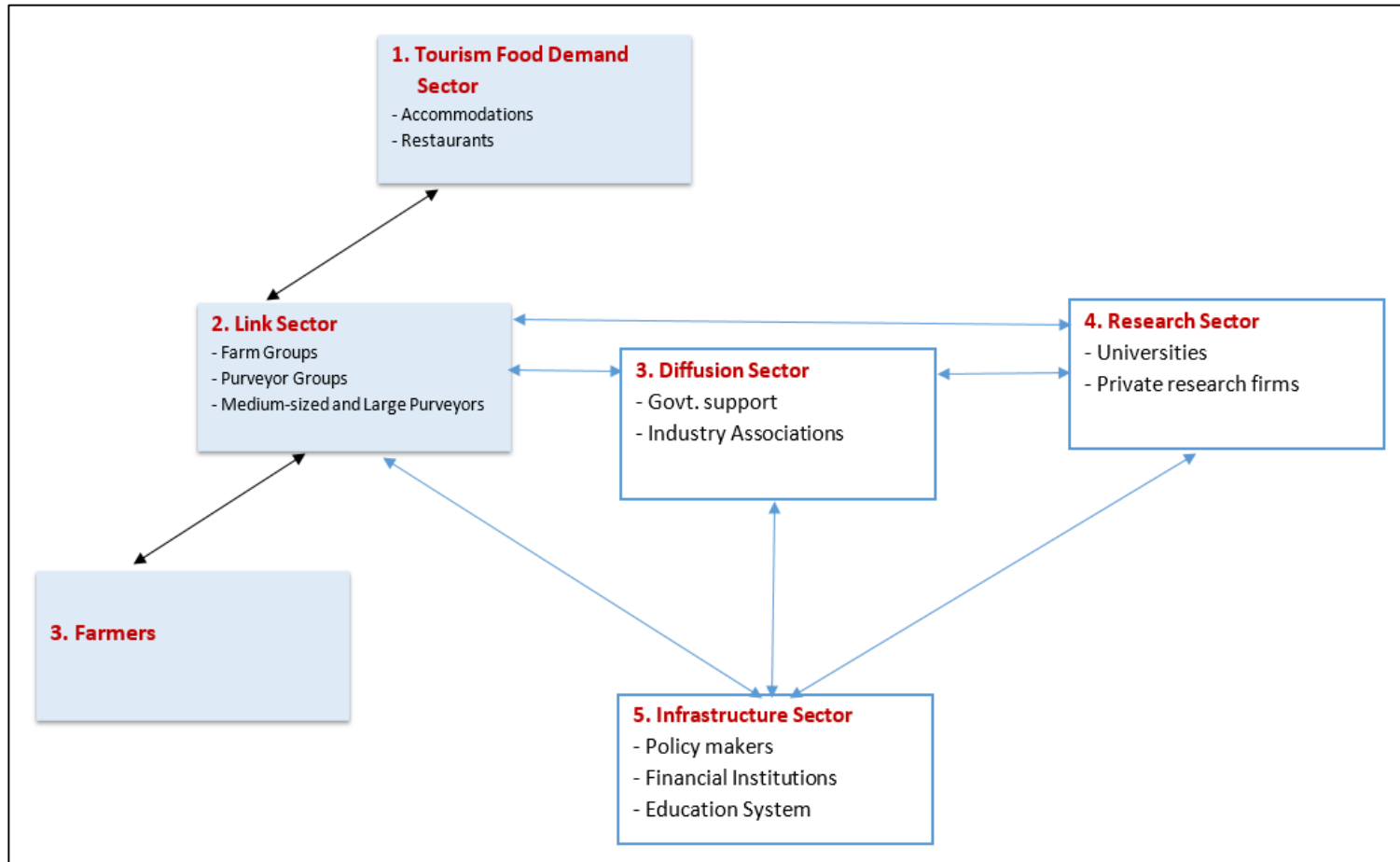
Although the primary focus of the research was the supply/demand interaction, elements of the other sectors were covered. As stated earlier, some elements of the link sector will require intermediation from the other sectors of the model. The full model (fig. 28) identifies government support as a part of the Diffusion Sector and universities as part of the Research Sector. The model envisages that one of these two areas will be the external intermediary for purvey groups in the link sector (see fig. 27). This intermediation will be an important function to ensure that competition between small purveyors does not lead to information hoarding or other activities which may affect the flow of information. As the figure 27 illustrates, this external intermediary will be responsible for disseminating information among the groups and will be the interface with other entities outside the Purveyor Groups. Although not stated explicitly in the model, each purveyor group is free to innovate, by seeking additional information not provided by the external intermediary, however, all purveyor groups, and the member purveyors, should have access to the same basic set of information to make them competitive.

The model envisages that the infrastructure sector, and especially the financial institutions, will play a critical role in making the model work. Given the fiscal challenges that the Jamaican government faces, and has faced over the last 20 years, these institutions will be required to provide the seed funding necessary to activate the group structure envisaged by the model. The model proposes that each group would have an office, staffed by at least one person, possibly part-time, with at least one computer, a printer and a broadband internet connection. This office would be the point of contact for information retrieval and dissemination to other groups as well as to individual group members. In addition, it would coordinate the training of, and conduct basic research for, members of the group.

The JATIS model proposes some fairly far-reaching actions/recommendations. In order to ensure that these were credible, member checking (Kaplan and Maxwell, 2005), was utlilsed. From the construction phase, the model was progressively elaborated, beginning with the first set of interviews until it was refined, based on the feedback received, and further validated by subsequent respondents. Each iteration, saw a fine-tuning of the model, until finally there was nothing more to change. Several respondents accepted that the JATIS model was workable and that the findings matched their experience within the sector.

6.4 Summary

The key contribution to research in this field, social informatics, is the model to increase collaboration and information sharing among actors in the Jamaican agritourism sub-sector. The model, the Jamaican Agritourism Innovation System (JATIS), has several of the components of other innovation models and in particular the agriculture innovation system proposed by several authors. Like JATIS, other models group players into sectors and focus on the interaction among the sectors. However, JATIS inserts a Link Sector between the supply and demand sectors to intermediate the interaction between them. Other models have them interacting directly. The Link Sector has 3 components: farm groups; purveyor groups; and medium-sized and large purveyors.

Each Link Sector component is comprised of several other groups, in the case of farm and purveyor groups, and organisations, in the case of the medium-sized and large purveyors. According to the model, there is competition between components, however, within components, there is a structure for information sharing to ensure that each group member is able to maximize their effort. Group members are

expected to compete, either with the other components as a part of their group, or with other group members, to supply the market.

In addition to inserting a Link Sector, the JATIS, replaces the supply sector, which in other models included several types of organisations and individuals, with farms. Therefore, in the JATIS, the only sector which directly interacts with farmers is the link sector. In addition to facilitating greater use of ICT, the JATIS addresses several business-related issues unearthed from the research findings. The JATIS encourages the capacity building required for the sustainable ICT use and effective business practice required to lower the price of Jamaican agricultural produce to the demand sector and make the imports, which in some cases are cheaper, relatively less attractive.

