

**THE GREEN TECHNOLOGY FINANCING
SCHEME (GTFS) IN MALAYSIA: REVEALING
THE COMPETENCY TRAP**

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ABSTRACT

This research aims to understand the transition of established entrepreneurial firms into sustainable entrepreneurship ventures in Malaysia using a competency based perspective. The research considers established entrepreneurial firms attempts to acquire green technology financing. By observing a green technology financing scheme (GTFS) a competency trap is identified that constrains established entrepreneurial firms, regardless of their excellent financing track record and previous business success in other ventures. Utilising Rasmussen et al.'s (2011, 2014) evolutionary entrepreneurial competency framework, the research examines how established entrepreneurial firms develop the entrepreneurial competencies to overcome this trap and acquire green technology financing. By comparing different established entrepreneurial firms during the process to acquire financing, the research examined the GTFS contextual influence on the deployment of competencies, revealing the multi-faceted nature of the competency trap. In order to acquire GTFS financing the research identified two sets of entrepreneurial necessary competencies; (i) opportunity refinement competencies (ii) resource acquisition competencies. However, development of these competencies is influenced by the established entrepreneurial firms' paths and the competency trap. Four different pathways to address the competency trap are highlighted. This emphasizes the need for more contextual based research at multiple levels of analysis to understand established entrepreneurial firms' transition into sustainable entrepreneurship ventures.

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In the name of ALLAH, the most Beneficent, the most Merciful.

“Ya Allah let this thesis speak for me and not against me in akhirat”

Abu Hurairah narrated that the Messenger of Allah (pbuh) said :

"Whoever is not grateful to the people , he is not grateful to Allah "

(Jami` at-Tirmidhi 1954; Book 27, Hadith 60)

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DEDICATION

Arif: “Dad, do dragons really exist?”

Me: “They are mythical creatures, they don’t exist.”

Arif: “Of course they do, if not there would be no pictures or stories about them. Well what about dinosaurs? They existed.”

I dedicate this thesis to

My parents, Abah Z and Mama F for everything,

My wife, Gee and kids, Arif, Raina, Nashrah and Arissa for their continuous understanding, support, motivation and patience; and

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CHAPTER 1: INTRODUCTION

1.1 Introduction

Developing countries are the most vulnerable to climate change impacts because they have fewer resources to adapt: socially, technologically and financially (United Nations Framework Convention on Climate Change, (2007:5).

The overarching frame of this research is climate change mitigation efforts in developing countries. Today, the global community is confronted with various environmental challenges (e.g. floods, drought and violent weather changes) related to the environment and climate change. Analysis by the Organisation for Economic Co-operation and development (OECD) (2009) shows that ambitious policy action is needed to address climate change and suggests that inaction could incur greater future costs to both the economy and the environment.

As a result, many countries are promoting sustainable development initiatives. In addition, numerous academics in sustainability and climate change are considering the concept of sustainable entrepreneurship and are suggesting it is part of the solution for the troubles caused by climate change (Hall, Daneke, and Lenox, 2010). The aim of this research is to explore and understand the conditions and the policies that will facilitate sustainable entrepreneurship activity among established entrepreneurial firms. It does so by focusing on the context of an alternative financing scheme for climate mitigation in Malaysia: the green technology financing scheme (GTFS).

1.2 Research Context: GTFS in Malaysia

In 1972, Edward Lorenz presented a paper entitled “Predictability: Does the Flap of a Butterfly’s Wings in Brazil set off a Tornado in Texas?” wherein he articulated how small errors in weather prediction could bring disastrous results (Lorenz, 2001). Here the research aligns itself with this view that the global environment is interconnected: undeniably no country stands alone against climate change issues.

Climate change represents an extraordinary challenge to policy making (Gough, 2011). This in turn requires extraordinary solutions therefore policy makers need to be innovative in their initiatives and policy prescriptions (Gough, 2011).

One of the most significant international environmental initiatives is the Kyoto Protocol. According to the United Nations Framework Convention on Climate Change (UNFCCC) (2011) the major feature of the Kyoto Protocol is that it sets and commits developed countries (37 industrialized countries and the European Community) to binding targets for reducing greenhouse gas (GHG) emissions. Under the principle of “common but differentiated responsibilities” (United Nations, 1992:1), the protocol places a heavier burden on developed nations. In respect of these, there has been a flurry of activities and environmental initiatives by national governments (OECD, 2009) (e.g. infrastructure for electric and hybrid cars). Here, York and Venkataraman (2010) assert that environmental degradation is often too serious for most conservation practices alone to solve.

To further our understanding of climate mitigation in a developing country context, the research selected Malaysia as the setting for the case study.

Malaysia gained independence in 1957 from Great Britain, and whilst it was formerly an agriculture based economy it slowly transformed into an industrial nation with a GDP growth of 6.2% per annum since 1970. Setting its sights to evolved into an advanced economy by 2020, Malaysia aims to achieve this target in a “resilient, low-carbon, resource-efficient, and socially-inclusive manner” (Malaysia Economic Planning Unit, 2015:6-2).

Malaysia is similar to many other developing countries in terms of GDP as outlined in the World Banks economic outlook report 2014. However, it is one of the developing countries to pledge to reduce its’ carbon reduction in Conference of Parties (COP) 15 in Copenhagen. The pledge in 2009 by the Hon. Prime Minister of Malaysia was to reduce Malaysia’s carbon intensity by 40% against the business as usual (BAU)¹ levels of 2005 by the year 2020 upon the assistance of ANNEX I

¹ Business as usual (BAU) levels is the level of carbon emissions without taking any intervention or mitigation initiatives.

countries²(United Nations Framework Convention on Climate Change, 2014)

Another reason Malaysia was selected is because, according to the World Bank and the United Nations, Malaysia can be considered a role model for other developing nations³⁴. As the world turns its focus towards climate change mitigation, Malaysia might be well-placed to again function as a role model for other developing nations. Indeed, to that end the Malaysian government has put various initiatives and policy prescription into place (e.g. National Climate Policy, 2009, Feed in-Tariff Act 2011 etc.)

The Malaysian National Green Technology Policy was envisioned as a mechanism to support this voluntary pledge. This resonates with Kivimaa and Mickwitz (2006) which outlined a role of integrating environmental policy with innovation and technology policy to achieve environmental goals. They suggest that by integrating environmental objectives into innovation and technology policies, both the

² According to the Kyoto Protocol, ANNEX I countries are classified as industrialized countries and countries in transition.

http://unfccc.int/parties_and_observers/items/2704.php

³ <http://blogs.worldbank.org/eastasiapacific/malaysia-developing-nation-development-partner>

⁴ http://www.wider.unu.edu/research/projects-by-theme/development-and-finance/en_GB/country-role-models/

negative effects of new technology development could be forecasted and together bring about sustainable economic development.

According to policy documents from UNFCCC (2013)⁵, financing remains one of the key challenges for climate mitigation in developing countries. Currently, climate mitigation in developing countries is financed by funds from developed countries through UNFCCC programs such as Global Environmental Fund (GEF)⁶ and Clean Development Mechanism (CDM)⁷. In terms of the amount needed for climate mitigation and adaptation, in the Asia Pacific region alone it is estimated to be “*US\$500-800 billion for climate change mitigation and renewable energy*” (United Nations Environment Programme, 2015:6). Specifically in the Asia Pacific region there are also national green financing initiatives such as enCON (energy conservation) fund in Thailand, while in China, Bangladesh, Indonesia these green financing

⁵ https://unfccc.int/files/cooperation_and_support/financial_mechanism/standing_committee/application/pdf/climate_pb_11.pdf

⁶ http://unfccc.int/cooperation_support/financial_mechanism/guidance/items/3655.php

⁷ http://unfccc.int/kyoto_protocol/mechanisms/clean_development_mechanism/items/2718.php

initiatives are spearheaded by state owned banks (United Nations Environment Programme, 2015).

Taking into consideration of these financing challenges, under the National Green Technology Policy, one of the key initiatives under this policy is a RM3.5 billion⁸ (GBP 700 million) alternative financing scheme known as the Green Technology Financing Scheme (GTFS) launched by the Government in 2010 to encourage participation in green technology-related business.

This fund provides alternative financing to firms that supply and utilize green technology. According to the National Green Technology Policy, the basic definition of green technology is technology that will reduce environmental degradation. Under the GTFS, for green technology producers (e.g. renewable energy producers), the maximum available financing is RM50 million, with consumer firms (e.g. energy efficiency) capped at RM10 million. Under the scheme the Government bears 2% of the total interest rate charged, and provides a guarantee on 60% of the loan.

Four sectors are eligible to receive GTFS financing: energy, water and waste management, transportation, and building and townships. The qualifying criteria according to the GTFS for these ventures are to:

⁸ The initial amount was RM1.5 billion but an additional RM2.0 billion was subsequently added.

minimise degradation of the environment; produce zero or low greenhouse gas emissions; be safe to use; promote a healthy and improved environment for inhabitants; conserve the use of energy and natural resources; and promote the use of renewable energy resources. (Malaysian Green Technology Corporation, 2012)

To acquire GTFS funding there are two phases of evaluation. The first is the technical evaluation conducted by technical experts appointed by the programme administrator. The first phase of evaluation also includes a business presentation review, akin to a pitching session where the entrepreneurial firm presents to a panel of bankers their projects. An entrepreneurial firm that fulfils the criteria in both of these phases of evaluation will be awarded a GTFS certificate, and is eligible to progress its GTFS application. The second phase of evaluation is when entrepreneurial firms apply for project finance. The process is managed by the financial institutions and they decide upon financing decisions. If rejected at this stage the entrepreneurs can also apply for a final pitching session with the banks through the program administrators.

However the GTFS also faces challenges. In a cross-country study by Beck, Demirgüç-Kunt, Laeven, and Maksimovic (2006), on determinants of financing obstacles indicates that financing obstacles in Malaysia are low, which means access to financing in the country is above average compared to world benchmarks. However, in the case of green technology, a recent study from Malaysia by Tan, Ang, Chung and Pek (2013) suggests that in general, renewable or green energy projects face difficulty to acquire financing and bank loans because of the high risk involved. According to them this difficulty is attributed to the lack of technical knowledge among the financiers to evaluate this high risk ventures. These

studies suggest there are contextual differences between access to regular project finance and the green technology-financing environment in Malaysia.

In order to address such issues, the GTFS has put in place technical evaluation mechanisms, government guarantees and interest rebates (Hansen and Nygaard, 2014; Wong, Ngadi, Abdullah, and Inuwa, 2015). However despite these efforts, access to the funds has been “slow and restrictive” (Maulud and Saidi, 2012:91). Moreover, it appears the firms experiencing difficulty accessing green technology financing are not simply nascent entrepreneurs but include well established entrepreneurial firms.

In relation to this problem, a detailed exploration of the GTFS scheme could provide key insights into the interplay between government, banks and sustainable entrepreneurs in climate change mitigation initiatives. Especially in other “bank-oriented countries” (Vanacker & Manigart, 2008:58) in the developing world. As it is the role of banks as financial intermediaries in the Asia-Pacific region is dominant compared to the US and Europe (UENEP,2015), here the lessons learned from the GTFS can be disseminated to be shared with other countries in the region to contribute to the region’s financial and capital markets to fulfil the financing needs of sustainable development. Furthermore, by focusing on established

entrepreneurial firms transitioning into the green technology space, it is in line with current global developments on climate mitigation with initiatives such as the RE100⁹ whose focus is on established firms.

Therefore research on established entrepreneurial firms within the GTFS scheme may enable a better understanding of the challenges faced by green technology firms attempting to finance sustainable entrepreneurship ventures specifically in developing countries with similar context as Malaysia. While the findings (e.g. bank knowledge asymmetry) can also provide insights for other developing countries that are “bank-oriented countries” (Vanacker & Manigart, 2008:58) in financing climate change mitigation.

1.3 Research Background

There are various definitions and terminologies associated with the concept of sustainable development and sustainable entrepreneurship (Dean and McMullen, 2007; Shepherd and Patzelt, 2011). In this research, sustainable development is defined according to the World Commission on Environment

⁹ The RE100 is made up of global established firms that have given their commitment to reduce their carbon footprint.

<http://there100.org/>

and Development also known as the Brundtland Report, whereby

sustainable development is to ensure that development meets the needs of the present without compromising the ability of future generations to meet their own needs.(United Nations, 1987:16)

The concept of sustainable entrepreneurship is defined by Dean and McMullen (2007:58) as

the process of discovering, evaluating, and exploiting economic opportunities that are present in market failures which detract from sustainability, including those that are environmentally relevant.

This definition is further elaborated according to Linnanen's (2002) typology of sustainable entrepreneurship (Please see section 2.2.2).

There are numerous sustainability initiatives by governments all over the world to address climate change challenges (i.e. carbon emissions). For example, governments are investing in green technology such as energy efficiency, renewable energy, low-carbon transport and energy systems, and research and development on green technology (OECD,2009). According to (United Nations Framework Convention on Climate Change,2007b) the estimated financing needed to mitigate the effects of climate change in 2030 will be around \$220 billion per annum by 2030 and this is projected to rise. This estimate is based only on mitigation and not adaptation figures.

The emphasis on climate change mitigation and large sums of money targeted towards such initiatives presents opportunities for entrepreneurs, and such opportunities are inherent to market failure (Cohen and Winn, 2007; Dean and McMullen, 2007). Indeed environmental degradation is considered to be a market failure in environmental economics (Dean and

McMullen, 2007). In this context, market failure would cause externalities such as pollution. The synthesis of both entrepreneurship and environmental degradation shows that the common denominator is market failure, which offers opportunities for the entrepreneur to generate profit at the same time solving environmental degradation (Dean and McMullen 2007). These two interconnected outcomes suggest sustainable entrepreneurship activity offers a win-win in terms of innovation, creativity, positive financial and environmental outcomes.

To understand venture creation in the context of sustainable entrepreneurship is especially critical (Hall et al., 2010; Shepherd and Patzelt, 2011) due to the adverse effects of climate change (Stern, 2008) and the need to mitigate these effects under high levels of uncertainty (York and Venkataraman, 2010). Therefore this research seeks to address the call by Hall et al. (2010) to explore and understand the conditions and policies under which sustainable entrepreneurship will thrive.

Established entrepreneurial firms transitioning to sustainable entrepreneurship will face financing difficulties. This is suggested by York and Venkataraman (2010) as they argued that established entrepreneurial firms will have difficulties embarking on sustainable entrepreneurship ventures due to organizational inertia. Hockerts and Wüstenhagen (2010) support this suggestion, however, they assert that once established entrepreneurial firms have decided on sustainable entrepreneurship ventures, they will outpace nascent firms because of their "superior market power", "financial resources" and "process innovation capabilities" (pg.487). In support of

Hockerts and Wüstenhagen (2010), studies in entrepreneurship financing have highlighted that established entrepreneurial firms will more easily acquire financing because of their excellent track record and experience (Colombo & Grilli, 2006; Parker, 2013; Rasmussen & Sørheim, 2012; T. Vanacker, Manigart, & Meuleman, 2014).

To shed light onto this financing quagmire which is represented in the GTFS, it is useful to consider a study by Cassar (2004) that suggests the root cause may be contextual differences between sector financing requirements. Parrish (2010:521) suggests there is a need for “distinct competencies” to overcome organizing tensions (e.g. financing) in sustainable entrepreneurship ventures. The organizing tension alludes to a new skill set for designing sustainable entrepreneurship ventures. Worthington and Patton (2005) also argues the need for new competencies in the context of established entrepreneurial firms in transiting from conventional to sustainable based ventures to gain competitive advantage. Taken together this seems to point to a contextual difference in financing requirements. The contextual difference stems from the different type of business that the established entrepreneurial firms were involved before this (e.g. retail to manufacturing of green technology products) which entails a different set of competencies. Understanding how these competencies are developed within specific context will contribute to the knowledge base on the conditions and policies for sustainable entrepreneurship to thrive from a competency based approach.

Thus, this research builds upon an emerging stream of literature on evolutionary entrepreneurial competencies

development (Ahuja and Katila, 2004; Rasmussen, Mosey, and Wright, 2011; Rasmussen et al., 2014) to understand the development of entrepreneurial competencies for established entrepreneurial firms to acquire green technology financing in Malaysia.

1.4 Research aims

The research aims to explore and understand the conditions and policies which enable established entrepreneurial firms to acquire green technology financing in the GTFS context. Here, the research focuses on the early years of the fund (2010-2015). As the research is exploratory in nature, the definition of established entrepreneurial firms in this research is broad.

Therefore for the purposes of this doctoral research, the following definition of established entrepreneurial firms is given: In the context of Malaysia an established entrepreneurial firms are understood to be firms that have been established by experienced entrepreneurs or experienced entrepreneurial teams and are in business for more than three years (Hall, G and Wahab,K.A., 2007) and continue to place the pursuit of new entrepreneurial opportunities (Shane & Venkataraman, 2000) at the heart of their operations. This pursuit of new opportunities might be in the form of a new venture.

Such established firms would be expected to have accumulated sufficient entrepreneurial competencies (Autio et al, 2000) so as to be able to acquire financing (Brinckmann, Salomo, & Gemuenden, 2009). However as discussed in section 1.2, being an “established entrepreneurial firm” is

necessary but not sufficient to acquire government guaranteed funds from banks.

Therefore the research question asks “How do established entrepreneurial firms develop the entrepreneurial competencies necessary to acquire green technology financing in the GTFS context?” This research question has been divided into three sub-questions.

- (i) How does the GTFS context influence the deployment of competencies by established entrepreneurial firms?
- (ii) What entrepreneurial competencies are necessary for established entrepreneurial firms to acquire green technology financing in this context?
- (iii) How are these competencies developed?

1.5 Motivation

The motivations for the research are four-fold.

- (i) Sustainable development is said to be the most prominent topic of our time (Shepherd and Patzelt, 2011). In relation to this, sustainable entrepreneurship activity is one part of the solution for climate change (Hall et al., 2010). Examining and understanding the conditions and policies facilitating and/or hindering sustainable entrepreneurship, will help to expand our knowledge of this emerging field.
- (ii) Financing is critical for any new ventures (Colombo and Grilli, 2006; Van Auken, 2001). Therefore to increase the scope of sustainable entrepreneurship

ventures, a deeper understanding of how financing is acquired in various contexts is vital.