Model validation was iteratively done in the field during data collection and a process of progressive elaboration was utilised to first generate the model and refine it to the point where most of the respondents saw nothing which required change.

Chapter 7 – Conclusion, Recommendations outside JATIS, Implications, and Future Research

7.1 Introduction

The previous chapter presented and described the Jamaican Agritourism Innovation System (JATIS), the model for incorporating ICT into the business practices of participants in the Jamaican agritourism sub-sector. Although the preceding chapter presented some general recommendations, those recommendations were directly related to the model presented. This chapter will present, in Section 7.2, a summary of the conclusions drawn by the researcher. In addition, Section 7.3 will present more in-direct recommendations which focus on the facilitating environment required for the model to be successfully implemented. This chapter also presents, in Section 7.4, the implications of the work presented in this thesis, and the future research required to extend or optimise this work. Section 7.5 summarizes the chapter.

7.2 Conclusions

At the beginning, the researcher began with a set of research questions to be answered. The critical question posed was "***In what specific ways can information and communication technologies be applied to the Jamaican Agritourism sub-sector in order to match farm output to market demand within the tourism sector?***" Several specific questions emanated from the more general one:

1. What is an effective agritourism model for Jamaica as perceived by selected players in the agritourism sub-sector?

2. What are the characteristics of the agritourism model identified by selected players as being effective for Jamaica?

3. To what extent has ICT been applied, in Jamaica, to the components of the agritourism model conceptualised from the theory?

4. How might ICT be best applied to agritourism in Jamaica?

It is these questions which directed the data collection to determine how best to integrate ICT into the business processes of some players in the Jamaican agritourism sub-sector. This ICT business process integration was seen as the greater part of the solution required to increase collaboration among the players, to increase the supply of Jamaican agricultural produce to the tourism demand sector and hence reduce food leakage. After analyzing the data collected, the researcher has made the following conclusions:

i. Although several components (entities and individuals) work towards the goal of providing agricultural products for the tourism sector, the Jamaican agritourism sub-sector is not well defined. The sub-sector is in need of organization and, using JATIS (fig. 28) as the effective model proposed, this should be tasked to the Diffusion and Research Sectors – namely the government and universities respectively. The current disorganized state of the sub-sector has led, and continues to lead, to inefficiency and frustration especially on the part of the larger accommodations and restaurants. The research sector is important, not necessarily as a direct beneficiary, but because there might be additional work required to fine-tune the JATIS. The possibilities identified for future research highlight additional work that might be necessary to improve the model presented.

ii. The components of the Jamaican agritourism sub-sector which are effectively using ICT to conduct business, namely the medium-sized and large purveyors

which supply larger hotels and restaurants, do not promote the inclusion of the other players. The current, working, structure has been a reaction to the several problems, many of which stem from cultural and business-related practices, that plague the sub-sector.

iii. ICT cannot be applied to the currently disorganized sub-sector without conducting additional work to, first, organize the sub-sector to build economies of scale, and, second, address the 'softer', socio-cultural factors which militate against sustainable technology use.

iv. Many of the current players, even small farmers, have access to ICT, especially smart phones and personal computers, however, these are often not used to conduct business. Therefore, the possible efficiency gains associated with technology use are not achieved. The JATIS has proposed a structure to address this deficiency, using factor models like TAM (discussed in Chapter 2).

v. The existing ICT available in Jamaica if utilized by the sub-sector, specifically the smaller players which constitute a large component of both the supply and demand sectors, can provide efficiency gains for price reduction thus making Jamaican agricultural produce cheaper to the demand sector. A relatively cheaper product will make imports less attractive and hence reduce imports.

vi. In addition to price, several other issues such as quality, consistency (both price and quality), currently make Jamaican agricultural produce unattractive to the hotels and restaurants, especially the larger ones. These, coupled with the current poor logistics, can be addressed by better use of information, through leveraging ICT.

7.3 Additional Recommendations

Although the JATIS presents a useful framework to organize the currently loosely coupled Jamaican agritourism sub-sector, the research uncovered several non-ICT issues that should be tackled and overcome if the model is to be successful. While implementing the model without viewing the external environment can provide the requisite information flow to address several of the themes emanating from the data, there are some, which require focused and collaborative effort.

7.3.1 Culture

One prevalent theme throughout the discourse was Culture. Culture has several dimensions and that which was highlighted was the dimension related to the other theme of trust or trustworthiness. The data revealed that there is very little trust between the players in the sub-sector. This distrust stemmed from a culture of parties in a trade not honouring their commitments to the other. To address this, the researcher recommends the following, adapted from IICA (2006):

- Relationships must be built between different stakeholder groups to ensure that communication channels remain open in times of difficulty

- Although ICT solutions might be implemented as projects, there should be provisions for future capacity development by putting in place continuous training and budgeting for upgrading the technology after several years

- Experiences and issues should be shared openly, through the facilitation of sectors outside the direct supply/demand interaction.

7.4 Implications

The work presented in this thesis has implications for both management and policy making for the larger agricultural sector and agritourism in Jamaica.

7.4.1 Implications for Theory

The work reported in this thesis makes contributions to the theory in several areas:

i. In the area of social informatics, it is, to the best of researcher's knowledge, the first such work to be conducted which focuses on the factors which might affect technology adoption in the Jamaican agritourism sub-sector, specifically among small and medium-sized farmers and small purveyors. Whereas previous studies may have looked at Jamaican SMEs or the Jamaican agricultural sector more generally, the specific sub-sector has never been studied.

In addition to providing new insight into technology adoption, the work presented has, through applying it to the Jamaican context, extended the traditional agricultural innovation systems model by including a Link Sector. Although other models include middle-men, none have shown that without their influence the innovation system will fail. The JATIS posits that, in the Jamaican context, and specifically that of agritourism, no direct interaction should take place between the farmers and any other sector identified in the model. And that all interactions with farmers should take place through the link sector, which comprises farm groups, representing farmers, as well as purveyor groups and the existing medium-sized and large purveyors.

7.4.2 Implications for Management

Although the research was conducted among a relatively small cohort of the identified Jamaican agritourism population, the data unearthed has presented a clear picture of the sub-sector. This understanding has led to the JATIS presenting a new model for Jamaican agritourism based on an understanding of what currently

exists and recommendations for improving the existing situation. The JATIS not only defines a formal structure for the Jamaican agritourism sub-sector, it provides, for the first time, a breakdown of all the components and the possible interactions among them.

The management implications focus on managing external links and entities and/or individuals who are not members of a traditional structure. Managers within the JATIS, those in the farm groups, purveyor groups, and the sectors external to the Link Sector, which interact with Link sector representatives, will need to understand the cultural dynamics and the mind-set of the players involved. Several past interventions have failed due to either misunderstanding or lack of emphasis on the socio-cultural factors which are key determinants of collaboration.