- (iii) Like other developing countries, Malaysia aspires to be a developed nation, however with the effects of climate change becoming more prevalent, there is need to mitigate climate change globally and locally. Therefore, this research aims to share its findings for use by other developing nations.
- (iv) Finally, it aims to explore the application of the evolutionary entrepreneurial competency framework (Rasmussen et al., 2011, 2014) in another context. Doing so will expand our understanding of competency development (i.e. in green technology financing context).

1.6 Methodology

Employing a qualitative approach, the research utilised a multiple case study research strategy which comprised of six cases studies of established entrepreneurial firms in the GTFS setting. To support these six case studies, additional data was collected from GTFS programme administrators, banks and consultants. The qualitative data collected included interviews, document collection and non-participant observations. The data analysis was guided by Miles and Huberman's (1994) steps for qualitative data analysis.

1.7 Key findings

The research has identified three key findings as detailed below.

1.7.1 Financing Competence Gap

The first key finding answers the first sub-question, "How does the GTFS context influence the deployment of competencies by established entrepreneurial firms?"

The research has identified a "financing competence gap" as one of the manifestations of the GTFS context. The financing competence gap consists of three elements: the different financing priorities of the stakeholders, bank knowledge asymmetry and financial criteria for green technology. In addition to this three elements there are two other interlinked GTFS contextual influence: (i) perceived ease of acquiring finance and (ii) the competency trap. These two effects have a high degree of influence to certain established entrepreneurial firms. The perceived ease of acquiring finance influences the deployment of competencies by giving the impression that to

acquire green technology financing is easy, which leads the established entrepreneurial firms to deploy under-developed competencies to acquire green technology financing, ultimately leading them to a competency trap. Being caught in the competency trap hinders the development of the necessary competencies to acquire financing.

1.7.2 Entrepreneurial Competencies

The second key finding answers the second sub-question, "What entrepreneurial competencies are necessary for established entrepreneurial firms to acquire green technology financing in this context?"

The research draws on entrepreneurial competencies based on Parrish's (2010) and Worthington and Patton's (2005) suggestion that "distinct competencies" are necessary for sustainable entrepreneurship ventures. The concept of entrepreneurial competencies is also taken as a means of explaining the differences between York and Venkataraman (2010) and Hockerts and Wüstenhagen (2010) on established entrepreneurial firms embarking on sustainable entrepreneurship ventures.

Following Rasmussen's et al. (2011, 2014) evolutionary entrepreneurial competency framework, the research has identified two sets of entrepreneurial competencies necessary to acquire financing. The first is "opportunity refinement competencies" and the second is "resource acquisition competencies".

1.7.3 Competency development path

The third key finding addresses the third sub-question, "How are these competencies developed?"

The established entrepreneurial firms possess existing entrepreneurial competencies that have proven relevant in achieving previous business success. However, they are entering into a new environment (i.e. a new financing context). Therefore instead of a need to develop new “distinct competencies” (Parrish, 2010:521), there is a need to reconfigure (Karim and Mitchell, 2000) the existing competencies to “distinct competencies” in order to make the sustainable entrepreneurship venture a success.

The previous financing and business experience makes up the existing path of the established entrepreneurial firms. This existing path will influence the ability of those firms to fully reconfigure their existing entrepreneurial competencies. This is because their existing path has a causal relationship with the competency trap (Liu, 2006). Therefore, depending on either their existing path or exogenous intervention (or shocks), the established entrepreneurial firms will either remain in the competency trap or develop new pathways to reconfigure their existing entrepreneurial competencies to acquire green technology financing. The research has identified these four pathways and has listed them in Table 1.

Table 1 Pathways and competency trap (from the researcher)

Pathways	Competency trap
Entrapped	Remained in the competency trap
Diverted	Diverted from the competency trap with external resources and acquired financing from other sources
Escaped	Escaped the competency trap with external resources to acquire GTFS financing
Evaded	Evaded the competency trap with external resources to acquire GTFS financing.

1.8 Research Contribution

This research offers the following contributions to theory and practice.

The research contributes primarily to the nascent sustainable entrepreneurship literature by answering Hall et al.'s (2010) call to unpack the conditions and policies under which sustainable entrepreneurs are able to pursue sustainable entrepreneurship ventures. This research does so in the context of the GTFS by focusing on established entrepreneurial firms (Hockerts and Wüstenhagen, 2010; York and Venkataraman, 2010) transition to sustainable entrepreneurship ventures (Worthington and Patton, 2005).

Here, the research proposes that established entrepreneurial firms ability to acquire green technology financing, is contingent on their ability to reconfigure their existing competencies into "distinct competencies" according to green technology financing under the conditions of a competency trap.

Secondly, the research extends our knowledge on the influence of context on competency development (Barney et al., 2011; Rasmussen et al., 2014; Zahra and Wright, 2011). This in turn adds on the existing knowledge on competency development for sustainable entrepreneurs (Parrish, 2010; Worthington & Patton, 2005). Under the GTFS context, the research has observed the variation in financing performance of established entrepreneurial firms. The variation of their financing performance is due to certain contextual factors that effects and influences on certain established entrepreneurial

firms more than the rest. However this might be limited to the Malaysia/ GTFS context only.

The research also contributes to the entrepreneurial competencies literature by extending Rasmussen et al.'s (2011,2014) evolutionary competency framework to a different context: established entrepreneurial firms in a developing country. This furthers the utility of the framework and highlights the contextual difference influencing competency development in the form of a financing competence gap.

The research also identifies multiple pathways to develop the necessary entrepreneurial competencies to acquire financing, consistent with Eisenhardt and Martin (2000) conceptualisation of equifinality in competency development (Eisenhardt and Martin, 2000). From these multiple pathways the research has also illustrated that through path breaking strategies the environmental context (i.e. alternative financing) can be changed and that the chosen route and speed of reconfiguration influences competency development and the acquisition of green technology financing.

Finally, the research contributes practical insights that are useful as a basis of a full review of GTFS by suggesting the need for a focus on entrepreneurial competency development for both the entrepreneurs and the bankers.

1.9 Structure of the thesis

The thesis is divided into seven chapters. The second chapter gives a review of the relevant academic literature. The literature review begins with a general overview of the entrepreneurship literature followed by a section on sustainable entrepreneurship. The review highlights the synergistic value of the field of entrepreneurship within the sustainability domain and secondly covers the current discussions in this underdeveloped sub-field (Cohen and Winn, 2007; Dean and McMullen, 2007; Shepherd and Patzelt, 2011). Among the key questions posed is an enquiry into the conditions and the policies that are useful for propagating sustainable entrepreneurship (J. K. Hall et al., 2010). In relation to this, one of the opportunities that the research points to is the intersection between sustainable entrepreneurship and financing. The review of the financing literature reveals that technology financing and green technology financing are almost similar during nascent stage. This can be explained because of the usage of technology as a main component for these ventures.

Chapter two also integrates the literature on sustainable entrepreneurship and entrepreneurship financing revealing contradictions between and across these streams of literature. The literature review then introduces the theoretical lens to be utilised, starting with a review of the Resource Based View (RBV), followed by the corporate entrepreneurship literature before delving into the entrepreneurial competencies literature and the evolutionary entrepreneurial competency framework (Rasmussen et al., 2011, 2014) which is explained as the framework for this research.

Chapter three discusses the research methodology of the study. A qualitative approach was adopted for the research. The chapter also discusses the research design and justification for choosing the case study research strategy, determining the unit of analysis, the process of case selection, and issues of reliability and validity within qualitative research. The data collection strategy and the research tools used (e.g. semi-structured interviews, observation, documentation) to generate the data are explained. Ethical considerations and a section on researcher reflexivity are followed by an illustration of the data analysis method.

Chapter four introduces the GTFS context and the cases. The first section of this chapter gives an account of the financing mechanism of the GTFS from the perspective of the program administrators, bankers etc. The next section introduces the cases and their GTFS financing. The last two sections in the chapter summarises the cases and analysis.

Chapter five of the thesis presents the cross –case analysis and the findings of the analysis. In the first section it gives an overview of the cross-case analysis, and followed by a description of the findings. This shows evidence of the financing competence gap and its myriad complexities, comprising the multiple stakeholder financing priorities, bank knowledge asymmetry, green technology financing criteria and the contextual influence of the GTFS. Next, the findings chapter highlights the necessary entrepreneurial competencies needed to acquire financing and followed by the development paths based on the evolutionary competency framework.

In chapter six, the findings are discussed in light of existing literature. This leads to a discussion of the proposed

contribution of the research. The main contribution of the research answers Hall et al.'s (2010) question about identifying what conditions and policies are necessary for sustainable entrepreneurship to thrive. The second is about the financing competency gap and the competency development. Next is the equifinality of the competency development paths, which suggests there is no single definite way to develop the entrepreneurial competencies that are necessary for established entrepreneurial firms to acquire green technology financing.

Chapter seven concludes the thesis by summarizing the key findings and contributions including the policy recommendations, research limitations and finally lists suggestions for further research opportunities.

CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

The aim of this chapter is to review the concept of sustainable entrepreneurship and unpack the fundamental issues underpinning this concept. The chapter also seeks to explain the suitability of entrepreneurial competencies as the theoretical lens for the research. The section begins with the literature on sustainable entrepreneurship. This is followed by the literature on entrepreneurship financing in order to explore and highlight the contextual similarities and dissimilarities between technology financing and green technology financing. The last section discusses the Resource Based View and entrepreneurial competencies literature. A chapter summary and conclusion is provided.

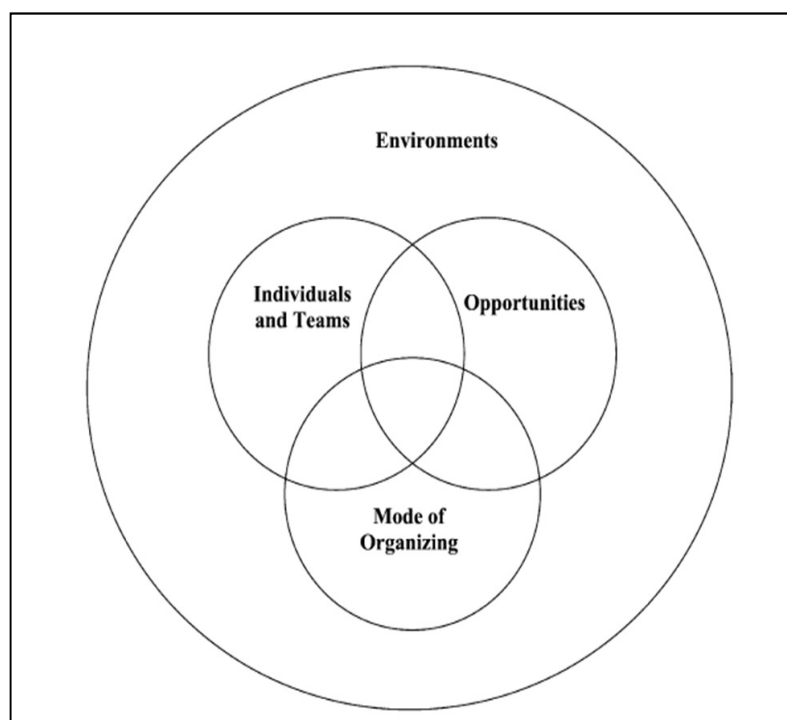
2.2 Entrepreneurship and Sustainable Entrepreneurship

The literature review begins by detailing seminal and contemporary articles in the field of entrepreneurship. This provides a definition of entrepreneurship, outlines the core of entrepreneurship research as being the study of opportunity exploitation, and details the legitimacy now attributed to the field of entrepreneurship. Subsequently, this review discusses the relationship between entrepreneurship and sustainable development. The research then expands the review further with a discussion of sustainable entrepreneurship specifically guided by the literature review in Hall, Daneke, & Lenox (2010).

The field of entrepreneurship primarily sits at a “nexus of interlocking opportunities, enterprising individuals or teams, and mode of action within the overall context of dynamic environments” (Busenitz et al., 2003:28). This is depicted in Figure 1.

In their seminal article, ‘The Promise’, Shane and Venkataraman (2000) outline three reasons why there is a need to study entrepreneurship. Firstly, they argue that through entrepreneurship, technical information can be converted into products and services. Secondly, through entrepreneurship market failures are discovered and can be mitigated. Finally, entrepreneurship drives innovation in products and processes and can be viewed as the engine driving the process of change.

Figure 1 Conceptual domain of entrepreneurship as a field (adapted from Busenitz et.al, 2003:297)



However the study of entrepreneurship has not been without difficulties. Generally the literature reviewed argues that an agreed definition of entrepreneurship among scholars is missing (Busenitz et al., 2003; Low, 2001; Shane and Venkataraman, 2000; Ucbasaran, Westhead, and Wright, 2001). Furthermore it suggests that data is difficult to obtain, theory is underdeveloped and there is a tendency for findings to be similar to other fields of research (e.g. strategy) (Shane and Venkataraman, 2000). This is not surprising because the field of entrepreneurship is multi-disciplinary in nature and have applied various popular theories to the study of entrepreneurship phenomena (Zahra, 2007).

More recently, entrepreneurship has been firmly recognised as a legitimate research field (Shepherd, 2015; Zahra and Wright, 2011). However, having achieved this legitimacy,

Shepherd (2015) reminds us of a need for entrepreneurship to prepare itself for threats and new opportunities to the field, including grand societal challenges such as climate change (Shepherd and Patzelt, 2011).

In light of this opportunity it is argued that the field of entrepreneurship has a pivotal role to play in climate change mitigation by developing new and innovative business applications for the future (Cohen and Winn, 2007; Dean and McMullen, 2007; Hall et al., 2010; Shepherd and Patzelt, 2011). According to Hall et al. (2010), there are numerous calls by scholars in sustainable development and climate change who look to entrepreneurship as a means to contribute solutions to environmental degradation. Taken together, this call has manifested itself as the emerging sub-field of sustainable entrepreneurship (Cohen and Winn, 2007; Dean and McMullen, 2007; Hall et al., 2010; Shepherd and Patzelt, 2011).

Sustainable entrepreneurship is a concept that champions entrepreneurship as a means to help to resolve environmental degradation and generate profit from it (Dean and McMullen, 2007; Hall et al., 2010; Parrish, 2010), while also merging the various "social value" topics in relation to entrepreneurship (e.g. social entrepreneurship, environmental entrepreneurship) into one (Hockerts and Wüstenhagen, 2010). There are numerous definitions and terminologies for sustainable entrepreneurship, however, in sum sustainable entrepreneurship is about the reconfiguration of economic, social and environmental to a new value chain (Hockerts and Wüstenhagen, 2010) by infusing innovation, creativity (Kivimaa and Mickwitz, 2006) and creating new ventures to

solve the uncertainty surrounding environmental degradation (York and Venkataraman, 2010). These kind of integrated views are beginning to appear and adopted, this is evident from more recent studies (Hockerts and Wüstenhagen, 2010).

A key review paper in this area of research is Hall, Daneke, & Lenox (2010) as it summarises extant sustainable entrepreneurship contributions whilst also detailing future research directions. In their assessment, Hall and colleagues (2010) highlighted the importance of sustainable entrepreneurship as part of the solution to solve sustainability issues (e.g. climate change) which they have coined as the "panacea hypothesis" (Thompson, Kiefer, & York, 2011). They do admit that this hypothesis is idealistic (Hall & Wagner, 2012). Here they suggest that sustainable entrepreneurs are individuals and firms that through their core business enable both environmental and social progress (Schaltegger, Lu deke-Freund, & Hansen, 2016). However the business case for of these entrepreneurial ventures is still important for the survival of those ventures (Majid & Koe, 2012).

According to Hall and colleagues (2010) the area of sustainable entrepreneurship is still nascent but its importance for helping to tackle some of the pressing sustainability challenges of our times makes it critical. However other than its apparent appeal, there is still much to be understood about on the nature of sustainable entrepreneurship (Hall et al. 2010). Hall et al. (2010) also notes that there are still major gaps on how the process of sustainable entrepreneurship will unfold as they argued below,

we have little understanding of how entrepreneurs will discover and develop these opportunities that lay beyond the pull of existing markets (Hall, Daneke and Lenox, 2010: 439)

This paper highlights the central gaps in the sustainable entrepreneurship literature by outlining the future direction of sustainable entrepreneurship. Here Hall et al. (2010) poses five fundamental questions. The first is “under what conditions do we expect to see entrepreneurial ventures rather than incumbent firms provide sustainable products and services?” The second is “under what conditions do we expect to see entrepreneurs pursue sustainable ventures?” The third is “under what conditions can entrepreneurship simultaneously create economic growth, while advancing social and environmental objectives?” The fourth, related to the last question, under what conditions is entrepreneurship welfare-creating versus welfare-destroying, especially once all externalities are factored in?” Finally the fifth “under what conditions does public policy positively influences the incidence of sustainable entrepreneurship?”

According to Cohen and Winn (2007:31) there are “four types of market imperfections, (i.e., inefficient firms, externalities, flawed pricing mechanisms and information asymmetries) contributing to environmental degradation.” These market imperfections present numerous opportunities for entrepreneurs and the economy for example innovation in new technologies, business applications, and new job creation (Cohen and Winn, 2007; Dean and McMullen, 2007; Shepherd and Patzelt, 2011).

Sustainable entrepreneurs who are able to identify these numerous opportunities (Cohen and Winn, 2007; Dean and

McMullen, 2007) will be able through specialised knowledge (Alvarez and Busenitz, 2001; Kuckertz and Wagner, 2010) and competencies (Parrish, 2010; Worthington and Patton, 2005) to exploit these opportunities (Shepherd and Patzelt, 2011) and fulfil the triple-bottom line (Elkington, 2004).

Drilling down to conceptualise the essence of sustainable entrepreneurs, Linnanen (2002) is able to suggest a typology of sustainable entrepreneurs as depicted in Figure 2.

Figure 2 Sustainable entrepreneurship typology (adopted from Linnanen, 2002:78)

<i>Desire to change the world</i>	<i>Desire to make money</i>	
	LOW	HIGH
	HIGH	LOW
	Non-profit business	Successful idealist
	Self-employer	Opportunist

Here Linnanen (2002) divides sustainable entrepreneurs into four categories. The first is the “self-employer”. Self-employers are described as people diverging from the capitalistic path. They are satisfied with a minimum income level to sustain a reasonable level of living and are identified as being involved in nature-orientated business. The second type is “non-profit business”; they are more interested in influencing society towards protecting the environment without the financial performance objectives. The third type is the “opportunist” that views sustainable entrepreneurship ventures purely on economic consideration with a tendency to be involved in environmental technology. The last one is the successful idealist; they aspire to strike a balance between pursuing high financial growth and social and environmental considerations.

The idea that sustainable entrepreneurs have a definite role in climate mitigation has been well argued by scholars such as Cohen and Winn (2007); Dean and McMullen (2007); York and Venkataraman (2010) and Shepherd and Patzelt (2011), however is there a difference between sustainable entrepreneurs and conventional entrepreneurs? Parrish (2010) and Meek, Pacheco, and York (2010) seem to suggest there is a divergence between conventional entrepreneurship and sustainable entrepreneurship.

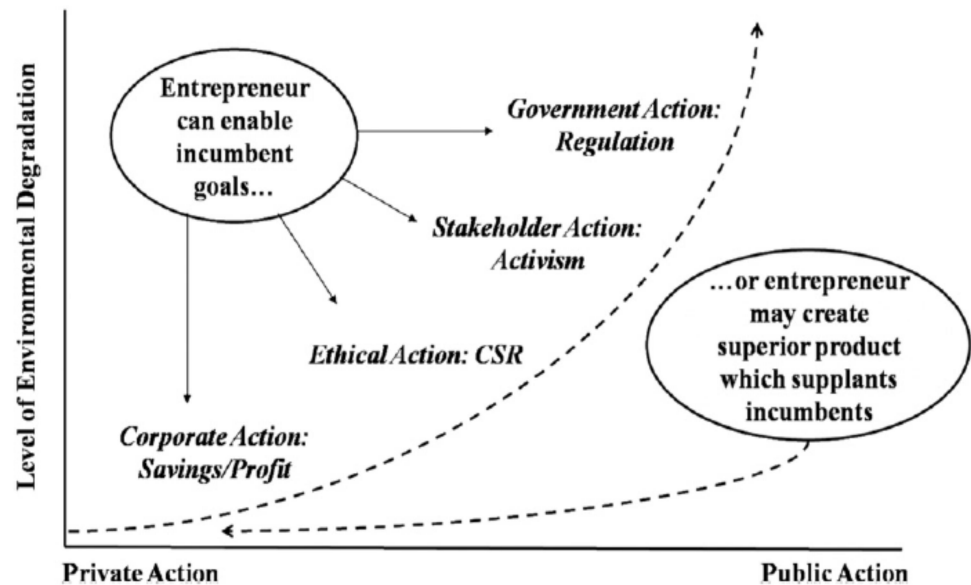
Alluding to this notion, Parrish (2010) suggests that the source of this divergence is based on the reason the enterprise is created. In his study he takes the assumption that sustainable entrepreneurs put more emphasis on preserving nature than maximizing profits (Choi and Gray, 2008; Muñoz and Dimov, 2014; Shepherd and Patzelt, 2011). Here he distinguishes sustainable entrepreneurs further by introducing a new type of reasoning; “perpetual reasoning” and “five principles of organisation design principles of resource perpetuation, benefit stacking, strategic satisficing, qualitative management, and worthy contribution” (pg.511). Parrish argues further that “distinct competencies” (pg.521) were needed to develop these design principles, maintain the original values and motives of the enterprise, and attain venture success.

Another viewpoint that contributes to this notion of divergence is from Meek et al. (2010), which asserts that homogeneity (DiMaggio and Powell, 1983) in certain societies will deter the creation of environmentally sustainable ventures. Therefore building on Parrish’s (2010) claim of divergence, sustainable entrepreneurship might be different from conventional entrepreneurship, and may be perceived as outliers in highly

conforming societies (Meek et al., 2010). Indeed this institutionalisation presents higher barriers for sustainable entrepreneurship (e.g. in financing), increasing the difficulty for entrepreneurs to exploit opportunities to address environmental challenges (Meek et al., 2010).

According to York and Venkataraman (2010:450) the efforts to address environmental degradation have generally gathered around four reasons: "1) governmental regulations and control (the visible hand), 2) stakeholder action (activism in the form of non-governmental organisations and consumers), 3) ethical motivation (corporate social responsibility), 4) competitive advantage (efficiency and wealth generation through environmental innovations)." Elaborating on the role of sustainable entrepreneurs to address these environmental challenges, York and Venkataraman (2010:449) outlines a framework for entrepreneurship to "complement regulation, corporate social responsibility and activism in resolving environmental problems." The main idea in the framework is for entrepreneurs to innovatively complement incumbent firms and institution to raise their effectiveness as depicted in Figure 3.

Figure 3 The opportunity space for sustainable entrepreneurship (adopted from York and Venkataraman, 2010:452)



York and Venkataraman further argued that for-profit and nascent entrepreneurs will be more suited to exploit these opportunities with incumbents or established entrepreneurial firms lagging behind because of their organizational inertia.

In an effort to conceptualize how sustainable entrepreneurship will thrive, Shepherd and Patzelt (2011) suggested the concept of feasibility and desirability to determine to act (or not to act) on sustainable entrepreneurship opportunities. Shepherd and Patzelt explain the concept of desirability centres around the notion of the motivation in preserving nature. While they define the concept of feasibility as the assessment of one's competencies to exploit an opportunity based on sustainability ideals. They suggest that to develop these competencies might be harder because of the need to integrate competencies on conventional business, and sustainability.

The idea of competencies development for established entrepreneurial firms to embark on sustainable entrepreneurship ventures had its origins in Hart's (1995) seminal article "Natural Resource Based View". Here he proposed that established entrepreneurial firms need to develop the competencies to adhere to environmental regulations to maintain competitive advantage. Worthington and Patton (2005) took this work further in looking at established entrepreneurial firms transitioning to sustainable entrepreneurship ventures. They pointed to a need for behavioural change or development of organizational competencies to follow the environmental path.

In an effort to further the understanding of the development of sustainable entrepreneurship ventures, Muñoz and Dimov (2014) propose two opportunity development pathways; the conformist and the insurgent. The conformist is someone who "operates in an enabling supporting context, characterised by dominance of supporting social context in the formulation of ideas, of value creation and an enabling business context in the deliberation of actions, and of intention and enabling business context in the pursuit of exchange relationships" (Muñoz and Dimov, 2014: 2). While the insurgent is someone whose "path operates against an establishment that is not conducive to sustainability ideals and is characterised by lack of explicit consideration of sustainability ideas and dominated by the absence of supportive social context in the deliberation of actions, and by intention and the absence of supporting context in the pursuit of exchange relationships" (Muñoz and Dimov, 2014: 3). Even though there is a stark difference between them, both of these conceptions suggest that

sustainability ideals are the main drivers of sustainability change.

Although the literature on sustainable entrepreneurship is emerging, there are contradictions. Even though most of the studies in sustainable entrepreneurship are on nascent entrepreneurs, one such contradiction is the question of established entrepreneurial firms venturing into sustainable entrepreneurship ventures. Hockerts and Wüstenhagen (2010) suggest that established entrepreneurial firms would be able to venture into sustainable ventures faster due to their superior resources (e.g. financial and human capital). York and Venkataraman (2010) suggest otherwise, pointing to an element of inertia or a competency trap (Levitt and March, 1988) making it difficult for established entrepreneurial firms to move into sustainable ventures. This contradiction has also manifested itself empirically in the context of established entrepreneurial firms trying to acquire green technology financing in the GTFS.

The contradictions indicate that there is a divergence in the way sustainable entrepreneurs need to run their business, which points to “distinct competencies” for sustainable entrepreneurship venture success (Hart, 1995; Parrish, 2010; Worthington and Patton, 2005). In this case what is missing is the development of these new competencies in the context of sustainable entrepreneurship in a developing country (Jamali and Mirshak, 2007).

Together these issues point to the direction of Hall et al.’s (2010) call to ask fundamental questions about research in sustainable entrepreneurship. This is the focus here: under what conditions and policies would sustainable

entrepreneurship thrive? Specifically, under what conditions would established entrepreneurial firms be able to acquire green technology financing in the context of the GTFS?

The next section will look at this question from the perspective of entrepreneurship financing,

2.3 Sustainable entrepreneurship and financing

In this second part of the literature review, the focus is turned to relevant articles on sustainable entrepreneurship and resource acquisition with a particular focus on financing. To fortify this discussion further, the research reviewed below is expanded to technology financing (focusing on green related technologies). The contextual differences from one industry to another industry are also explored in this part of the literature review. The articles selected are based on seminal articles on entrepreneurship financing and the articles discussed in section 2.2

One of the key resources required for venture creation and operation is financial capital (Brinckmann, Salomo, and Gemuenden, 2009; Cassar, 2004). The importance of entrepreneurship financing is all encompassing and cuts across various fields of operation. The significance of research on entrepreneurship financing has been given much attention over the years (Kuratko, 2006) with the traditional research focus being on the aspect of obtaining financing (Brinckmann et al., 2009).

Current literature on entrepreneurship financing suggest that one of the biggest obstacle to venture creation and growth is access to financial capital (Cassar, 2004; Colombo and Grilli, 2006; Kerr and Nanda, 2011; Van Auken, 2001; Zhang,

Souitaris, Soh, and Wong, 2008). Resolving financing constraints for entrepreneurs is an important agenda for policy makers worldwide (Kerr and Nanda, 2011). This is also reflected in the academic literature on entrepreneurship financing, with the topic of financing constraints being combined with policy components in them (e.g. Cassar, 2004; Kerr and Nanda, 2011; Van Auken, 2001), which resonate with the context of this research.

In a cross-country study by Beck, Demirgüç-Kunt, Laeven, and Maksimovic (2006) on determinants of financing obstacles, empirical data has shown that financing obstacles in Malaysia are low, which means access to financing in the country is above average in terms of world benchmarking. However, in the case of green technology, a recent study from Malaysia by Tan, Ang, Chung and Pek, (2013) suggests that in general, renewable or green energy projects face difficulty to acquire financing and bank loans because of the high risk involved. According to them this difficulty is because of the lack of technical knowledge among the financiers to evaluate this high risk ventures. This indicates some evidence of contextual difference in terms of the green technology financing environment in terms of evaluation.

In addressing these issues, the GTFS has put in place technical evaluation mechanisms, government guarantees and interest rebates (Hansen and Nygaard, 2014; Wong et al., 2015). However in spite of these efforts, the funds have been slow and restrictive (Maulud and Saidi, 2012). This dilemma has not only afflicted nascent entrepreneurs but also established entrepreneurial firms' acquisition of green technology financing.

This might be explained by building on Parrish's (2010) claim of divergence, in which sustainable entrepreneurship might be different from conventional entrepreneurship, and sustainable entrepreneurs may be perceived as outliers in highly conforming societies (Meek et al., 2010) as increasing the difficulty for entrepreneurs to exploit opportunities to address environmental challenges (Meek et al., 2010). This is also supported by Linnanen (2002) and Choi and Gray (2008) who argue that conventional and sustainable entrepreneurs are not on equal footing in respect of barriers to finance.

In an attempt to understand these financing challenges to sustainable entrepreneurship, this research studies whether the notion of financing requirements are specific according to sectors or context as suggested by Cassar (2004); if so, the question is what precisely is different? The research approaches this by reviewing the entrepreneurship financing literature on technology financing to discover dissimilarities with green technology financing.

The literature on technology financing, technology based firms (TBFs) and new technology based firms (NTBFs) is well documented (e.g. Van Auken, 2001, 2005; Westhead et.al, 1997; Westhead, et al., 2011). The benefits that technology-based firms bring to the development of the economy and their difficulty to acquire financing is also well researched. However there are arguments that the stakes for sustainable entrepreneurship compared to technology based firms are much higher with the spectre of climate change and its effects becoming more prevalent (Stern, 2008).

Looking at technology-based firms, according to Van Auken (2001:241) owners of technology-based firms face more

constraints due to “high risk, apprehension of investors, and the limited financial experience of the owner”, in other words insufficient financing skills. This concurs with Westhead et al.'s (1997) assertion that technology small firms will be viewed as a higher risk compared to small firms in general.

Potential investors especially traditional financial institutions like banks (Kerr and Nanda, 2011) will have difficulty in evaluating the feasibility and viability of new ventures, primarily because of the lack or no track record, and the seemingly high risk of the technology or products (Kerr and Nanda, 2011; Zhang et al., 2008). This is further compounded by the presence of information asymmetry (Westhead, Wright, and McElwee, 2011) between the potential investors and the entrepreneurs, especially for high- tech firms (Baum and Silverman, 2004; Van Auken, 2001; Zhang et al., 2008).

Studies by Praag, Wit, and Bosma (2005) and Colombo and Grilli (2006) provide yet more evidence of the existence of an information asymmetry between financiers and owners of small technology-based firms. According to Praag et al. (2005), the information asymmetry centres on unobservable and unverifiable information such as profit margins, technology feasibility. The risk to finance NTBFs is attributed to this information asymmetry (Westhead, Wright and McElwee, 2011).

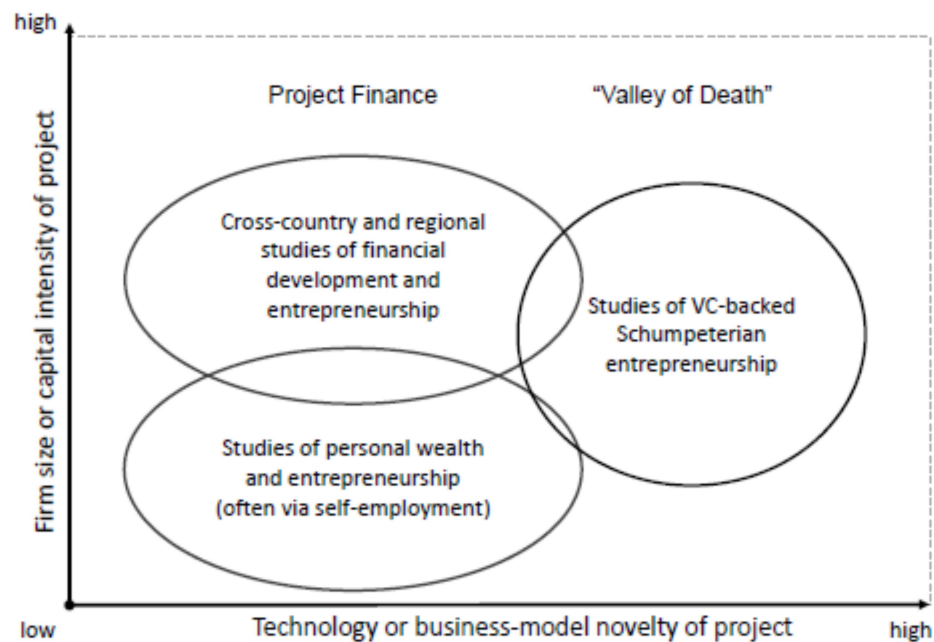
Van Auken (2005:95) argues that the risk of the firm is one of the most important contributing factors influencing both the “availability” and “potential sources of capital”. He suggests that the potential sources and the availability of financing will be lower if the risk of the firm is higher (Van Auken, 2005). Concerns about cash flow problems combined with limited

experience of raising capital by the owners of technology-based firms (Van Auken, 2001, 2005) contribute to magnify the risk.

Wiser and Pickle's (1998) research on financing investments in renewable energy suggest that policy will have implications on the risk of financing renewable energy. As an example a short feed in tariff contract will raise the risk of the renewable energy project. The other notion that Wiser and Pickle (1998) illustrated in their study is a supply side problem, with the renewable energy project risks were perceived as very high and that the financial community did not have the competencies (Meuleman, Amess, Wright et al., 2009) to evaluate renewable energy resource risks (e.g. wind, biomass). Looking at the supply side of financing, Bonnet and Wirtz (2012) suggest that rather than an information asymmetry problem the dilemma is a knowledge asymmetry between the banks and the entrepreneurs. Thus, even if the entrepreneur is telling the whole story the banks are not able to evaluate the facts because of the deep knowledge asymmetry. This corresponds to Meek et al.'s (2010) notion of institution as barriers in sustainable entrepreneurship ventures, in this case the financial institutions act as barriers.

These risks and the knowledge asymmetry inadvertently results in more costly financing compared to traditional generation sources (Wiser and Pickle, 1998). In a more recent study by Kerr and Nanda (2011), extremely capital-intensive and new technologies like clean energy projects (e.g. wind turbines, biofuel refineries) would lie in the top right-hand corner of Figure 4.

Figure 4 Two dimensional space for entering businesses (adopted from Kerr and Nanda, 2011:97)



Therefore in the case of entrepreneurship financing we can draw similarities between the barriers faced by sustainable entrepreneurship ventures and TBFs/NTBFs, such as high risk, low confidence of investors because of information and knowledge asymmetry, and the perceived inexperience of the entrepreneurs in financial management (Linnanen, 2002; Van Auken, 2001). Resembling TBFs/NTBFs, most sustainable entrepreneurship ventures also rely on technological innovations (e.g. renewable energy, water purification) to address environmental degradation which brings with it financing challenges. In light of these similarities, one might wonder if there is no difference between TBF/NTBF ventures and sustainable entrepreneurship technology financing.

However, the conclusion is based on nascent entrepreneurs; the context of this research is established entrepreneurial firms. In the case of established entrepreneurial firms, their

excellent track record and management are important aspects of financing which would suggest that obtaining financing would be easier for them (Baum and Silverman, 2004; Van Auken, 2001; Zhang et al., 2008). A recent study by Parker (2013) also suggests that based on established entrepreneurial firms' performance trajectory, financing risk to financial institutions would be less than expected even when they switch industries.

Further to this, the GTFS context might contribute to the financing differences because of the social and institutional context (Rasmussen et al., 2014). Research into this contextual difference corresponds to Zahra and Wright's (2011) suggestion of the importance to understand the contextual influences on the process of new venture creation and development. By gaining this understanding, will lead to better and accurate policies to support new (sustainable) entrepreneurship ventures.