7.3.2 Implications for Policy

The results of the investigation highlight the fact that the role of actors outside the supply/demand interaction is critical if more Jamaican agricultural products are to be used in the supply chain for hotels and restaurants. The results show that chefs prefer the superior flavor profile of Jamaican agricultural produce but are challenged by low quality, that is, high spoilage rate, inconsistent quality, inconsistent pricing, and product reliability. The JATIS has identified the diffusion and research sectors as playing prominent roles in innovation within Jamaican agritourism sub-sector to tackle the aforementioned challenges.

As figure 29 illustrates, the outside interaction with the Link Sector, must include moderation from the government and the universities in the form of external intermediaries within the Purveyor Groups. Government must set policy to facilitate the interaction and should be encouraged to provide concessions to the

infrastructure sector, specifically financial institutions, to enable them to provide the

funding necessary to make the groups work. The model prescribes that policy take a

holistic approach, which targets the system as opposed to the individual

components.

FIGURE 29 - POSSIBLES VARIABLES AFFECTING LINK SECTOR
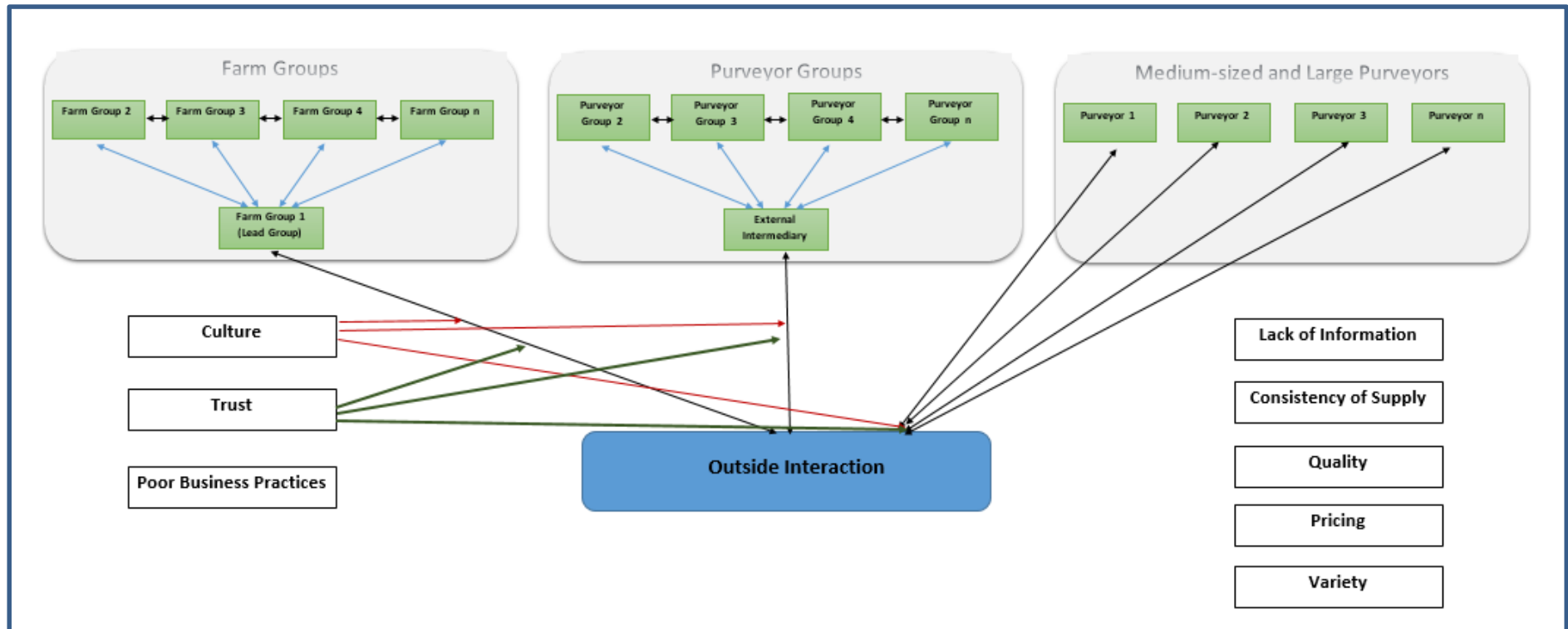
7.5 Future Research

The study undertaken for this thesis had several limitations such as limited time and budget, the lack of accessible, credible, and sufficient written information about the agritourism sector, the use of ICT in Jamaican agriculture, the farming community, and previous interventions. The researcher used a two-pronged approach, beginning with qualitative methods to identify the players, then quantitative methods to isolate participant groups, in the first phase, and ended with qualitative method to drill down into the data, in the second phase.

The researcher recognises the research presented in this thesis as the first step in the goal to minimize food leakage from the tourism industry. While the model presented is useful, other factors affecting the external, facilitating environment should also be investigated. Culture was identified as a consideration during the investigation, however, the researcher did not have the time to fully examine its effect on the sub-sector. Plus that investigation fell outside the scope of the research. Future research should focus on the role and effect of culture on the interaction between the various players in the sub-sector. In addition to determining its effect, the research should investigate what interventions might be required to mitigate the negative effects and maximize the positive ones.

Future research should also look at what factors will moderate or affect the interaction among the various players identified in the JATIS model. The model presents several sectors but does not indicate the relative influence of each sector on the overall model. Future research might wish to determine which sector has the most influence and how this influence is exercised. In additions, as figure 29 shows, several variables, namely trust, culture, and poor business practices, were identified which might affect the successful use of ICT by the actors involved. These variables,

while not ICT related, might derail successful ICT application. Future research should, as a first step, examine these factors to measure their effect on ICT use in Jamaican agritourism and, afterwards, seek to craft interventions to mitigate their effect.

The research also identified several other factors, namely lack of information, consistency of supply, quality, pricing, and variety that were reasons for the low interaction between large accommodations and restaurants, and small purveyors and farmers. These same reasons were advanced for the high level of leakage via imports. Future research should seek to ascertain the relative effect of each identified variable and to identify any others that might moderate or be added to the ones identified.

Much of the detailed measures suggested within the model are premised on technology adoption by individuals, mainly members of the farming and purveyor communities. However, although the theories in technology acceptance, such as the Diffusion of Innovation theory and the Technology Acceptance Model, are generally applicable, future research might wish to see how these might be modified, if at all, to better fit the players in the Jamaican agritourism sub-sector. Of note, is that the Updated Technology Acceptance Model (TAM2) presented in Chapter 2 (2.2.1.2, pp. 30-32) recognizes that social as well as cognitive processes influence technology adoption. An important issue related to ICT adoption among Jamaican farmers deserving of attention is the relative influence of "subjective norm" – whether someone important to the farmer might approve of his use of ICT – or "image" – the extent to which a farmer's standing among his peers, on his acceptance and future use of technology introduced.