These contradictions and contextual differences highlight a knowledge gap, not only on the financing differences but also to what kind of competencies (Parrish, 2010; Worthington and Patton, 2005) are necessary to acquire financing because of these differences? The GTFS mirrors these contradictions, with mixed success for established entrepreneurial firms in acquiring green technology financing. Therefore the GTFS context is fertile ground for answering Hall et al.'s (2010:445-446) fundamental questions, "under what conditions do we expect to see entrepreneurs pursue sustainable ventures?" and "under what conditions does public policy positively influence the incidence of sustainable entrepreneurship?"

In the next section, the research reviews the Resource Based View (RBV) as a potential theoretical lens to investigate these questions.

2.4 Resource Base View Theory (RBV)

In this third part of the literature review applicability of the RBV as the potential theoretical lens was explored. The idea of the RBV as the theoretical lens came about from the second part of literature review with the idea that to acquire financing in the context of the GTFS becomes a competitive advantage for firms.

Since Penrose's "Theory of the Growth of the Firm" publication in 1959, there has been a plethora of discussion pertaining to the relationship between RBV and the firm. However it was Barney (1991) that contrasted the difference of assumptions between Porter's firm competitive position and the RBV. Here, the key assumption of firm resource heterogeneity and immobility (Barney,1991;Wernerfelt,1984) defines the theoretical framework of the resource based view theory (RBV), which will result in the sustainable competitive advantage of the firm.

It is a manifestation of these assumptions which, according to Barney (1991), results in the firm resources being (i) valuable (rising of revenues or lowering of costs); (ii) rare (it is unique among firms in that market); inimitable (it cannot be copied); and (iv) non-substitutable (other resources do not provide the same functionality). The firm's resources are the fundamental elements of competitive advantage (Barney, 1991; Wernerfelt, 1984). Barney (1991:101) defines firm resources to include "all assets, capabilities, organisational processes, firm

attributes, and knowledge". He groups them into three main categories: "physical capital resources, human capital resources and organisational capital resources" (pg.101). This is also echoed by Mahoney and Pandian (1992) and Amit and Schoemaker (1993). Therefore, according to the RBV, a resource encompasses "anything which could be thought of as a strength or weakness of a given firm" (Wernerfelt, 1984: 192).

Over the years the RBV has evolved. In an effort to expand the RBV, Amit and Schoemaker (1993) introduced the concept of strategic industry factor at the industry level and strategic assets at the firm level, both of which are comprised of resource and capabilities. They also suggested and expanded the original attributes of valuable, rare, inimitable and non-substitutable to complementarity, scarcity, low tradability, inimitability, limited substitutability, appropriability, durability and overlap in strategic industry factors.

Mahoney and Pandian (1992) coined RBV as a useful conversation because it reconciled various strategic management literatures (e.g. Barney, Ketchen, and Wright, 2011; Wright and Marlow, 2012). One of the reasons for this is that, as Peteraf (1993) argues, RBV has explanatory powers as a corporate theory in terms of range diversification from related constrained and conglomerate form. This was further strengthened by Amit and Schoemaker (1993), who added behavioural decision-making biases and organisational implementation in the context of the firm's resources and capabilities, making RBV more robust. In further fortifying the argument for a RBV model for sustainable competitive advantage, Peteraf (1993), building on the two original key

assumptions of resource heterogeneity and immobility, proposed a RBV model with heterogeneity as the cornerstone of RBV while adding on two new elements which are ex-ante limits competition and ex-post limits competition.

As the potential theoretical lens for this research, RBV and entrepreneurship share the same unit of analysis which is the resources (Alvarez and Busenitz, 2001). The ability of acquiring resources and managing existing resource is by itself an important resource for entrepreneurial firms and is considered heterogeneous (Barney, 1991; Alvarez and Busenitz, 2001). This heterogeneity relates to the fact that in order to configure these resources to exploit these opportunities, it is the entrepreneurial specialist knowledge that gives them the competency to exploit these opportunities (Alvarez and Busenitz, 2001; Man, Lau, and Chan, 2002).

Therefore by adopting the RBV, the research would be able to identify the resources needed for established entrepreneurial firms to acquire green technology financing. This is further complemented by Wernerfelt's (1995) suggestion to look at resources in detail, with the notion that strategy should be based on differences between firms.

In assessing the RBV after 20 years, the critical question of where these resources originate from remains unanswered, that remains a major critique to the RBV (Barney et al., 2011; Wright and Marlow, 2012). Another source of criticism is the length of resource development, with the accepted norm that the development of resources is long-term, with the question of short and mid-term development of resources still not studied (Barney, 2001).

While adopting the RBV as the theoretical lens of the research would identify the resources needed to acquire green technology financing, it leaves, the question of origins of the resources unanswered. In light of the need to identify and understand the development of these resources in the context of the GTFS, the review now turns to the corporate entrepreneurship literature. This will be reviewed in the next section.

2.5 Corporate Entrepreneurship

According to Sharma and Chrisman (1999:18), "*Corporate entrepreneurship is the process whereby an individual or a group of individuals, in association with an existing organization, create a new organization or instigate renewal or innovation within that organization*". The creation of these new ventures will involve the creation of new competencies or improve existing ones and can shape better competitive strategies (Zahra, Nielsen, & Bogner, 1999). Corporate entrepreneurship takes various forms such as new internal businesses, corporate joint ventures, corporate and university spin-offs and start-ups by former employees (Phan, Wright, Ucbasaran, & Tan, 2009).

In order for corporate entrepreneurship to take place there are organizational antecedents that need to be fulfilled. This include rewards, top management support, resources, organizational boundaries and autonomy (Kuratko, Hornsby, & Goldsby, 2004). A recent significant development within the field of corporate entrepreneurship is the concept of strategic entrepreneurship. Strategic entrepreneurship concerns itself with the question on "*how do firms create and sustain a competitive advantage while simultaneously identifying and*

exploiting new opportunities?”(Hitt, Ireland, Sirmon, & Trahms, 2011:57). More and more strategic entrepreneurship has been viewed as a source for competitive advantage (Ireland, Covin, & Kuratko, 2009). According to Hitt and colleagues, there is a need for new competencies in order to embark on corporate entrepreneurship. This resonates with Zahra, Nielsen & Bogner (1999) that assert the need for competency development in corporate entrepreneurship in order for established entrepreneurial firms to be successful in their new ventures. This resonates with the context of the research, where the established entrepreneurial firms new ventures into the green space also requires new competencies (Worthington & Patton, 2005)

Current corporate entrepreneurship literature highlights the link between competency development and knowledge (Hitt, Ireland, Camp, & Sexton, 2001; Lei, Hitt, & Bettis, 1996) and external context (Zahra & Covin, 1995) and offers frameworks to identify entrepreneurial competencies necessary for venture creation with one such framework is Hayton & Kelley (2006) competency based framework for corporate entrepreneurship. However similar to the discussion of the RBV, this still does not answer the origins of the competencies.

Here Hitt et al. (2011) in their concept of strategic entrepreneurship suggested that the mechanism to develop these new competencies requires the process of resource orchestration with inputs from environmental factors, organizational resources and individual resources. Taking a leaf from these developments in corporate entrepreneurship, Rasmussen, Mosey, & Wright (2011) argued for an evolutionary perspective on the development entrepreneurial

competencies. Rasmussen and colleagues then furthered this research in 2014 with arguments on the influence of context to this evolutionary perspective and proposing an evolutionary competency framework. This evolutionary competency framework will be discussed further in the next section.

2.6 Entrepreneurial Competencies

Before discussing further the evolutionary competency framework the concept of entrepreneurial competencies should first be explained. The concept of entrepreneurial competencies is a widely used concept across various sectors (Mitchelmore and Rowley, 2010). The conception of competencies have been used interchangeably with resources, skills and capabilities in academic studies (Colombo and Grilli, 2005; Rasmussen et al., 2011). There are several definitions of competencies that have been put forth, such as Brinckmann et.al (2009:224) citing Boyatzis (1982); Chandler and Hanks (1994); Man, Lau, and Chan (2001) offers this definition of competency, "the degree of fit between the demands of a task and the abilities of the person or group that fulfils the task", while another definition is Danneel's (2002:1102) definition that a competency is an "ability to accomplish something by using a set of material and immaterial resources".

According to Mitchelmore and Rowley (2010) the source of these various definitions among scholars is a legacy of the study of entrepreneurship, which itself has different definitions and interpretations. This is also a reflection of the importance of entrepreneurial competencies in firm performance and has been supported by several authors such as Man et al. (2002) and Rangone (1999). For instance, recognising this importance to firm performance, Brinckmann et al. (2009) suggested that

the competency based approach be used to expand the research area of entrepreneurship financing. Here Brinckmann and colleagues focused specifically into the financial management competencies of companies to acquire financing.

According to Man et al. (2002) and Martin and Staines (1994) both citing Mole et.al (1993) explains that there are three approaches to study competency; from the inputs; from the process or the outcomes. Even though the studies on entrepreneurial competencies are skewed towards individualism, Brinckmann et al. (2009) and Rasmussen et al. (2011) claim that for high-technology firms, entrepreneurial teams are needed. For instance in Rasmussen et al. (2014) the entrepreneurial team was the focus in accumulating relevant competencies that are necessary to gain "credibility threshold" (Vohora, Wright, and Lockett, 2004:164) for the new venture.

As the research is focused on established entrepreneurial firms, the idea of competencies in corporate venturing is relevant to the discussion. Here, Hayton and Kelley's (2006) competency based framework suggest entrepreneurial competencies can be accumulated at the firm level from individuals, which would relate to Barney's (1991) assertion that resources are elements in the firm. This points to Mitchelmore and Rowley's (2010) two sets of competencies, entrepreneurial competencies and functional competencies (skills) which is supported by Teece, (2014) and Zahra and George, (2002).

The combination of these various definitions and interpretations, the relationship between entrepreneurial competencies and firm performance (e.g. acquire financing),

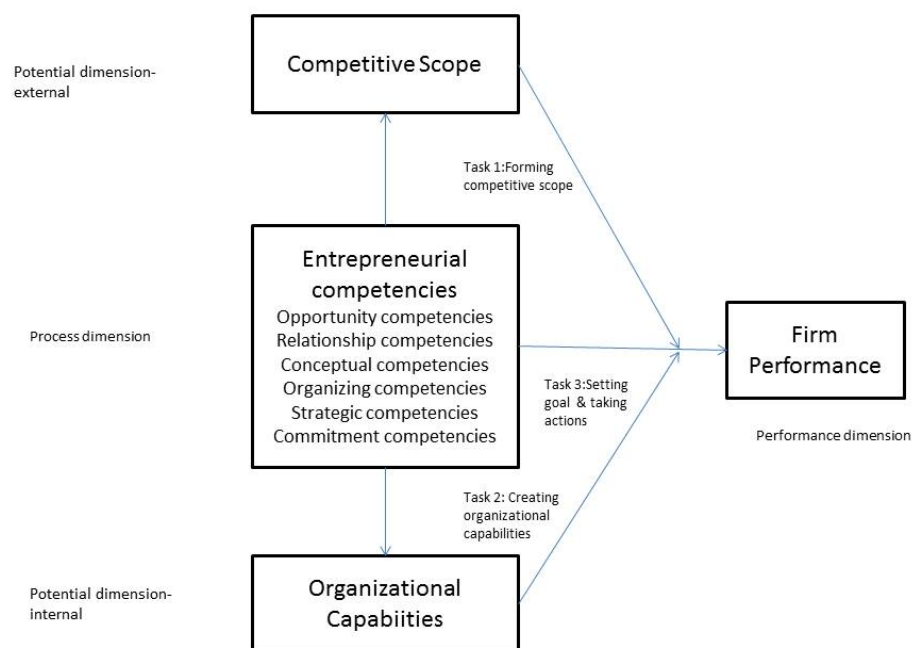
the notion of building blocks of venture creation as suggested by Mitchelmore and Rowley (2010); Teece (2014); Zahra and George (2002) illustrates the dynamism of entrepreneurial competencies. This, and together with what has been discussed in section 2.1 and 2.2 gives grounds to suggest the competency based approach as the most suitable theoretical lens for the research.

The next section will discuss the several frameworks based on entrepreneurial competencies that might be applied for this research.

2.6.1 Frameworks

There have been several frameworks that have been put forth on entrepreneurial competencies, one of the first is Man et al.'s (2002) conceptualization of a SME competitiveness model based on entrepreneurial competencies as depicted in Figure 5.

Figure 5 SME competitiveness model (adapted from Man et al., 2002:134)



Focusing on the individual entrepreneur, Man et al. (2002), conceptualises that the characteristics of entrepreneurial competencies are high level characteristics. These high level characteristics consist of “personality traits”, “skills” and “knowledge” (pg.133). According to them the accumulation of these characteristics results in the ability to competently perform his job or task. Table 2 below outlines the six major areas of entrepreneurial competencies according to Man et.al (2002)

Table 2 Competency areas (adapted from Man and Lau,2002:132)

Competency area	Behavioural focus
Opportunity competencies	Competencies related to recognizing and developing market opportunities through various means
Relationship competencies	Competencies related to person to person or individual to group based interactions, e.g. building a context of cooperation and trust, using contacts and connections, persuasive ability, communication and interpersonal skill
Conceptual competencies	Competencies related to different conceptual abilities which are reflected in the behaviours of the entrepreneur e.g. decision skills, absorbing and understanding complex information and risk taking and innovativeness
Organizing competencies	Competencies related to the organization of different internal and external human, physical, financial and technological resources, including team building, leading employees, training and controlling
Strategic competencies	Competencies related to setting, evaluating and implementing the strategy of the firm
Commitment competencies	Competencies that drive the entrepreneur to move ahead with the business

Another notable framework is Hayton and Kelley's (2006) competency based framework on corporate entrepreneurship. In their competency based framework they discuss four entrepreneurial competencies necessary for established entrepreneurial firms to start new ventures. These four entrepreneurial competencies and their attributes are shown in Table 3.

Table 3 Entrepreneurial competencies and attributes (compiled from Hayton and Kelly, 2006:413-419)

	Entrepreneurial Competencies	Attributes
1	Innovating	function of domain specific knowledge, cognitive ability, creativity and openness to new experience
2	Brokering	combination of analogical reasoning skills, personal confidence, credibility, networking skills, curiosity, creativity and intrinsic motivation
3	Championing	emotional intelligence, transformational leadership skills, broad organizational experience, credibility and trustworthiness
4	Sponsoring	Deep technological and business knowledge, risk tolerance, persistence and passion, and transformational leadership

Two of the most recent works on entrepreneurial competencies are by Rasmussen et al. (2011, 2014). The setting of their research is university spin-off's (USO's). They propose an evolutionary entrepreneurial competency development framework. This framework utilises Hayton and Kelly (2006) competency based framework on corporate entrepreneurship and the evolutionary perspective from Nelson and Winter (1982) to understand how competencies develop. They propose that the development of competencies takes place over time, and is influenced by their starting point, and that it is possible they need to break from an existing path (Ahuja and Katila, 2004). A significant attribute of this framework is that the competencies are deemed to be developed once they have passed a critical juncture (Vohora et.al, 2004) in the venture phase development.

In Rasmussen's et.al (2011, 2014) framework they have identified three significant entrepreneurial competencies in venture development:

- 1) developing a viable business opportunity (opportunity development),
- 2) championing individuals that provide meaning and energy to the entrepreneurial process (championing), and
- 3) accessing resources necessary to develop the new venture (resource leveraging).

Here Rasmussen et.al (2014) observes the significance influence of the local environment in their case the department level of the universities towards the development of entrepreneurial competencies. However a critique of this framework that the framework does not provide insights on how to measure these competencies (Morris, Webb, Fu, & Singhal, 2013)

The next section will discuss the applicability of these frameworks for this research.

2.6.2 Applicability of the frameworks

The three entrepreneurial competencies based frameworks that are being reviewed in this research were developed in various contexts. Man et al. (2002) studied SME performance, while Hayton and Kelley (2006) focused on corporate entrepreneurship and Rasmussen et al. (2011, 2014) considered university spin-offs while developing their evolutionary competency framework. The challenge is translating the lessons from these contexts for application to other contexts.

The empirical subject of interest for this thesis is established entrepreneurial firms, and their success or failure to secure green technology financing. The justification of this topic for further study is supported by a gap in extant knowledge about

venture creation in the sustainable entrepreneurship field. The contextual influence in the research is quite notable with a multiple stakeholder involvement between government, banks and established entrepreneurial firms. However the research frames the problem as an issue of venture development which is in line with the framework proposed by Rasmussen et al. (2014). The evolutionary approach to competency development that their framework proposes would alleviate the predicament of understanding how the resources are developed (Barney, 2001). In their research on the influence of university departments on university spin-off, the context was taken into account, which also resonates with the current research.

Therefore based on the research aims and the literature on both the RBV and entrepreneurial competencies literature, the research proposes to use Rasmussen et al.'s (2011,2014) evolutionary competency based framework as the theoretical lens of this research.

2.7 Summary and conclusion

The role of sustainable entrepreneurship in mitigating climate change has created various research opportunities. This has raised fundamental questions about venture creation in sustainable entrepreneurship (J. K. Hall et al., 2010). One fundamental question that the research has reviewed in this chapter, is the contradictory viewpoints about established entrepreneurial firms' entry into sustainable entrepreneurship ventures (Hockerts and Wüstenhagen, 2010; York and Venkataraman, 2010). This divergence has manifested itself empirically in the context of the GTFS, with some established entrepreneurial firms being financed and some being non-

financed. The entrepreneurship financing literature points to a difference in the financing context (Cassar, 2004) while the sustainable entrepreneurship literature points to institutional influences (Meek et al., 2010) and “distinct competencies” (Parrish, 2010; Worthington and Patton, 2005) to bridge the divergence between the context and influences.

Therefore the research gap about how venture creation in sustainable entrepreneurship occurs, entwined with the empirical dilemma of established entrepreneurial firms not being able to acquire green technology financing, has been translated into the research question: “How do established entrepreneurial firms develop entrepreneurial competencies to acquire green technology financing?”

As explained above, the research will use the evolutionary entrepreneurial competency framework (Rasmussen et al., 2011, 2014) as the theoretical lens to investigate these question. In the next chapter the research will explain the methodology, method, data collection and analysis for the research.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

This chapter describes and explains the methodology deployed in this study and details the theories underpinning the choice of methods.

This chapter is divided into seven major sections. It begins by restating the research aims and research questions, followed by an overview of the paradigms in research, justification for the chosen methodology, the research design, data collection, analysis and concludes with a summary of the chapter.

3.2 Research aims

The aim of the research is to explore and understand the conditions and policies under which established entrepreneurial firms are able to acquire green technology financing in the GTFS context. This has been translated into the research question: "How do established entrepreneurial firms develop the entrepreneurial competencies to acquire green technology financing in the GTFS context?" This research question has been divided into three sub-questions:

- (i) How does the GTFS context influence the deployment of competencies by established entrepreneurial firms?
- (ii) What entrepreneurial competencies are necessary for established entrepreneurial firms to acquire green technology financing in this context?
- (iii) How are these competencies developed?

3.3 Research philosophy

The following section discusses the concerns of research philosophy regarding how to define ontology: “what is the nature of reality?” and epistemology: “what is knowing?” and “how is knowledge constructed?”

According to Saunders, Lewis, and Thornhill (2009:107) research philosophy relates to “the development and the nature of knowledge.” This highlights the importance of the research philosophy, which is essential for understanding the creation of knowledge.

A discussion of research philosophy is not complete without considering the research paradigm. So what is a paradigm? According to Lincoln and Guba (1994:107)

a paradigm may be viewed as a set of basic beliefs (or metaphysics) that deals with ultimates, or first principles. It represents a worldview that defines, for its holder, the nature of the world, the individual’s place in it, and the range of possible relationships to that world and its parts, as for example, cosmologies and theologies do. The beliefs are basic in the sense that they must be accepted simply on faith (however well argued); there is no way to establish their ultimate truthfulness.

In 1979, Burrell and Morgan introduced a paradigm typology consisting of the functionalist paradigm, followed by the interpretivist paradigm, the radical structuralist paradigm and lastly the radical humanist paradigm. Table 4 provides brief explanations of the paradigms.

Table 4 Burrell and Morgan Paradigm typology (adopted from Goles and Hirschheim 2000:253)

Paradigm	Description
Functionalist	“The functionalist paradigm is concerned with providing explanations of the status quo, social order, social integration, consensus, need satisfaction, and rational choice. It seeks to explain how the individual elements of a social systems interact together to form an integrated whole”.
Interpretivism	“The interpretivist paradigm seeks explanation within the frame of reference of the perspective men gives meaning to society and institutions”.
Radical Structuralist	“The radical structuralist paradigm has a view of society and organisations with emphasis on the need to overthrow or transcend the limitations placed on existing social and organisational arrangements. The focus is primarily on economic power relationships”.
Radical Humanist	“The radical humanist seeks radical change, emancipation, and potentiality, and stresses the role that different social and organisational forces play in understanding change”.

In the case of management research there are four major research philosophy positions the first is positivism, followed by realism, interpretivism and finally pragmatism (Saunders et al., 2009).

In relation to the aims of the research and the exploratory nature of the current research, an interpretivist approach is adopted. Table 5 highlights the attributes of the interpretivist approach.

Table 5 Interpretivist approach attributes (adapted from Saunders et al. 2008:119)

Interpretivist Approach Attributes	
Ontology	Socially constructed, subjective, may change, multiple
Epistemology	Subjective meanings and social phenomena. Focus upon details of situation, a reality behind these details, subjective meanings motivating actions
Axiology	Research is value bound, the researcher is part of what is being researched, cannot be separated, and so will be subjective
Data Collection Techniques	Small samples, in-depth investigations, qualitative

In line with the interpretivist approach, the research will adopt a qualitative methodology, as discussed in the next section.

3.4 Qualitative methodology

Sustainable entrepreneurship is a nascent field with numerous fundamental issues meriting in-depth exploration. The research question was derived from gaps identified in the literature combined with prior knowledge about the GTFS context. The aim of the research as stated in section (3.2) is to explore and understand under what conditions and policies will established entrepreneurial firms be able to acquire green technology financing in the GTFS context. To further this understanding, the research adopts a qualitative research methodology.

There are various definitions of qualitative research. According to Lincoln and Denzin (1994:2), the qualitative research methodology presents us with a picture of the investigation which is likely to be involved:

Qualitative research is a field of inquiry in its own right. It crosscuts disciplines, fields and subject matter. A complex interconnected family of terms, concepts, and assumptions surround the term qualitative research. It is a situated activity that locates the observer in the world. It consists of a set of interpretive, material practices that make world

visible. Qualitative research also involves the studied use and collection of a variety of empirical materials.

An important characteristic of qualitative research is the importance of the natural settings and utilising various interpretive methods to comprehend thoroughly the object of research (Lincoln and Denzin, 1994).

The justification for the decision to adopt a qualitative approach was based on the exploratory nature of the research, with the GTFS still being new and the multiple perspectives from the various stakeholders justifies the qualitative approach. This was further justified by recent calls

to enhance the realism of entrepreneurship research by interacting with and learning from practising entrepreneurs and offering grounded explanations that will provide richer and more precise insights (Zahra and Wright 2011:73).

The dynamism that encapsulates entrepreneurship (Neergaard and Ulhoi, 2007) is mirrored in sustainable entrepreneurship research (York and Venkataraman, 2010). The addition of an underexplored developing country context makes it difficult to offer predictions and hypothesis. Furthermore the dynamism of entrepreneurial competencies as explained in the previous chapter (see section 2.5) makes the competency development process difficult to predict and requires detailed descriptions. Therefore, a quantitative research approach at this juncture would not have adequately captured the dynamics of entrepreneurship activity in this context. Indeed a quantitative approach might have restricted the scope of this exploratory research.

This argument resonates with Gartner and Birley (2002:388) who advocate qualitative approaches to studying the entrepreneurial phenomenon

There is something missing here. Some questions simply do not get asked, or cannot be asked, when undertaking quantitative studies. It is this conundrum (What is missing?) that qualitative research might be better suited for. How then can these “missing” questions be asked?

The field of sustainable entrepreneurship is a nascent field; few studies consider the intersection between sustainable entrepreneurship venture creation, policy and financing. This gives credence to qualitative research that aims to explore “uncharted depths” (Neergaard and Ulhoi, 2007:4).

Numerous entrepreneurship scholars have studied entrepreneurial competencies (e.g. Ahuja and Katila, 2004; Man and Lau, 2000; Rasmussen, Mosey, and Wright, 2011, 2014) using qualitative methods. By using a qualitative approach they were able to delve deeper into the entrepreneurial development process and better understand the context. As a result such studies were able to identify specific entrepreneurial competencies for the context (Rasmussen et al., 2011, 2014).

Thus, in line with the aims of the research, the decision to adopt a qualitative research approach was based on the need to generate rich, detailed descriptions of experiences of the GTFS financing process from the perspectives of multiple stakeholders. In order to acquire these datasets, the research used a multiple approach to collect rich data including semi-structured interviews, non-participant observations and document collection. This provides the opportunity to ascribe actual actions in a real-life context (Gephart, 2004).

3.5 Theory Building

The importance of theory to the academic realm is of absolute importance, to the extent that scholars like Corley and Gioia (2011) have termed them as “currency” of the realm. Based on Whetten's (1989) seminal article a theory “comprises of the factors that should be logically considered as part of the explanation of the social or individual phenomena of interest, the relationship between these factors and the rationale (psychological, economic, or social dynamics) which constitutes the theory's assumptions — the theoretical glue that seals them together” (pg.489-490). Another definition of theory offered by Corley and Gioia (2011:12) is “theory is a statement of concepts and their interrelationships that shows how and/or why a phenomenon occurs.”

In research there is a dichotomy between what is termed theory application (deductive approach) and what is termed as theory building (inductive approach). The former is related to positivism and the latter to interpretivism with both having their own merits to be adopted in a research setting (Saunders et al., 2009).

In general theory application is to apply an existing theory, develop, and testing the hypothesis (Saunders et al., 2008). In terms of applying theory application to the field of sustainable entrepreneurship, this could explain the relationship between existing constructs and sustainable entrepreneurship. Furthermore by applying a theory to a new setting such as sustainable entrepreneurship, adds on the utility of the theory (Corley and Gioia, 2011). While the theory also acts as a guide for new research avenues for the new field

(e.g. sustainable entrepreneurship). Data collection for theory application is centred on surveys and questionnaires.

In the case of theory building, it concerns with developing theory from the data analysis (Saunders et al., 2009). Data collected on the phenomenon are usually qualitative in nature, thus giving the data set a richness that can provide a more in-depth understanding, and a more holistic picture.

Comparing both theory building and theory application, the aim of the research which is to understand and explore sustainable entrepreneurship (see section 3.2) is more suitable with theory building. This corresponds with the qualitative approach being adopted by the research (see section 3.4). Furthermore, theory building emphasise “the importance and uniqueness of the phenomenon at hand, the questions explored, and the context of the research” (Zahra, 2007:444). Zahra (2007) adds that by combining new theory and new phenomenon, gives significant opportunities for creative research and theory building. This is true for the current research setting and puts the research suitable for a theory building case approach (Eisenhardt and Graebner, 2007) which will be discussed in the following sections.

3.6 Research Design

The research design process can be understood as a plan to design and implement the investigative tools that one uses for answering the research question (Yin, 2009). The research design process comprises of several components. In the following section, the key components of the research design will be explained which include the type of case study strategy

employed, the unit of analysis, case selection and reliability and validity issues.

3.6.1 The Case Study Research Strategy

Robson (2002:178) defines case study as

a strategy for doing research which involves an empirical investigation of a particular contemporary phenomenon within its real life context using multiple sources of evidence.

However, in a case study, caution should be applied because of the ambiguity of the boundaries between the phenomenon and the context, thus emphasise on the context is important (Yin, 2009). A case study research strategy can be based on both qualitative and quantitative data, therefore case study offers various data collection techniques be used in combination for example archives, interviews, questionnaires and observations (Eisenhardt, 1989).

There are four types of case study strategies; first the single case holistic design; single case embedded design; multiple-case holistic design; and finally a multiple-case embedded design (Yin, 2009:46). Figure 6 depicts the type of case study strategies. The difference between a single case study and a multiple case study is explained in table 6.

Figure 6 Types of case study strategy (Yin 2009:46)

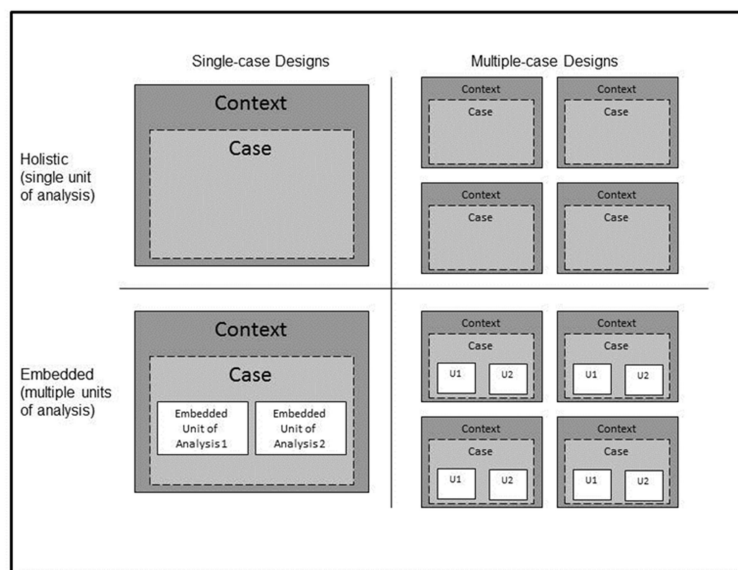


Table 6 Case study characteristics (compiled from Saunders et.al 2009:146-147)

Case study type	Characteristics
Single Case Study	Represents a critical case; an extreme or unique case; opportunity to observe and analyse a phenomenon that few have considered before.
Multiple Case Study	More than one case, literal replications and theoretical replications.
Holistic Design	Research is concerned only with the organisation as a whole then you are treating the organisation as a holistic case study.
Embedded Design	Research is examining a number of logical sub-units within the organisation, this will involve more than one unit of analysis; this would be called an embedded case study.

The research's guiding reason for choosing a multiple case study was because of the research aims, the nature of the research questions and the contextual setting of the study. In explaining this decision, the research is supported by Saunders et al. (2009) suggestion that case studies are suitable for in-depth explanations. Supporting this further is Yin's (2009:8) and Saunders et al. (2009:146) suggestion that case studies

have the ability to significantly answer the “why?”, “what?” and “how?” questions.

On the question of why a multiple case study was chosen, the justification for this decision is due to analytic power that it gives as put by Eisenhardt and Graebner (2007:27) suggestion that

adding three cases to a single-case study is modest in terms of numbers, it offers four times the analytic power. Thus, theory building from multiple cases typically yields more robust, generalisable, and testable theory than single-case research.

Supporting this further, a multiple case study approaches have been employed on numerous occasions in entrepreneurship research settings. This includes the investigation of related problems to the subject of resource acquisition and entrepreneurial competencies.

For example, Man and Lau (2000) studied the competency-performance relationship of SME owner/managers and their firms in the context of entrepreneurship in Hong Kong. Rasmussen et al. (2011) looked into multiple case studies of university spin-offs. Hallen and Eisenhardt (2012) used a multiple case study strategy to explore how organisations efficiently form inter-organisational ties. Rasmussen et al. (2014) studied the influence of the influence of university departments on the evolution of entrepreneurial competencies in spin-off ventures using multiple cases.

Extant studies choose the case study approach due to the context of the study, the need to have a deeper understanding of the phenomenon and also the generalisability of case study research strategy via literal replications and analytic generalization (Yin, 2009).

Finally, there has been explicit concerns about the validity and reliability of case study research (Patton, 1987; Saunders et al., 2009; Yin, 2009), however the rationale behind the case study research is not generalisability but about reaching an understanding. Therefore, the criteria to assess the robustness of the case study research strategy should not be the same as for quantitative research.

3.6.2 The unit of analysis

In a case study it is important to define the case and the unit of analysis in relation to the research question.

Based on the research question, “How do established entrepreneurial firms develop the entrepreneurial competencies to acquire green technology financing in the GTFS context” as the guide, the unit of analysis for each of the cases is the entrepreneurial competencies of the selected established entrepreneurial firms. This allows the research to consider the development of entrepreneurial competencies during the various stages of the financing process and to understand the context in which their development took place.

On a practical note, choosing entrepreneurial competencies as the unit of analysis also helped to avoid sensitivity when discussing financing matters with financial institutions and program evaluation with government officials. This is because they were asked to discuss entrepreneurial competencies of the established firms in that context. If the discussion was primarily focused on their own competencies, it is likely the discussion would have been defensive (Garavan and MacKenzie, 2015). The next section provides detail on the selected cases.

3.6.3 Case Selection Criteria

Selection of the cases was critical in the case study research design. In a case study research the sampling logic is not based on the random sampling logic utilised by survey research but is through theoretical sampling (Glaser and Strauss, 1967).

In applying theoretical sampling to select the cases, the research endeavoured to select information-rich cases that will be particularly informative to the research aims and research questions (Saunders et al., 2009; Yin, 2009)

Based on Danneels's (2002) suggestion that site variety which includes unusual or special cases (Saunders et al., 2009) will offer many possibilities for comparisons and identifying idiosyncrasies to help to fulfil the research aim and understand the context better. Therefore, the case selection attempted to include different characteristics (e.g. financing and business experience) and a variety of resources and products (e.g. Solar, Biomass, Manufacturing) in order to enable richer case comparison. The selected cases included established entrepreneurial firms that had successfully and unsuccessfully obtained GTFS financing. In order to ensure this, prior knowledge of some of the outcomes of the firms' initial attempts to obtain GTFS funding was required; this was available by searching the GTFS database.

A control element was introduced in the selection of the cases, with the cases limited to the producers of the energy sector in under the GTFS and first time applicants. This was justified because studying a specific industry with the most similar characteristics enables more valid comparison of ventures.

This theoretical assumption is underpinned by the work of Hallen and Eisenhardt (2012:39) on “cohort sampling”. The second justification is pragmatic, in that the energy sector is the main contributor of carbon emissions and attracts the highest number of applicants in the GTFS.

A total of 92 established entrepreneurial firms (from the energy sector producer category) were identified from the GTFS database of both financed and non-financed firms. A request for interview was sent to all 45 firms in the central region (of Malaysia). The reason why the central region was selected has a theoretical and practical basis. In terms of the theoretical basis, studies such as Feldman and Audretsch in 1999 have shown that cities have more tendencies for more innovativeness, while on a practical basis it was logistically more viable. A positive response was received from nine firms but only six agreed to follow-up interviews and further data collection. Following a process of scrutinizing the characteristics of those agreeing to take part and those who did not respond, the characteristics of the cases were identified and deemed to follow Danneels (2002) and Hallen and Eisenhardt (2012) case selection criteria.

3.6.4 Reliability and Validity

The issue of reliability and validity focuses on the question of “how true is the data that you have acquired” (Saunders et al., 2009:153-159). In order to ensure that the data collected is true, reliability and viability must be addressed in the research design process and during data collection. Table 7 below show the definitions of reliability and validity.

**Table 7 Definition for Reliability and Validity (from Saunders et.al
2009:600-602)**

	Definition
Reliability	“The extent to which data collection technique or techniques will yield consistent findings, similar observations would be made or conclusions reached by other researchers or there is transparency in how sense was made from the raw data.”(pg.600)
Validity	“(1) The extent to which data collection method or methods accurately measure what they were intended to measure. (2) The extent to which research findings are really about what they profess to be about.”(pg.602)

To minimize the threat to validity the researcher followed Saunders et al. (2009) and Yin(2009) suggestions. The first is triangulation which is defined as

The use of two or more independent sources of data or data-collection methods within one study in order to help ensure that the data are telling you what you think they are telling you.(Saunders et al., 2009:602)

In the case of the research, triangulation was employed by a multi-method approach to data collection; semi-structured interviews, non-participant observations, and document collection. In order to strengthen the triangulation, the research also followed King and Zeithaml (2001:80) suggestion to have “multiple respondents in the industry” in order to cross reference the data (e.g. established entrepreneur firms, banks and program administrators) on competencies in the GTFS.