Other social influences affect technology use. Future research should focus on what social factors affect technology use, especially among older individuals, particularly women, and even then during the early stages of using the technology. This further research might be able to predict future technology use and lead to more successful interventions specific to the different age and sex cohorts. As Venkatesh et al. (2003) state, "as the younger cohort of employees in the workforce mature, gender differences in how each perceives information technology may disappear" (p.469).

Although the model presented was developed based on data collected in Jamaica, it might be applicable to other SIDS, especially those in the Anglophone Caribbean where the socio-cultural factors are similar. Further research should be conducted to determine whether the model is externally valid, in SIDS generally and those in the Caribbean.

7.6 Summary

This chapter presented additional recommendations to those in Chapter 6 which emanated from the Jamaica Agritourism Innovation System (JATIS) model. The JATIS was crafted based on what was unearthed from the research findings along with the literature analysed. The work in this thesis makes several contributions to the theory in the field of social informatics and presents several implications for the management and public policy.

The major contribution is the customization of the traditional agriculture innovation systems model to the Jamaican context. The Jamaican context presented in this thesis was specific to agritourism and so the model is one for the Jamaican agritourism sub-sector. This customization extends the model and includes the

critical role of purveyors in the Jamaican context by inserting a Link Sector through which all interactions between farmers and the other sectors will take place. The model posits that without the Link Sector working efficiently, the agritourism innovation system in Jamaica will fail. Success in the Link Sector will lead to efficiency gains which will have the effect of lowering prices and making Jamaican agricultural produce more attractive to the demand side.

The research presented in this thesis should be seen as the first step, or among the first steps, in the goal to minimize food leakage from the tourism industry. Culture was identified as a consideration which requires additional investigation to focus on the role and effect of culture on the interaction between the various players in the sub-sector. Future research should also seek to quantify the relative effect of all the sectors on the overall model and the variables which mitigate these effects.

Although ICT has the potential, even without adding to what is currently available to the players in the sub-sector, there is need to create or improve the facilitating environment. Trust-building is one of the activities that must be undertaken and this must be facilitated by the government and academia for ICT to have the desired effect. Collaboration is possible and, if done in the systematic way articulated by the model, can reduce food leakage in Jamaican agritourism.

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Appendices

Appendix I – Application for Research Ethics Approval Form

Manchester Business School

Application for Research Ethics Approval

When completed this form should be returned to the PGR Office.

The form should preferably be typed, where handwritten please use BLOCK CAPITALS.

Surname:…ANGLIN………………………………… **Student Number**: 7316609………….…

Forename(s)…PATRICK……………………………………...

Programme:…DBA…………………………………………………………………………...

Thesis title: …Integrating information and communication technologies (ICT) into the business processes of small and medium sized enterprises (SMEs) operating in the agri-tourism sub-sector in Jamaica: towards a productivity model.

The following should be addressed, where applicable, when explaining how you will address any ethical issues arising from your doctoral work. All questions must be answered. 'Not applicable (N/A)' is a satisfactory answer where appropriate.

1. **Brief description of the research project including the main research aims and objectives including research questions and why it is important.**

> *The project is the fieldwork for my thesis (title above) where I propose to conduct face-to-face interviews with, as well as distribute questionnaires to, several groups operating in the Jamaican agri-tourism sub-sector, namely:*
>
> - *Farmers*
> - *Hoteliers*
> - *Restaurateurs*

2. **Does the research involve any of the following?:**

	Yes	No
• use of questionnaires designed by the researcher	■	☐
• use of standard survey instrument	☐	■
• use of on-line surveys	☐	■
• use of interviews	■	☐
• use of focus groups	■	☐
• audio-taping participants or events	☐	■

- video-taping participants or events

- research about participants involved in illegal activities ☐ ■

- access to personal and/or confidential data without the participant's specific consent ☐ ■

☐ ■

- administration of any stimuli, tasks, investigations or procedures which may be experienced by participants as physically or

mentally painful, stressful or unpleasant during or after the research

- observation of participants without their knowledge ☐ ■

3. Provide a summary of the design and methodology of the project, including the methods of data collection and the methods of data analysis.

The research will be conducted in three phases:

- *Phase 1 – analysis of the demand-side using questionnaires and in-depth interviews*
- *Phase II – analysis of the supply side using questionnaires and in-depth interviews*
- *Phase III – evaluation of model produced. Data will be collected from both the demand and supply sides using a combination of in-depth interviews and focus groups*

4. Describe the research procedures e.g. how relevant research participants are identified, recruited and the organisation of the field research.

Participants will be identified as follows:

- *Demand side participants (restaurateurs and hoteliers) will be selected by short-listing sector participants from a list provided by the Jamaica tourist board. First round of short listing will be done by grouping/re-organizing the larger list by resort areas, then looking at the major players in each resort area using criteria such as size (staff complement, annual turnover), clientele, location within the resort area.*

- *Supply side participants (farms) will be selected based on size. In the Jamaican situation, farm size ranges are as follows;*
  1. Under 1 hectare;
  2. 1 – 5 hectares;
  3. 5 – 50 hectares;
  4. 50 to less than 200 hectares; and
  5. 200 or more hectares (statin, 2007).

  No commensurate data was located relating to income or the number of persons employed and therefore the SME definition for the Jamaican situation would only include farm size. The foregoing means that the Jamaica definition of an agricultural SME would be all farms except for those within group 5 (200 or more hectares).

5. **What, in your opinion, are the ethical considerations involved in this research e.g. risk to participants and researchers (physical or psychological), issues that might be sensitive, embarrassing or upsetting etc? Describe precautions to minimise or mitigate the risks and issues identified above?**

> - *Confidentiality of information – given the tense economic environment (competition and government) participants will expect that the information gleaned does not fall into the 'wrong hands'. I will seek, where possible, to anonymize responses and never share the data gathered with either government or competitors.*

6. **Will the research specifically target:**

	Yes	No
students or staff of this University	☐	☑
adults (over the age of 18 and able to give informed consent)	☑	☐
children (anyone under the age of 18)	☐	☑
the elderly	☐	☑
people from non-English speaking backgrounds	☐	☑
anyone intellectually or mentally impaired who can't provide consent	☐	☑
anyone who has a physical disability	☐	☑
patients or clients of professionals	☐	☑
anyone who is a prisoner or parolee	☐	☑
any other person whose capacity to give informed consent may be compromised	☐	☑

Please note that you may also need to obtain satisfactory CRB clearance (or equivalent for overseas students).

7. **Will payment or any other incentive be made to any research participant? If so please specify and state the level of payment to be made and/or the source of the funds/gift/free service to be used. Please explain the justification for offering payment or other incentive.**

> *No payment, or incentive of any kind, will be provided to participants.*

8. **Please indicate the method of recruitment by ticking the appropriate box(es). Tick all that apply.**

Mail Out	☐	Email	☑	Telephone	☑
Advertisement	☐	Recruitment carried out by third party ☐	Personal ontacts	☑

Recruitment carried out by researchers ☐	Contact details obtained from public documents ☐	Contact details obtained from private sources ☐

Participants from a (please explain) ☐	Snowball ☐	Other ☐

Previous study

If using a **mail out** who will be distributing it?..