The second step was Yin's (2009) suggestion to use a case study protocol (preparation, information pack, questions), part of the protocol includes the preparation before the interview as shown in table 8:

Table 8 Preparation before interview (adapted from Kovacic:2008)

	Preparation
1	Collect relevant background about next interviewees
2	Updating the information pack (see Appendix I,II)
3	Review and reflect previous interviews
4	Update interview questions

The other important part of ensuring reliability and validity is to ensure that the informants are telling the truth especially during discussing sensitive topics, the researcher approached this by gaining trust by being transparent, by being humble and sequencing the sensitive questions later in the part of the interview.

According to Yin (2011), for all kinds of research the key quality control is validity. He explains that a valid study is one that has properly (e.g. according to the participants' view) collected and interpreted its data, so that the conclusion represents the context that was studied. Here the researcher also offered and discussed the preliminary findings and analysis with colleagues and interviewees.

3.7 Data Collection

Data collection serves as the basis for achieving the research study aims. According to (Yin,2011:129) in qualitative research, "data can be obtained from field based activities: interviewing, observing, collecting and examining (materials), and feeling."

In the case of data collection for qualitative research, the emphasis is on the researcher as the main research instrument (Saunders et al., 2009; Yin, 2011). As the main instrument of the research, the researcher must be prepared for any eventualities by planning and making contingencies. In

the next section, the research will explain in detail the data collection strategies in this research.

3.7.1 Data Collection Strategy

The primary consideration for data collection was to capture the complexity in the context of the GTFS.

The research used several data sources: (1) semi-structured interviews, (2) follow-up e-mails and phone calls, (3) archives including media, corporate material, and the GTFS database (4) observations. The justification for including multiple sources was to enhance confidence in the accuracy of emergent theory by capturing multiple viewpoints (Patton, 1987; Saunders et al., 2008; Yin, 2009). Pilot interviews were conducted in 2012 and again in 2013 with relevant informants to test the focus of the questions and gain informants' feedback as highlighted in the table 9.

Table 9 Pilot interviews and feedback (from the researcher)

No	Group Interview/ Personal interview	Position	Feedback
1	Program Administrators	Multi	Arrangement for access, type of questions, type of documentation available
2	Established entrepreneur Energy-Producer	Executive Director	The banks understanding, financing experience, difficulty to acquire financing-GTFS
3	Established Entrepreneur Water-Producer	Executive Director	Technology understanding, multiple evaluation
4	Venture Capital	Managing Partner	Overview of the GTFS, Barriers between banks and firms

The primary data source was semi-structured interviews with three types of informants: (1) top level managers with key responsibilities for raising funding, typically the Managing Director/Owner of a firm, non-CEO founders of the firm, and in some cases the firm's chief financial or technology officer (CFO or CTO); (2) participating financial institutions under the GTFS; and (3) GTFS program administrators. A key strength in the interview data was access to information about the actions (e.g. failed attempts, communication skills) from the perspectives of established entrepreneurial firms, financial institutions and the program administrators that are unavailable from other sources. A total of 29 interviews were conducted, including follow-ups. The duration of each interview was 20–90 minutes, and they were audio recorded

transcribed and translated into English¹⁰. Examples of the interview questions are shown in Appendix III & Appendix IV.

The data collection strategy was designed with the intention of understanding the overall green technology financing ecosystem and to identify the development and role played by entrepreneurial competencies for acquiring green technology financing. Interviewing all the respective stakeholders also acted as a triangulation tool to verify accounts. This provided good contextual background to the research.

To implement this strategy the research endeavoured to interview the major stakeholders involved in the GTFS. The stakeholders were divided into four groups (see Table 10): the established entrepreneurial firms; the program administrators; the financial institutions, and other related parties (business consultants, technical consultants, trade associations).

¹⁰ A majority of the interviews were conducted in a mixture of Bahasa Malaysia and English. The researcher transcribed and translated the interviews.

Table 10 Data collection and interviewee categories

Groups of Interviewees	Data collection strategy employed
Established Entrepreneurial firms ¹¹	Negotiate access to GTFS database Filter according to case selection Arrange interview via introduction
Program Administrators	Personal networking and email/letter of introduction
Financial Institutions	Personal networking and email/letter of introduction
Others (business consultants, technical consultants, trade associations)	Personal networking and email/letter of introduction

The semi-structured interviews were complemented by participant observations on the following occasions: when participating in GTFS awareness seminars, pitching sessions, site visits, and during document collection.

The next session discusses how and why each data type was collected and how it was used.

3.7.2 Semi-structured interviews

Semi-structured interview were conducted with the four target groups stated above in table 10.

The main source for data collection was through semi-structured interviews. Semi-structured interviews and in-depth interviews were used for several reasons, primarily to give an opportunity for the “interviewees a chance to explain, or build

¹¹ The questions for the sustainable entrepreneurs were adapted from Man & Lau (2000)

on, their responses” (Saunders et.al. 2009:324). As the interviewees are able to use their own words or in other words free expression of their ideas (Autio, George and Alexy, 2011), the researcher can use the opportunity to probe the meanings and ask detailed questions which might lead to more interesting data (Saunders et.al. 2009). The second reason why the research used a semi-structured interview is because of the informality that the semi-structured interviews gives compared to structured interviews (Yin, 2011). This informality relaxes the interviewee and the interviewer and would facilitate personal contact later on to be used for further questioning and clarification on the interview session. The third reason is the flexibility of semi-structured interviews, for example in cases the interviewee would like to see the set of questions before the actual interview appointment, questions can be modified during the course of the interview.

The initial interview questions and themes for the interview were based on the literature review. As the interview process progressed, the questions became varied based on new information from previous interviewees. It is important to remember that it is an iterative process. Another concern that the research sought to address is the need to be aware of the interaction with the interviewees, as some questions might impact the data collected through ideas-leading questions (Saunders et al., 2009). This was eventually addressed by self-discipline as experience of conducting the fieldwork grew.

The 29 interviews were either one-to-one or involved two respondents at one time. The duration of the interviews varied. For follow-up interviews, it depended on the clarification that was needed from the respondents. Usually for

follow-up clarification it would be conducted by Facebook, Whatsapp instant messaging or by telephone. The place of the interview also varied from their construction site of the power plant, offices, to coffee shops. The list of interviews is shown in table 11.

Table 11 List of semi-structured interviews (from researcher)

No.	Interview	Person	Place	Length of audio recording (or if only notes)
1	Biomass A	Executive Director	Office	59:52
2	Manu A	Managing Director and Executive Director	Office	1:19:45
3	Manu A	Executive Director	Office	23:56
4	Manu B	Managing Director	Office	54:01
5	Solar C	Senior Finance Executive	Office	53:37
6	Solar C	Managing Director	Online	Notes
7	Biomass D	Administration Manager and Project Manager	Site Office	56:46
8	Biomass D	Executive Chairman	Coffee Shop	1:15:48
9	Biomass D	Administration Manager	Online	Notes
10	Solar D	General Manager and Chief Financial Officer	Office	43:07
11	Solar D	Senior Finance Manager and Business Executive	Office	59:35
12	Solar D	Project Partner	Office	1:33:40
13	Bank 1	Head of Department	Office	36:39
14	Bank 1	Head of Department	GTFS Awareness Conference	Notes
15	Bank 1	Head of Department	Coffee Shop	Notes
16	Bank 2	Senior Credit Officer	Office	50:12
17	Bank 2	Senior Credit Officer	Online	Notes
18	Bank 3	Senior Credit Officer	Office	40:14
19	Bank 4	Senior Credit Officer	Office	38:37
20	Bank 5	Senior Credit Officer	Office	Notes
21	Program Administrator/Agency	Program Administrator 1	Office	27:59
22	Program Administrator/Agency	Program Administrator 2	Office	21:43
23	Program Administrator/Agency	Program Administrator 2		Notes

24	Program Administrator/Ministry	Program Administrator 3	Office	26:55
25	Program Administrator/Ministry	Program Administrator 4	Office	18:47
26	Program Administrator/Ministry	Program Administrator 5	Office	16:11
27	Program Administrator/Agency	Program Administrator 6	Office	29:41
28	Technical Expert 1	Technical Expert 1	Office	51:05
29	Technical Expert 2	Technical Expert 2	Office	14:26

The next data collection method to be discussed is non-participant observation.

3.7.3 Non-participant observation

Three settings were deemed suitable for conducting observations. The first was the GTFS seminar¹², the second was the pitching session and the third are site visits to the factories. The strategy adopted in the non-participant observation was to immerse the researcher in the setting. For the GTFS seminar and pitching session it gave the researcher an opportunity to observe how entrepreneurs talked about

¹² The GTFS seminar is an awareness seminar on various types of entrepreneurship financing schemes offered by the Central Bank of Malaysia. The GTFS is one of the schemes that are featured in this seminar. The seminar takes place over two days, the first day is for the financial institutions and the second day is for the entrepreneurs. The highlight of this seminar is that the second day includes a closed-door session where bankers are invited to a pitching session by GTFS applicants who were unsuccessful in previous applications to the banks.

their competencies, projects during their pitches for finance and to gauge the level of interest from the financial institutions in terms of the GTFS. While the site visit was an opportunity for the researcher to observe closely the progress of the projects and triangulate with the data collected from the interviewers on the progress. This non-participant observation is similar to Robson's (2002) informal observation, which allows considerable freedom in what information is gathered and how it is recorded, with the aim of capturing the complexity of the context. The list of non-participant observations is listed in table 12.

Table 12 List of non-participants observations (from the researcher)

	Event	Venue	Duration
1	GTFS Seminar	East Coast Region	1 day
2	GTFS Seminar	Central Region	1 day
3	Pitching session	East Coast Region (2 firms, including Biomass A)	½ day Video recording
4	Pitching session	Central Region (5 firms, including Manu B)	1 day Video recording
5	Pitching Session	Bank A	Notes
6	Site visit	Manu B	½ day Site photos
7	Site visit	Biomass D	1 day Site photos

3.7.4 Document Collection

According to Yin (2011), documentation collection represents another form of primary evidence that can be invaluable to qualitative research. Documentary evidence is a useful triangulation tool for verifying information from other data sources.

There was abundance of available documentary evidence therefore it was important to only consider what was most relevant especially because of the geographical difference

between the United Kingdom and Malaysia. In addition to deciding which of the documents are most relevant, there was also the question of what documents were allowed to be removed from the premises. Ultimately the documents collected were mainly business plans, company profile, etc. as shown in table 13.

Table 13 List of document collected (from the researcher)

	Type	Form
1	Program administrator's meeting minutes: Notes of the minutes; e.g. samples of decisions made on certification of the GTFS, certification process and issues about GTFS.	Notes
2	Company registration and financial statements from Companies Commission Malaysia Major shareholders, yearly audited accounts, date of establishment	PDF
3	GTFS submission document Financing experience, technical documentation on the project, cash flow projection, GTFS certification (evaluation)	Notes
4	Business plan Marketing, cash flow, growth projections	PDF
5	Company profile Annual reports	PDF
6	News Reports Media reports on firms	PDF

3.7.5 Ethical Consideration

Prior to carrying out the fieldwork, the planned methodological framework was submitted to the Business School Research Ethics Committee ¹³ at the University of Nottingham for approval. A favourable opinion was obtained on the 14th of February 2013. Interview consent was acquired from the participants before conducting the interview, please see Appendix II.

The research was conducted in Malaysia, and approved by the Government of Malaysia (PhD sponsor). The context and culture of Malaysia is a familiar setting for the researcher. There was a need to access the database to identify the firms for the interviews. The database is used for administrative purposes and is comprised of and limited to the company background, a description of the projects for financing, and the funding status. Access to the database was obtained via the database administrator, and information released to the researcher was upon request as previously agreed by the database owner. The information and the confirmation of consent were provided in *Bahasa Malaysia* and English languages. All identities have been anonymised. The data was stored on a password protected secure PC.

¹³ A link to the University of Nottingham Code of Research Conduct and Research Ethics can be found at <http://www.nottingham.ac.uk/business/nexus/index.phtml?anml=-1&sid=4149>.

3.8 Reflexivity

Reflexivity according to Saunders et.al (2009:292) is a

concept used in the social sciences to explore and deal with the relationship between the researcher and the object of research.

Reflexivity also includes

an awareness of the ways in which the researcher as an individual with a particular social identity and background has an impact on the research process (Robson, 2002: 172).

As the researcher is the collection instrument in semi-structured or unstructured qualitative interviews, the unique researcher characteristics (Pezalla, Pettigrew and Miller-Day, 2012) influences the data collection.

It is important to mention that the researcher worked as an employee for the Ministry of Energy Green Technology and Water (MEGTW) from 2010 to 2011 as the Principal Assistant Secretary for the Green Technology Policy Division. The GTFS is administered by an agency under the MEGTW. The researcher left the MEGTW in 2011 to pursue his PhD full-time. Because of the previous working relationship with MEGTW, the researcher had certain advantages. This includes a certain amount of trust from the program administrators to access confidential data (e.g. technical documents, financial analysis). The researcher was also given access to closed events such as pitching sessions with the banks. Another unique advantage that the researcher had was, he understood the local cultural context. Being aware about these unique advantages several steps were taken to minimize potential bias.

The strategies were based on Robson's (2002:173) adoption of Ahern's (1999) guide on using reflexivity to identify areas of potential researcher bias as shown in Table 14.

Table 14 Ahern's (1999) guide on using reflexivity to identify areas of potential researcher bias (adopted from Robson, 2002:173)

1	Write down your personal issues in undertaking this research, the taken-for-granted assumptions associated with your gender, race, socio-economic status, and the political milieu of your research. Finally consider where the power is held in relation to your research project and where you belong in the power hierarchy.
2	Clarify your personal value systems and acknowledge areas in which you know are subjective.
3	Describe possible areas of potential role conflict. Are there particular types of people and/or situations with or in which you feel anxious, annoyed, at ease? Is this publication of your findings likely to cause problems with a group of people? Consider how this possibly could influence whom you approach or how you approach them.
4	Identify gatekeepers' interests and consider the extent to which they are disposed favourably towards your project. This can help you prevent potential role conflicts.
5	Recognise feelings that could indicate a lack of neutrality. These include avoiding situations in which you might experience negative feelings, seeking out situations in which you will experience positive feelings.
6	Is anything new or surprising in your data collection or analysis? If not, is this cause for concern, or is it an indication of saturation? On occasion, stand back and ask yourself if you are 'going native'.
7	When blocks occur in the research process, re-frame them. For example, is there another group of people who can shed light on this phenomenon? Would another additional form of data collection, such as document analysis or diaries, give a greater insight?
8	Even when you have completed your analysis, reflect on how you write up your account. Are you quoting more from one respondent than another? If you are, ask yourself why.
9	Consider whether the supporting evidence in the literature really is supporting your analysis or if it is just expressing the same cultural background as yourself.
10	A significant aspect of resolving bias is the acknowledgement of its outcomes. Therefore, you might have to re-interview a respondent or re-analyse the transcript once you have recognised that bias in data collection or analysis is a possibility in a specific situation. It is worth remembering that even if preconceptions and biases are acknowledged, they are not always easily abandoned.

The first step was to "neutralise" by admitting the researcher's former links with the MEGTW. The researcher compiled an

information pack detailing the research (e.g. purpose of the research, the focus of the research, introductory letter from MEGTW). The information pack offered a way for interviewees to seek further information from either the Academic Supervisor or another representative of the University. Here the researcher noted the researcher's former links were not a critical point in terms of power relationship,

The pilot interview was arranged months in advance, via an introduction from the GTFS administrators to the entrepreneur. This was followed up by countless phone calls and email from the UK to the entrepreneur to confirm and reconfirm the pilot interview. In Malaysia, after a two-and-a-half hour drive from the city to the see the entrepreneur, it did not happen and it never did. These were the first among many interviews that were arranged but did not happen. This indicated to me that even with my previous connections with the Ministry¹⁴ which was clearly stated in my information sheet, it did not trouble them to decline my request to be interviewed, which I assume that the entrepreneurs that I interviewed did not feel pressured to respond to my request for an interview. (excerpt from field notes)

In an effort to avoid interview bias, the researcher tried to arrange the sequence of the interviews between the four groups, the established entrepreneurial firms, bankers, program administrators and others (e.g. technical experts) and to read the summary of previous interview notes. This

¹⁴ This is something that I experienced as a double-edged sword, being both facilitating and detrimental at the same time. As part of the preparation, I read PhD thesis that were in the same situation like me. (e.g. Kovavic,2008)

was to get a more balance view and at the same time to triangulate between the interviewees.

The third strategy was to discuss the preliminary findings and analysis with colleagues and interviewees during the data collection stage, which also enhanced the reliability of the findings. Explanations, viewpoints and suggestions for the data collection were offered by former colleagues and interviewees. As the data collection progressed, the researcher grew into his role, absorbing opposite findings and viewpoints became calmer.

The fourth strategy was triangulation whereby the researcher used other methods to collect data, including observations (e.g. GTFS seminar, pitching sessions) and document collection as another form of triangulation.

During the analysis stage, the strategy was to critically review the findings and the analysis with critical colleagues and interviewees. All of these strategies were strengthened by regular supervisor meetings during the data collection and analysis period.

3.9 Analysis

In planning for qualitative analysis, the researcher was mindful that

There is no clear and accepted single set of conventions for analysis corresponding [as] to those observed with quantitative data (Robson, 2002: 456).

As the aim of the research is to explore and understand under what conditions and policies will enable established entrepreneurial firms to acquire green technology financing in the GTFS context, the analysis was guided by the evolutionary competency development framework (Rasmussen et al., 2014). The analysis was conducted by focusing on the competency development of the cases before, during and after the financing process and the influence of the GTFS. To avoid conflation during the analysis process, between the actions of the actors and the influence of the GTFS context, the strategy of retroduction was used (Leca & Naccache, 2006; Rasmussen et al., 2011, 2014). Retroduction is suggested by Sæther (1998) to be useful for research on the greening of industry because links to theory can be made explicit to increase our understanding of the relations between industry and the social and environmental context.

Miles and Huberman's (1994:4) description of qualitative data analysis coincides with the strategy of retroduction:

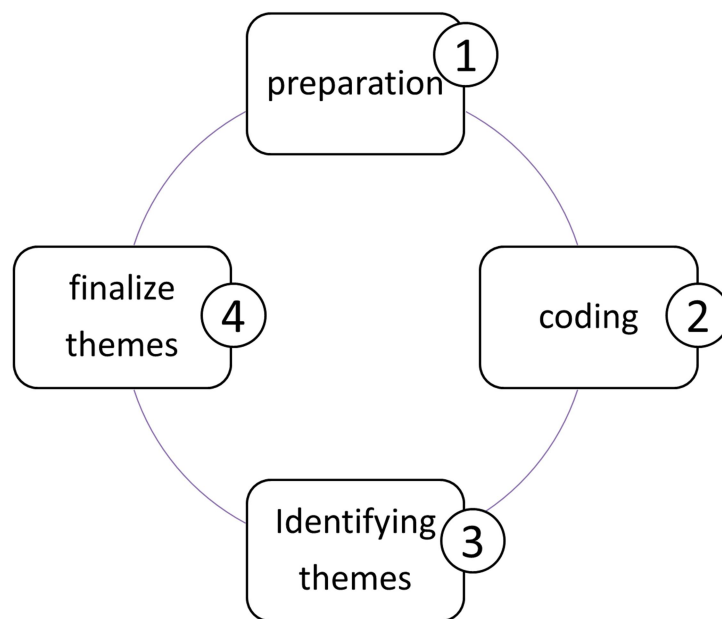
We aim to account for events, rather than simply to document their sequence. We look for an individual or a social process, a mechanism, a structure at the core of events that can be captured to provide causal description of the forces at work.

Here, Miles and Huberman (1994:10) suggest that qualitative analysis consists of three interwoven and parallel elements,

spanning the time before, during and after data collection. The first is data reduction which “refers to the process of selecting, focusing, simplifying, abstracting, and transforming the data that appear in written up field notes or transcriptions”; the coding process is an example of data reduction. The next element that they suggest is the data display, which is “an organised, compressed assembly of information that permits conclusion drawing as an action” (pg.11). Putting codes in a matrix, flow charts are an example of data display. The third and final element that they propose is conclusion drawing and verification; here they suggest “the meanings emerging from the data have to be tested for their plausibility, their sturdiness, their ‘confirmability’ - that is, their validity” (Miles and Huberman, 1994:11)

In adopting the three elements in the analysis, the research has four stages of analysis. The first stage was the preparation, here the interviews were transcribed, checked for accuracy with the recordings and familiarised. The second stage was the coding; the coding was individual cases. Here it was an iterative process, with the codes checked against the literature; followed by cross-case analysis. The third stage was to identify themes and the last stage was to finalise those themes. Later the themes were sent to the respondents for feedback before finalizing the themes. The overview of the data analysis is depicted in Figure 7 below. In the next section the research will explain each of the stages in detail.

Figure 7 Data analysis steps (from the researcher)



3.9.1 Preparation

In preparing for the data collection and analysis, the researcher attended specific courses in data analysis, this included training in qualitative data analysis software (Atlas.ti and Nvivo 10). Nvivo 10 was used because of the support available within the University.

Since the type and format of the data collected varied, preparing the data presented specific challenges. Interviews were transcribed, checked for accuracy with the recordings and sent back to the interviewees for confirmation. The videos were left in MPEG format, the pictures in JPEG, and documentary evidence was scanned.

The case study narrative and financing flow charts based on the financing process was developed using the data to form a deeper understanding of the cases.

3.9.2 Coding

During data collection a summary form was adapted from Miles and Huberman (1994), and was used as a tool for theoretical saturation and a reflection tool during the coding period. The form helped to recognise early patterns emerging during the data collection period. As the same pattern emerged from the multiple interviews, it pointed to theoretical saturation. An example of this is the bank's learning curve, which was a recurring pattern in the interviews with the entrepreneurs, the banks and the program administrators. The example of this summary form is in the Appendix IV.

The coding process was adapted from Strauss and Corbin (1998). In general this starts with open coding i.e. the process of generating initial concepts or first order concepts from data. This was then followed by axial coding, to develop and link the concepts into conceptual families, and lastly selective coding was applied in order to formalise these relationships into theoretical frameworks.

The coding process was done in NVivo 10. The open coding process generated the initial concepts. The summary of the data collection also offered some leads. However, by intending to let the data speak for itself, the initial concepts were generated through open coding from the cases. There were some open codes that were expected such as the barriers and challenges to green technology. As the coding process proceeded, patterns became more apparent, idiosyncratic case financing process to acquire green technology financing were slowly emerging from the data. Some examples of these codes are firm background, previous financing experience, business experience and current competencies. This helped to refine the

individual cases financing process to acquire green technology financing, and refine financing flow charts. A concrete example for this code is the previous financing experience, with a pattern on the type of financing before this (e.g. contract financing, project financing, long term financing, credit facilitation)

By comparing and contrasting the financing processes between the cases, other interesting concepts also started to emerge, including the distinct tension or conflict among the multiple stakeholders that was similar to a “blame game” when explaining the reasons behind established entrepreneurial firms’ inability to acquire green technology financing.

Another round of coding was conducted, by which time it was slowly emerging how the context was influencing the financing process of the individual cases. This second round of coding also helped to further refine what the financing process of the individual cases were in terms of critical characteristics and events that influenced how the cases succeeded or failed to acquire green technology financing. (e.g. supplier choice, supplier credibility-bank evaluation techniques)

The next stage was the axial coding; linking the concepts into conceptual families and linking the structure to the process. Through linking these, the aim is to answer the ‘why’ and ‘how’ questions (Strauss and Corbin, 1998). In this stage, the first order concepts were brought together with concepts that offered a better explanation from other sources. Here the first order concepts such as firm background, previous financing experience, business experience and current competencies were explored iteratively with the literature (e.g. Ahuja and Katila, 2004; Sydow, Schreyögg, and Koch, 2009; Vohora,

Wright, and Lockett, 2004). In the data structure display in Table 16 (see page 175), axial codes are named second order themes.

3.9.3 Identifying Themes

The next stage of coding is the selective coding, which is the process of integrating and refining the theory. Emergent themes were slowly building up. In the data structure display the themes are known as the aggregate dimensions. Although the analysis seems to be a linear process, coding was a back and forth process.

The importance of this stage of coding is to focus on variation, particularly to look for and explain the variations across cases; this is an important criterion in order to propose a better theory (Strauss and Corbin, 1998).

3.9.3 Finalise themes

Before the themes were finalised, they were sent to some of the interviewees (bankers, established entrepreneurial firms and program administrators) to ascertain if there was any particular objections. The feedback contained no particular objection to the themes.

The aggregate dimension, second order themes and the first order concepts are shown in Table 16 (see page 175). In the next chapter the research will describe the context and the individual case studies.

CHAPTER 4: THE GTFS CONTEXT AND CASES

4.1 Introduction

This chapter describes the local context and the cases. The interviews recorded the local context and the entrepreneurial firm's interpretations of their reality as they attempted to acquire financing for their green technology ventures. The local context is in section 4.2, giving voices to the other stakeholders in the GTFS.

This is followed by the six case studies in section 4.3 which were developed by combining the information from the interviews of the entrepreneurial firm's executives, GTFS program administrators, bankers involved in financing the entrepreneurial firms, pitching observations, site visits and documentation such as GTFS submission forms and supporting documents (e.g. technical documents).

The case description follows a similar format, with variation depending on the depth and breadth of information gathered in each particular case. Section 4.4 of the chapter focuses on the analysis of the case studies.

4.2 GTFS context

In this section, the research describes the GTFS and the contextual influence that surrounds the scheme from the viewpoints of the various stakeholders. This section also highlights the complexities of the relationship between the stakeholders.

The green technology policy announced by the government resulted in various opportunities for entrepreneurial firms to pursue. These include opportunities such as to supply renewable energy to the national grid under the Feed in Tariff (FiT) program. These green technology opportunities have attracted a wide range of established entrepreneurial firms to venture into green technology. These established entrepreneurial firms include firms with various backgrounds and expertise entering this new green technology space. Here, one of the biggest challenges for new industries is to acquire financing for these new ventures.

Recognising this dilemma the Malaysian government under the National Green Technology Policy has designed a scheme named the Green Technology Financing Scheme (GTFS) to help entrepreneurs obtain financing. According to the program administrators (PA):

GTFS is been established for the purpose to provide an alternative financing for the SMEs' to embark on the Green Technology businesses. (PA1)

Green Technology Financing Scheme [is a] scheme [...] to promote the development for green technology projects so under this scheme the government provides some incentives for example a rebate of 2% of the interest rate that is being offered by the banks and additionally 60% guarantee on the loan that are given to them by the banks. (PA1)

As explained in section 1.2 the GTFS is divided into two phases of evaluation. The first is the technical evaluation by the government committee and the second evaluation is by the banks. Both of the evaluation phases are important, however the banks evaluation is critical because of the role of the banks to provide financing for the scheme. Here the role and the expectations of the banks from the perspective of the government is explained by a program administrator below,

The government [...] had various discussion with various parties concern, the government looking at the commitment of the financial industry to not solely to depend on the government, it should be initiative shared, shared initiative in boosting the green technology [...] the government is looking at the social responsibility of [the] financial institution to give back to the society. (PA5)

These quotes illustrate the government's expectation that the banks would play a socially responsible role in financing these green ventures. In spite of the government's support, and benefits the ratio for the companies that were financed was only a third of the companies that had gained GTFS certification and benefits. This financing quagmire exposes a difference in terms of evaluation between the certification and financing process between the government and the banks as explained by a program administrator.

[...] banks look at it differently. For the bank whenever they lend money, they expect to be paid so despite the fact the project can be very green if the bank thinks that it will not generate enough cash flow to repay loan, the bank won't finance it. So for the bank, it doesn't matter whether the project is green or brown, their agenda is different, they lend money that means they invest, they expect to make something out of it and get to be fully paid within the bank period, so they don't care whether the project is green or not green. (PA2)

For the established entrepreneurial firms, the banks were not following the government's directive. There have been numerous complaints by entrepreneurial firms that banks are not being supportive to their financing needs. This was also observed in a pitching session between the entrepreneurial firms and the banks organised by the program administrators.

However these arguments also reveal the established entrepreneurial firm's perception that the financing would be easy because of the government program. Accordingly, the entrepreneurial firm did not sense that they suffered from a competency gap in terms of financing; therefore they did not recognise this as something to address immediately.

While in the case of the banks, green technology is new. Here the head of department (HOD) of Bank 1 argued that,

GTFS is still new. The general market has yet to fully embrace it. The financial institution is still (grappling) with it. (HOD Bank 1)

Therefore the banks resorted to what they know best, as illustrated in the quotes below from two senior credit officers (SCO),

The way that we finance green and the other projects are not [any] different using the 5C¹⁵. We are in the business to make money, credit mitigation. (SCO Bank 5)

It's going to be looked at on the platform of a new business. New business because they have no experience [...] they are going to start from scratch so, how do you evaluate them [...] you evaluate them [the same with] newcomers. (SCO Bank 4)

These quotes highlight that the banks do not consider an established firm's excellent track record in the financing application. These arguments also illustrate the method of evaluation by the banks to evaluate green technology projects. However another dimension to be highlighted here is that the banks and the entrepreneurial firms have a learning curve on green technology financing which needs to be addressed.

To highlight this dichotomy between the bankers and the entrepreneurial firms, a program administrator (PA) explained:

The other factor that GTFS need [...] is to give knowledge as [in] ways to evaluate and access a project. I think how to convince the banks [is] another story. [This is] because [banks] don't understand the technology. Maybe from the business plan it is [good] but what about the technology risk? How do we evaluate? Some projects have good

¹⁵ The 5C credit criteria, is a criteria that the majority of the banks to evaluate financing. The 5C's are character, capacity (cash flow), capital, condition and collateral. The order of the Cs is according to importance.

technology but the entrepreneur does not have a good business plan. The bank does not see this, but the government feels the project is viable. They cannot link the technology with the business plan, that's the area we need to do train the credit officers. (PA1)

The program administrator points out the complexity and the barriers behind the financing process even though the GTFS was designed to facilitate financing. The quotes above indicate that these complexities, and barriers stems from the GTFS context.

4.2.1 Summary of the GTFS Context

There are several pivotal points to be highlighted due to the GTFS context.

First, since the GTFS is new there is a difference in financing priorities and understanding among the major stakeholders (program administrators, banks and entrepreneurs) about the GTFS. The stakeholder differences in financing priorities and understanding leads to a learning curve in dealing with the context.

The learning curve for the banks leads to the second point which is the problem of knowledge asymmetry. This knowledge asymmetry influences the banks evaluation of green technology projects. This inadvertently also contributes to a new evaluation criteria. The creation of the new criteria requires an iterative process between the various stakeholders especially the banks and the entrepreneurial firms.

The third point is that the GTFS with the lure of government support through the guarantee and benefits attracts entrepreneurial firms to transition from one industry to another (e.g. marketing to manufacturing of green technology

products). However even established entrepreneurial firms face difficulties to acquire financing under the GTFS context due to a competency gap. This highlights some challenges to the effectiveness of GTFS as a policy mechanism to facilitate financing.

In summary, the financing context under the GTFS is different and has different influence for the various stakeholders. For the established entrepreneurial firms it is the competency gap arising from the transition to a new industry, and the complexities of the financing process itself. In the case of the banks it is mainly the learning curve to a new industry. Finally for the program administrators it is policy making to come up with effective programs to facilitate green technology development.

4.3 Case Studies

This section provides the individual case studies focusing on the main research question, "How do established entrepreneurial firms develop the entrepreneurial competencies necessary to acquire green technology financing in the GTFS context?"

This section outlines how each case offers insights into their acquisition of financing under the GTFS. These insights are elaborated in each case by describing their background and financing application under the GTFS. By contrasting previous financing experience and financing under the GTFS, the case studies also reaffirms the contextual differences and challenges to financing, the necessary competencies and the

development (non-development) of those competencies by the entrepreneurial firms.

Here the cases are divided into non-financed and financed entrepreneurial firms. The first two cases, Biomass A and Manu A are non-financed case studies and will predominantly contribute to answering the first sub research question on competency deployment. While the next four cases, Manu B, Solar C, Solar D and Biomass D are financed case studies and will address all three sub research questions; competency deployment, the necessary competencies and competency development.

4.3.1 Case one: Biomass A

The case study starts from the time of the project's inception and ends when the financing acquisition was aborted. The description of case one will explain the background of Biomass A in terms of their previous financing and business experience. A narrative of the financing application under the GTFS is also included as a means to compare and contrast Biomass A's background with their new business venture and financing application under the GTFS. The case study highlights the contextual influences on the deployment of Biomass A's competencies.

4.3.1.1 *Background*

Biomass A was established in 2005. The owners of Biomass A are an established Engineering Procurement Construction Company (EPCC) who bought Biomass A in 2010. In their past projects the owners were heavily involved in power distribution projects for the national utility. However in the

current project under GTFS they are focused on power generation instead. Another significant change because of this new project is that they will become independent power producers.

Another point of differentiation for Biomass A's owners is their previous financing experience. Before this their financing experience had been based on contract financing. The financing period under contract financing is short term between one to two years. However, as an independent power producer this involves taking into consideration long term developmental aspects such as energy generation and transmission. Therefore contract finance would not be suitable in this case. Here Biomass A needs to apply for project financing, a type of financing that they are not used too. Due to the nature of the project, the financing process, and the GTFS there was a significant contextual difference for Biomass A.

4.3.1.2 Financing Application

Biomass A was seeking RM136 million to finance their independent power plant utilising empty fruit bunches. The electricity that is generated from the power plant will be supplied to the national grid.

As part of their investment readiness (McAdam & Marlow, 2011) Biomass A applied for the GTFS certification through the GTFS website. Subsequently to fulfil the GTFS requirement for certification, Biomass A presented their business plan to the GTFS' technical committee to verify the technical viability and the environmental status of the project. Their presentation

was technically-oriented, and easily fulfilled the technical requirement of the GTFS (e.g. environmentally friendly project). Upon fulfilling the technical criteria of the GTFS, Biomass A was subsequently awarded the GTFS certificate on the 10th of May 2010.

To further enhance their investment readiness, Biomass A made a bid to acquire the quota to supply electricity to the national grid via a Renewable Energy Power Purchasing Agreement (RePPA) and successfully obtained the quota in 2011. They further invested approximately RM20 million on the project infrastructure (e.g. land purchase). Concentrating more on the technical details of the project, Biomass A upgraded the technology and obtained the rights to the technology with a view to expand regionally. In addition, Biomass A secured the raw material for their power plant from a reputable supplier and employed a technical consultant to attest to the feasibility of the project.

Biomass A then proceeded to apply for financing to various local and international banks under the GTFS scheme. However, to their apparent surprise, their application was rejected at the credit officer stage by all the banks to which they applied. This outcome occurred in spite of the investment readiness steps undertaken and the government guarantee. The banks that rejected their application included the local and international banks that Biomass A owner's already had an excellent track record. Biomass A ended up applying to seven banks but all of these financing requests were rejected. The executive director (ED) of Biomass A in describing the financing journey said

I think we have approached almost six to seven banks, and these are bankers who have financed me [before], and these are the same people who are telling me today that, “Oh, for this BIOMASS A we have got concerns” [...] How much of convincing we have done and still we are not able to penetrate through their barriers or their thoughts.
(ED of Biomass A)

This argument illustrates Biomass A’s frustration with the rejection but also the concerns that the banks had about this venture. This either suggests that the banks were unable to understand the project or that Biomass A were unable to convince to the bankers about the viability and feasibility of their proposed biomass venture.

To rationalize these rejections, the executive director of Biomass A lamented that the banks do not understand the new venture and that the government guarantee is not strong enough. The executive director based this assumption on the fact that the institutions to whom they had applied for financing already knew about their established track record.