If using an **advertisement** explain where it will be placed. Have you attached a copy? Y/N - if no please explain

...............N/A..
....
....

If recruitment is to be conducted by a **third party** (e.g. friend, contact, doctor) have you attached an approval letter

- requesting their assistance? Y/N - if no please explain…N/A…………………………………………………..
- confirming their willingness to act? Y/N - if no please explain………N/A…………………………………………..

If contact details are to be obtained from **private sources** have you attached an approval letter? Y/N - if no please explain…N.A…………………………………………………………………………………
....
....

9. **Please give details of how informed consent is to be obtained. <u>A copy of the proposed consent form, along with the proposed information sheet must accompany this proposal</u>.**

> *N/A*

10. **Data Protection and Confidentiality. Please state who will have access to the data and what measures will be adopted to maintain the confidentiality of the research participant and to comply with data protection requirements e.g. will the data be lawfully processed, anonymised, secured and not kept longer than necessary?**

> *For the demand-side - I will not record the identity of the respondent (although due to the nature of the research, it is likely that one would be able to identify the persons within a facility able to provide the requisite answers). I will also seek to anonymize properties (hotels and restaurants).*
>
> *Only the researcher will have access to the data. These data will be stored on the researcher's laptop PC which employs two factor (biometric and password) access authentication. Backups will be stored on an external hard-drive that has been encrypted using the TrueCript software (AES 128-bit encryption). No data will be stored on flash memory, smart phones or devices where security is questionable.*

11. Will the research results be made available to the participants? If so describe how they will be disseminated.

Research results may be made available, upon request, to participants. However it is the final thesis (which will include the model) that I intend to make widely available

12. State location(s) where the project will be carried out.

Jamaica:

- *Kingston*
- *Port Antonio*
- *Ocho Rios*
- *Montego Bay*
- *Negril*
- *SouthCoast*
    - o *Whitehouse (Westmoreland)*
    - o *Treasure Beach (St Elizabeth)*
    - o *Alligator Pond*

13. The proposed period of field research is from April 15, 2013 to June 21, 2013
_____ (this must not be before the date of Ethics Committee approval)

Signature:… ………………… **Date**: April 8, 2013………………………………...

Supervisor's Declaration:

I have discussed the above ethical issues with the student in relation to his / her proposed research and agree that the involvement of human participants / human data / material is essential for the proposed research topic.

Supervisors Name:…………………………………………………………………………….

Supervisor's Signature:……….. ……………………………………………………………..

Date:………………………………………….

***The following section will be completed after you have submitted the form to Emma Griffiths in the PGR Programmes Office**, Email: emma.griffiths@mbs.ac.uk*

Director of PGR Programmes: ………………………………………….

Action: ……………………………………………………………………**Date** ………………..

NB: Should you change your research plans you will need to complete another ethics form. Please contact the PGR Ethics Committee should you have any questions.

The University
of Manchester

Appendix II – Participant Information Sheet and Consent Form

Thesis Title – *Integrating Information and Communication Technologies (ICT) into the Business Processes of Small and Medium-sized Enterprises (SMEs) in the Jamaican agritourism sub-sector: Towards a Productivity Model.*

Participant Information Sheet

You are being invited to take part in a research study as part of a student project towards a doctoral thesis (see title above). Before you decide, it is important for you to understand why the research is being done and what it will involve. Please take time to read the following information carefully and discuss it with others if you wish. Please ask if there is anything that is not clear or if you would like more information. Take time to decide whether or not you wish to take part. Thank you for reading this.

Who will conduct the research?

Patrick Anglin
Doctoral Candidate
Manchester Business School
University of Manchester
Booth Street West, Manchester, M15 6PB, UK

Title of the Research

Examining the use of ICT in the supply chain of hotels and restaurants which cater to tourists, with specific emphasis on the medium-sized farmers who provide produce for these hotels and restaurants.

What is the aim of the research?

To get an understanding of the supply chain and logistics issues faced by the hotels and restaurants, the production and demand fulfilment issues faced by farmers, and the other issues faced by the other players in the agritourism system. .

Why have I been chosen?

Your hotel/restaurant has been selected based on it being on the list of top hotels/restaurants provided by the Jamaica Tourist Board (JTB). Where all hotels/restaurants in a particular resort area cannot be visited, the selection of a hotel/restaurant was done based on the schedule of the researcher and the ease of accessibility of the establishment to be visited – purposive sampling.

Your farm has been selected based on it fitting the criteria for a medium-sized farm that might benefit from the use of ICT. The original list of medium-sized farms came from the most recent Census on Agriculture (2007) and the determination of your farm potentially benefitting from

ICT came from prior research, conducted with the assistance of the Jamaica Agricultural Society (JAS) in 2010.

What would I be asked to do if I took part?

The researcher will ask you a set of questions pertaining to several things within your operation such as the current use of technology, issues faced in procurement (or fulfilling the demand) of food items.

What happens to the data collected?

The data collected will be used to write the final doctoral thesis and, where opportune, included in other scholarly papers. At no time will the information be used for commercial (including market research) purposes or be passed to any competing or government entity without the prior, written, consent of the respondent.

How is confidentiality maintained?

In some cases the researcher may opt to record the interaction with the respondent. These recordings are digital and will be stored on the researchers personal computer. All data will be encrypted and the researcher's PC will be password protected allowing only the researcher access to it after two separate sets of credentials are entered (two-factor authentication).

All backups to external media will also be encrypted. References to interviewees will be coded and the code sheet stored in a separate location to the actual recordings. Where transcripts of recording are produced, these will also be encrypted and password protected.

What happens if I do not want to take part or if I change my mind?

It is up to you to decide whether or not to take part. If you do decide to take part you will be given this information sheet to keep and be asked to sign a consent form. If you decide to take part you are still free to withdraw at any time without giving a reason and without detriment to yourself.

Will I be paid for participating in the research?

You will not be paid for participating in this research.

What is the duration of the research?

The duration of each interview may vary, lasting between 30 minutes and an hour depending on the establishment's size, complexity, and its use of technology.

Where will the research be conducted?

The research will be conducted in the 6 resort areas in Jamaica (as identified by the Jamaica Tourist Board):

1. *Kingston*
2. *Port Antonio*

3. *Ocho Rios*
4. *Montego Bay*
5. *Negril; and*
6. *The South Coast*

Will the outcomes of the research be published?

Research may be published in academic journals dealing with the following subjects:

- *Tourism*
- *Information and Communication Technologies (or Management Information Systems)*
- *Logistics*
- *Agriculture*

Contact for further information

Patrick Anglin

Telephone
(876)469-3837 (digicel)
(876)579-6375 (digicel)
(876)939-1151 (LIME)

Email
patrick.anglin@gmail.com
patrick.anglin@postgrad.manchester.ac.uk

Instant Messaging

Google Chat: patrick.anglin

MSN: pat_anglin@hotmail.com

Skype: patrick.anglin

What if something goes wrong?

If a participant wants to make a formal complaint about the conduct of the research they should contact the Head of the Research Office, Christie Building, University of Manchester, Oxford Road, Manchester, M13 9PL.

Title of Research
Examining the use of ICT in the supply chain of hotels and restaurants which cater to tourists, with specific emphasis on the medium-sized farmers who provide produce for these hotels and restaurants.

CONSENT FORM

If you are happy to participate please complete and sign the consent form below

Please Initial Box

1. I confirm that I have read the attached information sheet on the above project and have had the opportunity to consider the information and ask questions and had these answered satisfactorily.

2. I understand that my participation in the study is voluntary and that I am free to withdraw at any time without giving a reason and without detriment to any treatment/service

I agree to take part in the above project

Name of participant   Date   Signature

Name of person taking consent   Date   Signature

Appendix III – Survey Instrument (Preliminary Investigation, Phase 2)

Dear Repondent,
My name is Patrick Anglin and I am a doctoral student at the University of Manchester. The purpose of this survey is to learn more about the farmers who sell produce, directly or through a distributor or vendor, to the tourism sector. Your individual responses will be kept confidential, then pooled with those of other persons and used for academic purposes only. **No one will be able to identify you specifically**.

Although your assistance is being sought in answering all the questions truthfully, you may choose not to answer any question with which you are uncomfortable. **The questionnaire contains 30 questions and will take about 10 minutes of your time.**
Please place a tick (✓) in the box to the right of the appropriate response.
_____

Background data

1. **Age**

   ☐ Younger than 25 ☐ 25 - 34 ☐ 35 – 44 ☐ 45 - 54
   ☐ 55 - 64 ☐ 65 - 74 ☐ 75 and older

2. In which parish is your farm located?

   ☐ St Thomas ☐ Portland ☐ St Mary ☐ St Ann

   ☐ St Andrew ☐ St Catherine ☐ Clarendon ☐ Manchester

   ☐ St Elizabeth ☐ Westmoreland ☐ St James ☐ Hanover

   ☐ Trelawny

3. How large is your farm (in acres)?

   ☐ Less than 25 ☐ 25 - 50 ☐ 51 - 75 ☐ 76 – 100

   ☐ 101 - 125 ☐ 126 - 150 ☐ 151 -1 75 ☐ 176 – 200

   ☐ 201 – 225 ☐ 226 - 250 ☐ More than 250

4. Are you the owner or part owner? ☐ Yes ☐ No

5. Is the farm family-owned? ☐ Yes ☐ No
6. Is the farm managed by the owner? ☐ Yes ☐ No
7. How many persons work on the farm on a regular (day-to-day) basis?

   ☐ Less 5 ☐ 6 - 10 ☐ 11 - 15 ☐ More than 15

Farming Operations
8. How long has the farm been in operation?

☐ Less than 1 year ☐ 1 - 5 years ☐ 6 - 10 years ☐ 11 -15 years

☐ 16 - 20 years ☐ 21 -25 years ☐ 26 - 30 years ☐ More than 30 years

9. What do you produce on the farm?

☐ Field crops only ☐ Livestock only ☐ Both livestock and Field crops

10. Which field crops do you produce? **(Please select all that apply)**

LEGUMES	VEGETABLES	PLANTAINS
☐ BROAD BEAN	☐ BEETROOT	☐ HORSE PLANTAIN
☐ SUGAR BEAN	☐ BROCOLLI	☐ OTHER PLANTAIN
☐ COW PEA	☐ CABBAGE	**POTATOES**
☐ GUNGO PEA	☐ CALALOO	☐ IRISH POTATO
☐ RED PEA	☐ CARROT	☐ SWEET POTATO
☐ PEANUT	☐ CAULIFLOWER	**YAMS**
CONDIMENTS	☐ CELERY	☐ LUCEA
☐ ESCALLION	☐ CHO-CHO	☐ NEGRO
☐ GINGER	☐ CUCUMBER	☐ RENTA
☐ ONION	☐ EGG PLANT	☐ ST. VINCENT
☐ HOT PEPPER	☐ ICEBURG LETTUCE	☐ SWEET
☐ SWEET PEPPER	☐ OTHER LETTUCE	☐ TAU
☐ THYME	☐ OKRA	☐ YELLOW
FRUITS	☐ PAK CHOI	☐ OTHER
☐ CANTELOPE	☐ PUMPKIN	**OTHER TUBERS**
☐ PAW-PAW	☐ SQUASH	☐ BITTER CASSAVA
☐ PINEAPPLE	☐ STRING BEAN	☐ SWEET CASSAVA
☐ WATERMELON	☐ TOMATO	☐ DASHEEN
CEREALS	☐ TURNIP	☐ COCO
☐ HYBRID CORN	☐ OTHER VEGETABLES	
☐ ORDINARY	**SORREL**	
☐ SWEET CORN		
☐ RICE	☐ **OTHER_____**	_____

10. What livestock do you currently produce? **(Please select all that apply)**

☐ Cattle (Beef) ☐ Goat ☐ Fish
☐ Pigs ☐ Chicken (Meat) ☐ Cattle (Milk)
☐ Sheep ☐ Chicken (Eggs) ☐ Other _____ (Please Specify)

11. How do you sell your produce? **(Please select all that apply)**

☐ Direct to end consumer ☐ To intermediary (e.g. Higgler) who then supplies consumer
☐ To supermarket/retailer ☐ To Hotel, Restaurant or other food establishment
☐ To agri-processor ☐ Other (Please Specify)_____

12. Do you know which segment of the market (e.g. Jamaican household, Tourist, Restaurant patron) normally consumes your produce?

☐ Yes   ☐ No

13. If yes to 12 (above), choose the segment of the market that normally consumes most of your produce.

☐ Jamaican household   ☐ Jamaican visitor
☐ Overseas visitor   ☐ Produce normally exported overseas
☐ Other _____

14. How do you manage your growing/production patterns? **(Please select one)**

☐ I get information from the market (price, demand, etc.) normally produce based on what the market demands

☐ I normally produce based on what the farm can support

☐ I normally produce based on my gut feeling

☐ I normally wait to see what other farmers are producing then do the same

☐ I use another method_____

Current use of Information and Communication Technologies

15. Which of the options below best describes your understanding of the term "**Information and Communication Technologies**" **- ICT**.

☐ A computer
☐ A cell phone used to send text messages
☐ The set of tools used to send, receive and process information
☐ Equipment needed to write complex computer programs
☐ Something else not in the list above

16. Do you currently use ICT?
☐ Yes   ☐ No

17. Do you own or have access to a computer?

☐ Yes   ☐ No

18. If yes (to question 17), do you **<u>use</u>** the computer?

☐ Yes   ☐ No

19. If yes (to question 18), please select from the option below how you currently use the computer. **(Please select all that apply)**

☐ I use the computer to surf the Web just for fun
☐ I use the computer to surf the Web to look for business-related information
☐ I use the computer to draft important documents
☐ I use the computer to do my accounts
☐ I use the computer to store important business information
☐ I use the computer for other things

20. Do you own a cell phone?

☐ Yes　☐ No

21. Can you cell phone access the internet?

☐ Yes　☐ No　☐ Don't know

22. Do you think using ICT in your farming operations can improve your business?

☐ Yes　☐ No

23. Do you think you need to make greater use of ICT in your farming operations?

☐ Yes　☐ No

24. Choose from the list below the technologies **currently being used on your farm to conduct business**?

☐ Cell phone that can send text messages and access the internet
☐ Computer to access the Internet
☐ Inventory Management computer program
☐ Computer program to create documents and spread sheets
☐ Computer program for agriculture
☐ A printer
☐ A fax machine

25. Which of the items from the list below would be of greatest benefit to you? **(Choose one)**

☐ Access to a computer
☐ Basic training in using a computer
☐ Internet access
☐ Cheaper internet access
☐ A support system to assist with ICT issues/problems
☐ Assistance with learning to use the Internet
☐ A data enabled cell phone with cheap data plan

26. Would you like to know how you can use ICT to improve your business?

☐ Yes　☐ No

27. How would you describe your knowledge of how other famers use ICT?

☐ Excellent ☐ Good ☐ Average ☐ Poor

28. Would you like to know more about how **other Jamaican farmers** are using ICT to improve their business?

☐ Yes ☐ No

29. Would you like to know more about how **farmers outside Jamaica** are using ICT to improve their business?

☐ Yes ☐ No

30. Would you be interested to learn about growing patterns for produce demanded by tourists?

☐ Yes ☐ No

Thank You for participating in this survey.

Appendix IV – Detailed map showing Jamaican Towns and Parishes
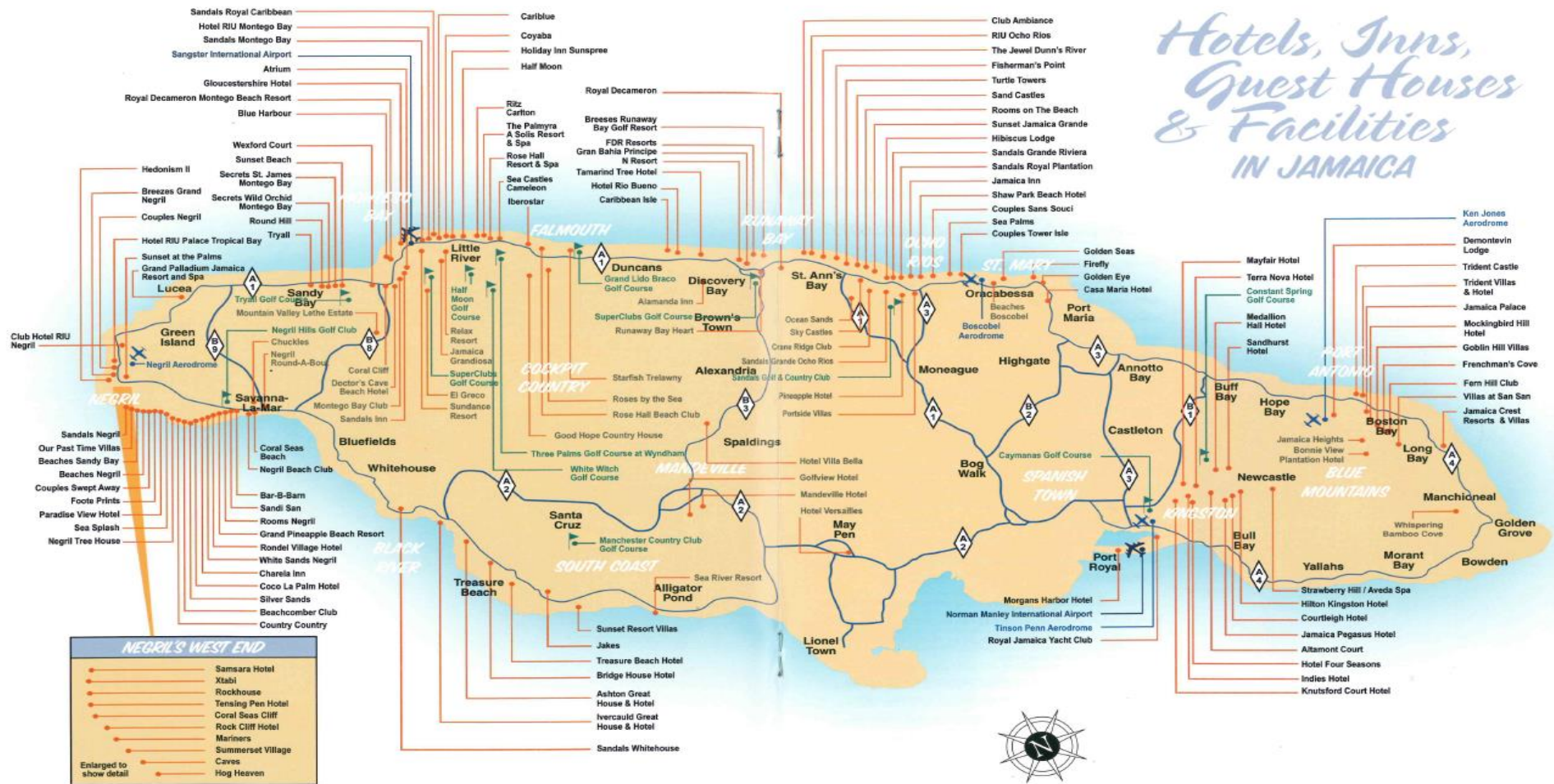
Appendix V – Crops produced by farmers (phase 2, preliminary investigation)

Case Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
$Produce_List[a]	23	74.2%	8	25.8%	31	100.0%

a. Dichotomy group tabulated at value 0.

$Produce_List Frequencies

		Responses		Percent of Cases
		N	Percent	
Field Crops Produced	Legumes	11	9.9%	47.8%
	Condiments	17	15.3%	73.9%
	Fruits	17	15.3%	73.9%
	Cereals	7	6.3%	30.4%
	Vegetables	19	17.1%	82.6%
	Sorrel	2	1.8%	8.7%
	Plantains	7	6.3%	30.4%
	Potatoes	8	7.2%	34.8%
	Yams	13	11.7%	56.5%
	Other Tubers	9	8.1%	39.1%
	Other	1	.9%	4.3%
Total		111	100.0%	482.6%

Case Summary

	Cases					
	Valid		Missing		Total	
	N	Percent	N	Percent	N	Percent
$Produce_List*q8	5	16.1%	26	83.9%	31	100.0%

$Produce_List*q8 Crosstabulation

	Produce	
	Field crops only	Total

261

Field Crops Produced				
	Legumes	Count	4	4
		% within q8	80.0%	
	Condiments	Count	5	5
		% within q8	100.0%	
	Fruits	Count	5	5
		% within q8	100.0%	
	Cereals	Count	3	3
		% within q8	60.0%	
	Vegetables	Count	4	4
		% within q8	80.0%	
	Plantains	Count	1	1
		% within q8	20.0%	
	Potatoes	Count	3	3
		% within q8	60.0%	
	Yams	Count	2	2
		% within q8	40.0%	
	Other Tubers	Count	2	2
		% within q8	40.0%	
	Total	Count	5	5

Percentages and totals are based on respondents.

Appendix VI - Themes for Hotel/Restaurant operators explored in interviews

Background

1. Opening hours
2. Location (independent or affiliated with a hotel) - I may not need to ask this of the restaurant
3. Size, i.e., number of employees (full-time, part-time, seasonal)

Operations

4. Clientele
5. Type of food served
   - Seasonal menu
   - Daily menu (does the menu change depending on what is available)
6. Source of food (proportion that is local or imported)
   - Carbohydrates
   - Vegetables
   - Protein
   - Other
7. How is the procurement conducted? (As a member of a group? From a consortium?)
   - Logistics
     - Order lead time
     - Stock-out options
       - Open market
       - Import
       - Remove from menu

Technology Used

8. PC
   - Desktop
   - Laptop
9. Software
   - Business Productivity Software
     - Word Processor
     - Spreadsheet
   - Specialized software such as ERP software
10. Internet

Appendix VII - Themes for Suppliers explored in interviews

Background (About the organization)

1. Opening hours
2. Location (branches, etc.)
3. Size, i.e., number of employees (full-time, part-time, seasonal)
4. Turnover (if available publicly)

Operations

5. Target market
6. Customer base (breakdown)
   - Rural Jamaica
   - Urban Jamaican
   - Overseas
7. Type of products sold (and to what segment of the market)
8. Source of products (proportion that is local/imported)
   - Carbohydrates
   - Vegetables
   - Protein
   - Other
9. How is the procurement conducted? (As a member of a group of companies? From a consortium with other companies?)
   - Logistics
     - Customer supply chain integration
     - Supply lead time
     - Back-end supply linkages
       - Local
       - Overseas

ICT Used in the organization
For both back office operations and front office (interaction with customers)
10. Computing Hardware and digital architecture
    - Servers
    - Desktop
    - Laptop
    - Tablets
11. Software
    - Business Productivity Software
      - Word Processor
      - Spreadsheet
    - Specialized software such as ERP software
12. Telecommunications
    - Internet
      - VOIP, Email, IRC
    - Smart Phones

Appendix VIII - Hotel Restaurants in Jamaica

	Resort Area	Facility (Hotel, Inn, Guest House)
1	**Kingston**	Morgan's Harbour Hotel and Marina
2		Knutsford Court Hotel
3		Indies Hotel
4		Hotel Four Seasons
5		Altamont Court
6		Jamaica Pegasus Hotel
7		Courtleigh Hotel
8		Strawberry Hill/Aveda Spa
		Mayfair Hotel
9		Terra Nova All-Suite Hotel
		Medallion Hall Hotel
10		Spanish Court Hotel
11		Wyndham Kingston Hotel
12		Sandhurst Hotel
1	**Portland**	Demontevin Lodge
2		Trident Castle
3		Trident Villas and Hotel *
4		Jamaica Palace *
5		Mockingbird Hill Hotel *
6		Goblin Hill Villas
7		Frenchman's Cove
8		Fern Hill Club
9		Villas at San San
10		Jamaica Crest Resort and Villas
		Sunset Resort Villas *
1	**Ocho Rios**	Club Ambience
2		RIU Ocho Rios
3		The Jewel Dunn's River
4		Fisherman's Point
5		Turtle Towers
6		Sand Castle
7		Rooms on the Beach
8		Sunset Jamaica Grande
9		Hibiscus Lodge

	Resort Area	Facility (Hotel, Inn, Guest House)
10		Sandals Grand Riviera
11		Sandals Royal Plantation
12		Jamaica Inn
13		Shaw Park Beach Hotel
14		Couples San Souci
15		Sea Palms
16		Couples Tower Isle
1	Montego Bay	Sandals Royal Caribbean
2		Hotel RIU Montego Bay
3		Sandals Montego Bay
4		Atrium
5		Gloucestershire Hotel
6		Royal Decameron Montego Beach Resort
7		Blue Harbour
8		Cariblue
9		Coyaba
10		Holiday Inn Sunspree
11		Half Moon
12		Ritz Carlton
13		The Palmyra A Solis Resort and Spa
14		Rose Hall Resort and Spa
15		Sea Castles Cameleon
1	Negril	Sandals Negril
2		Our Past Time Villas
3		Beaches Sandy Bay
4		Beaches Negril
5		Couples Swept Away
6		Foote Prints
7		Paradise View Hotel
8		Sea Splash
9		Negril Tree House
10		Samsara Hotel
11		Xtabi
12		Rockhouse
13		Tenseng Pen Hotel
14		Coral Seas Cliff
15		Rock Cliff Hotel
16		Mariners
17		Summerset Village
18		Caves
19		Hog Heaven
1	South Coast	Sunset Resort Villas
2		Jakes *
3		Treasure Beach Hotel *
4		Bridge House Hotel

	Resort Area	Facility (Hotel, Inn, Guest House)
5		Ashton Great House and Hotel *
6		Ivercauld Great House and Hotel
7		Sandals Whitehouse

Appendix IX – Applications which facilitate data collection from members of the farming community

Application	Pricing Model	Description
FrontlineSMS	Free and Open Source	"Frontline SMS is a piece of software, which is downloadable off the internet, which turns a laptop computer and a mobile phone or modem into a two-way group messaging hub." (http://www.psfk.com/2009/10/frontline-sms.html) Used to collect and disseminate information via SMS. The application can work without an internet connection to connect devices such as cellphones and GSM modems to a computer using a local cell number. With internet access, the application can be connected to online or cloud-based SMS services to provide additional functionality. *(FrontlineCloud is a paid cloud-based SMS service which allows a user to send, receive, and manage SMS messages and data from anywhere in the world)* **(Source:** www.frontlinesms.com, 2015)
FrontlineForms	Free and Open Source	An enhancement to FrontlineSMS which integrates data collection with SMS messaging and which works with Java-enabled handsets. "With the FrontlineForms tool, a single mobile phone can be used to collect structured data while off-line" (Banks and Dillon, 2009)
iFormBuilder	Free (limited functionality) and Paid (full functionality)	A cloud-based mobile data collection platform that allows data to be collected with an iPhone, iPod touch or iPad. Also facilitates data collection while the user is offline.