However it became apparent that Biomass A’s belief that they would acquire financing easily under the GTFS heavily contributed to the misinterpretation of the environment as admitted below,

“[...] we failed to realise, we thought it was so easy because at that time we thought, if GTFS agree, everything will be good.” (ED of Biomass A)

This misinterpretation of the environment might be further attributed to their previous financing experience as described by the executive director (ED) of Biomass A in this argument below,

Financing, we are fortunate that we had the support of the local banks because the project is Tenaga [National Electricity Company], so there's a lot of confidence from the local institution [...] payment is never an issue. Therefore, financing was not too much of an issue because all the projects are contract financed. (ED of Biomass A)

Furthering this argument the executive director (ED) of Biomass A said;

[...] but if let's say I call a bank today and say, I'm getting a 40 million dollar contract, can you finance? They will be [here] tomorrow, they will be sitting here. You know, so that's not an issue. (ED of Biomass A)

This argument also illustrates the influence of contextual differences in terms of financing. In their previous business, financing was not an issue however in this new venture their track record does not seem to support their financing application. Another anomaly was, even though substantial capital has been put into the business and the presence of private and government collateral, these facts did not help to secure the financing. This highlights a misinterpretation of the new financing context from the very beginning of the venture. This misinterpretation could be due to the influence from the GTFS context. Unlike the technical aspect of the project which had benefited from consultants inputs, the financial aspect of the project was conducted internally. By keeping the financial aspect internally they were not fully aware of the influence in terms of the differences in the financing context. In other words, they had a low input from external resources in the venture.

In letting out his frustration at being rejected for the new venture the executive director (ED) of Biomass A added,

The bankers themselves, being a commercial people, if they try to evaluate that technology, I think it's not going to work. You know, they are not in a position to say whether this is viable or that is not viable. They are not in a position because they are not technical people. But they make conclusions based on market research, market analysis and based on that they come to a point that the project is not viable. So we're having that problem.

They go and do research on the technology provided. This is exactly what they did they asked me who is the supplier and I told them. They checked the website, then the banks asked the suppliers annual statement and they came back to me to say that the project is not viable. (ED of Biomass A)

These two quotes exemplify how the bankers set about verifying information about the viability of the technology. This situation also highlights the tools that the banks are using to evaluate green technology projects.

Biomass A's executive director further added that

Despite our bank balance, our books and all kinds of stuff, until today the bankers are not able to finance a deal yet [...] we've been exhausting our revenues for the last one-and-a-half years in trying to secure finance. I cannot imagine how others are [...] trying to move. Even [though] we have spent millions, we have shown them the receipts [...] despite that there is a general perception of lack of confidence whether the project is viable. So the main thing with all the bankers is not the guarantee part [but] whether the project itself is viable or not. Nobody is having that confidence, and there is no... parties, who are able to convince the financiers that this technology is workable. (ED of Biomass A)

This quote illustrates that Biomass A was caught in a knowledge asymmetric dilemma, where project viability is a major concern for the bankers however the bankers do not have the knowledge to evaluate the project. To express the hopelessness of their situation, Biomass A appeared to feel

that nobody that could help them pass this stage; instead blame was attributed to the ineffectiveness of the GTFS's role in financing. These highlights the need for developing new competencies to convince the banks; competencies that Biomass A did not have at the time.

Evidence from the documentation submitted to the GTFS committee by Biomass A, shows the detailed account of the project, including the proposal for a new technology-gasification of the empty fruit bunch (EFB) to produce energy. The documentation was full of technicalities and would need a specialist to evaluate them. This relates to the claim by Biomass A that the bank did not understand the nature of the technology and, therefore, the business. For the executive director of Biomass A, the fact that Greentech¹⁶ had certified the technology and had given the 60% guarantee on the technology, should have been enough assurance for the bank that the technology would work.

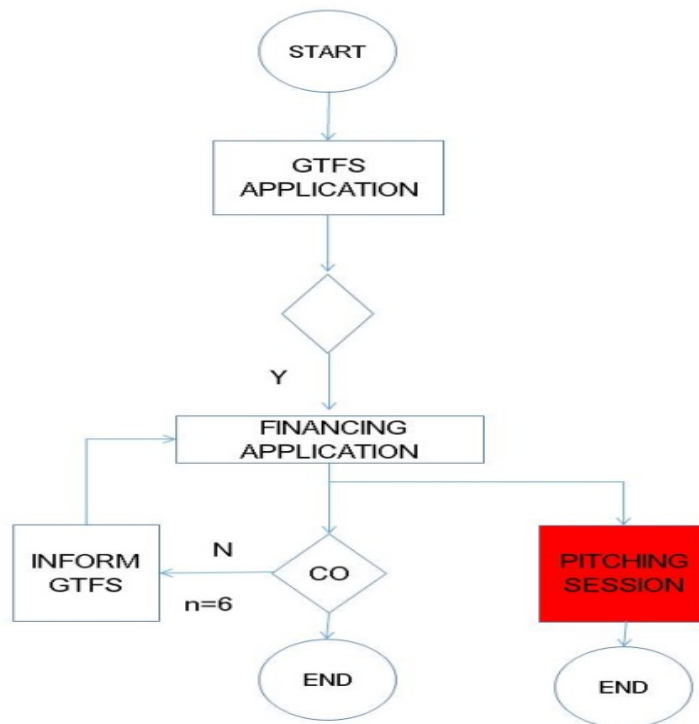
In their final pitching session, the pitch for their project was very detailed; but it failed to ignite the interest of the banks. Observations suggest that the presentation was too technical

¹⁶ The Malaysian Green Technology Corporation is commonly known as GreenTech. GreenTech is the administrator for the GTFS.

and did not provide adequate answers to some of the panel's questions. Such questions related to the supply of raw material and the buyers of the by-products. Even at the pitching session, Biomass A was still not able to sufficiently educate and convince the bankers.

In the end Biomass A did not acquire financing. During the final interaction with Biomass A, they informed the researcher that they have put their new venture on hold indefinitely and were currently concentrating on their core business of power distribution. Figure 8 summarizes the financing process of Biomass A.

Figure 8 Financing flowchart for Biomass A



Legend

CO: Credit officer CC: Credit Committee

4.3.1.3 Case summary of Biomass A

1. Biomass A has existing competencies, developed during previous projects. These competencies had helped them to acquire financing and implement their previous projects which were mainly in power distribution and based on contract financing.

2. Biomass A was confident they would acquire GTFS financing. Overall, Biomass A believed that to acquire financing for their new green technology venture would be simple enough, especially as they had already been awarded the GTFS certification. Biomass A had attributed too much significance to the GTFS certification and benefits, the owners were optimistic in their assessment of the process to acquire financing. As a result there was this notion that financing would be easy.

3. However the new venture was different both in terms of financing and technical aspects which contributed to a competency gap. Biomass A realised the existing competencies are not enough for Biomass A to acquire financing in the current context. However, the notion that financing would be easy influenced the deployment of Biomass A's competencies. As a result Biomass A had decided to emphasis on their technical competencies but overlooked the importance of adapting/ reconfiguring their financing competencies.

4. Even though Biomass A was an established entrepreneurial firm and had previous success they misunderstood the new context in dealing with the banks. Due to the nature of the new venture, the financial evaluation of the project changed. The misinterpretation of the environment influenced Biomass A's refinement of the opportunity resulting in a financing rejection cycle.

5. Finally, despite the fact Biomass A had existing competencies, Biomass A were not able to fully deploy their competencies to refine the opportunity and explained the project in detail to the bankers. Even though the data

suggests some learning arose from the multiple rejections from the banks, Biomass A had already decided to abort the new venture.

4.3.2 Case two: Manu A

The case study starts from the time of the project's inception and ends when the financing acquisition was aborted. The description of case two will explain the background of Manu A in terms of their previous financing and business experience. A narrative of the financing application under the GTFS is also included as a means to compare and contrast Manu A's background with their new business venture and financing application under the GTFS. The case study highlights the contextual influences on the deployment of Manu A's competencies.

4.3.2.1 *Background*

Established in 2005, the core business of Manu A is to market solar energy solutions, specialising in solar hybrid inverters. A subsidiary of Manu A acts as an integrator of these solutions. Under the GTFS, Manu A planned to establish a factory to manufacture solar hybrid inverters. The reason Manu A came up with the idea of establishing a factory to manufacture solar hybrid inverters was due to the growing demand in the region and the inability of their principal in Australia to supply the products for this growing demand.

In terms of financing experience, Manu A's experience is based on contract financing as their core business is the marketing of solar hybrid inverters. As a manufacturer, the new venture will be a significant change from Manu A's existing core business.

This significant change will also represent a new approach in terms of financing. These changes including financing under the GTFS context is a different context for Manu A in their transition from being a marketing firm into a manufacturing firm.

4.3.2.2 *Financing Application*

Manu A was seeking RM2.1 million to finance their factory to manufacture solar hybrid inverters for the South East Asian market. The factory was projected to have a return of investment (ROI) of 20%.

Manu A had experience in marketing and contract financing. However, the nature of their new venture to set up a factory needed new plans. To help refine their new venture, the directors of Manu A had detailed plans for their factory, including technical expertise from their Australian principal. Manu A had also obtained a manufacturing licence from the government and gained special pioneer status¹⁷ which brings a 10 year tax exemption for the factory. They had also engaged a technical consultant to help them with the technical details of the planning as shared by the managing director (MD) of Manu A,

¹⁷ Special pioneer status is a 10 years tax exemption awarded by the Malaysian government to firms that manufacture new technologies.

And then of course we have quite a number of expatriates here because this technology is new to Malaysia and currently we've got a couple of local engineers working with us and they're trying to understand how to design and all those kind of things. So, if you look around Malaysia, for inverter, there's never a product in Malaysia. (MD of Manu A)

In terms of the marketing of the product, Manu A through their established marketing network in the industry manage to obtain a letter of intent from a government link company (GLC) for solar hybrid systems to be implemented on a wide scale in rural areas. Based on this there was this assumption by Manu A that had captured and secured a sizeable market for rural electrification. In terms of financing, due to their established track record and the fact they already had the GTFS certification, Manu A was quite confident they would acquire financing. Therefore the financial aspect of the project was handled internally as expressed by the managing director (MD) of Manu A,

At the moment, we've got an accountant with us, but...but the whole financial package is planned between the directors, that means D, myself and Steve. We are the three people doing one of many. (MD of Manu A)

Here Manu A's input from external resources were limited to the technical aspect of the new venture. Manu A applied for the GTFS certification through the GTFS website. The Managing Director of Manu A presented their business plans to the GTFS technical committee and the business review committee.

In terms of the technical committee, they received good comments (e.g. high potential) their technical plans were

deemed feasible and environmentally friendly. However, they received mix comments from the business review process by the financial institutions (specifically about the purchasers of the product). The outcome of the whole evaluation agreed to award the GTFS certificate to Manu A on the 13th of December 2011. According to the Managing Director, who presented in front of both committees, the GTFS certification process was “easy”. Having felt that they had easily acquired the GTFS certification, Manu A assumed that financing would also be easy. This highlights the influence of the GTFS context on the financing application.

Here they applied for financing from their main bank, a leading local, commercial bank. The application included various new sets of documentation required by the bank. Because they easily acquired GTFS certification, Manu A thought that the financing would also be as easy. Here Manu A complained about the documentation requirements which they deemed to be unnecessary documentation required by the bank. From Manu A’s perspective the bank was delaying the application.

The Managing Director (MD) of Manu A described this documentation requirement as,

[...] too much time is wasted. We were supposed to have set up the factory much earlier, but the financing is so slow. We already have obtained the export licence, manufacturing licence, pioneer status, tax free status [...] but we can’t set up the factory because the financing part is slow. Even though GTFS has given us a letter, the bank is taking it as secondary. They’re more focus on other things. (Managing Director of Manu A)

The quote below reveals Manu A’s intention to capitalize on the guarantee to mitigate any concerns about the new venture

as part of their planning which might have contribute to their lax in upgrading their financing competencies.

... the idea to make it into a manufacturing company [...] [furthermore with] the GTFS finance says it's guaranteed by the government, CGC."

This believe in the government guarantee might contribute to the reason why they felt that financing would be easy and apprehension towards the documentation request from the banks.

Apart from the documentation, the managing director of Manu A also complained about the way the banks evaluated of the project. Here, he commented on the banks learning curve to evaluate technology based projects:

[...] I think the banks they need to employ a mixture of people who understand projects, engineering. You see, if you look at most banks [...] they don't understand technology. You can show the best technology, they just ignore. So I think it is a problem where the [bank's] policy needs improvement where their people have to understand [technology]. (Managing Director of Manu A)

Manu A shared their frustration at the pace of the financing process by venting:

It is taking a lot of time [...] the government has got a plan but the government has to make sure that the plan succeeds.

Since the day, we got the certificate, it's been one year, no bank is interested. So to the bank, what the government say doesn't mean anything. (Managing Director of Manu A)

These quotes illustrate the frustration and the surprise the managing director of Manu A felt at the level of difficulty to acquire financing, even from their main bank. Manu A felt that GTFS financing would have been easier than their current projects which are value more than their GTFS venture.

However there seems to be no bankers running to give them loans.

There seems to be a competency gap on the part of Manu A as they could not provide what the banks wanted. It also highlights the misinterpretation of the financing environment from Manu A's part. However for Manu A, they felt that this process was because of the bank's lack of confidence in the government's guarantee. The managing director and executive director of Manu A complained that the government guarantee was not respected by the financial institutions. This was repeatedly mentioned during the interviews:

You see, the thing here, without looking at the detail, we put in the papers, right? Most banks straight away reject it. We can see that they're showing minimum interest to GTFS. In fact, some of them propose that we should apply for normal financing, to ignore GTFS.
(Managing Director of Manu A)

As their application took longer than they anticipated, they started to apply financing from other banks. To their dismay these other banks also rejected them; some even rejected them outright without any explanation. To account for this the executive director exclaimed that:

[...] when the bank turns down our application, they didn't give us very concrete reasons but I called and I emailed them why [...] they didn't help us. They didn't give such a concrete answer. Nothing. (Executive of Director of Manu A)

This quote illustrates that due to a lack of feedback they were unable to learn from the experience of being rejected. This was later substantiated by a direct question to the executive director whether she learned anything from the multiple rejections, she replied "No".

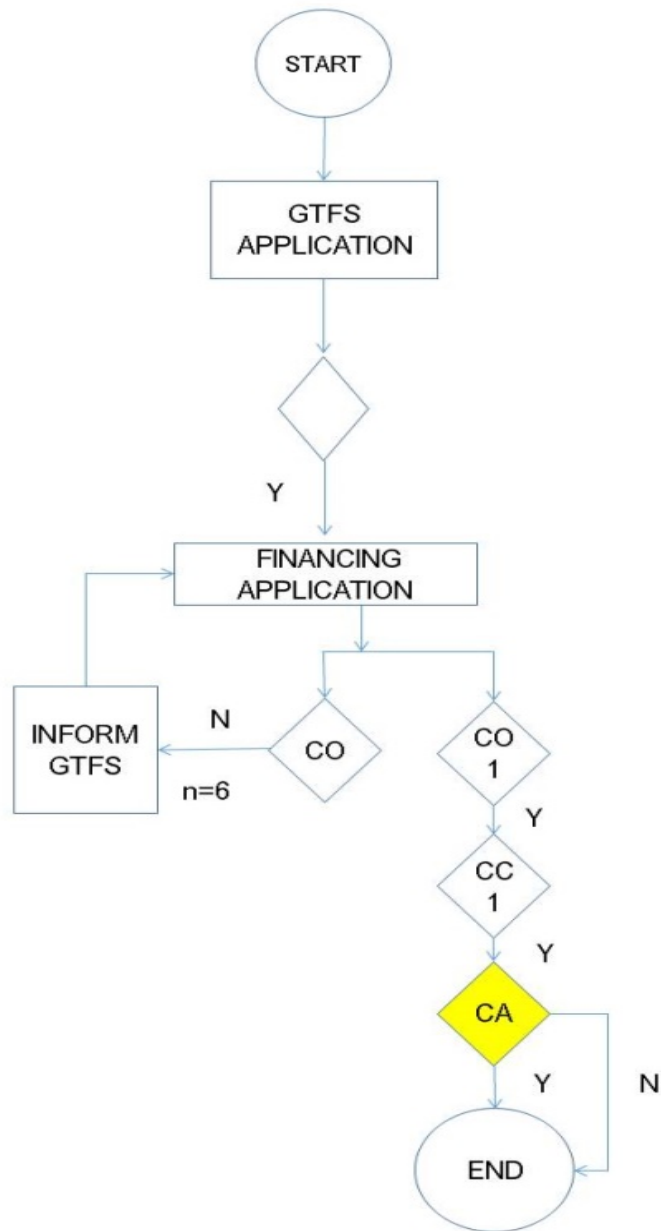
One of the points for rejection was picked up by the interview. This point was the vagueness of the purchase of the products evident from the quote below from the managing director of Manu A and executive director of Manu A

So the government has got a plan to electrify S** State, and that project is getting closer and closer. We have a lot of meetings that happen and our partners in these projects have also presented to the ministries, [and] even [the] Economic Council. So we know it's getting closer. So we tied up all these facilities so that it [is] parallel [when] the project starts the factory is ready [...] now the project is going to start, the factory doesn't even exist. (Managing Director of Manu A)

We showed to the bank, the letter of intent. They are worthless. (Executive Director of Manu A)

Financing was initially approved by their main bankers based on the letter of intent and the threat that Manu A would take their business elsewhere. However the financing was revoked because the letter of intent did not translate into a purchase order. Figure 9 shows the financing flowchart for Manu A.

Figure 9 Financing flowchart for Manu A



Legend

CO: Credit officer CC: Credit Committee CA: Credit Approval

4.3.2.4 *Case summary of Manu A*

1. Manu A possessed existing competencies from implementing previous projects. These competencies helped them to acquire financing and implement their previous projects which were mainly in marketing solar hybrid solutions and based on contract financing.
2. The new venture was different both in terms of financing and technical aspects which contributed to a competency gap. However having easily acquired GTFS certification they assumed that the financing would also be easy. Here Manu A misunderstood the new context and believed that obtaining financing would be easy. This perception was evident in their planning for the project, where Manu A felt that GTFS certification would help to absorb and mitigate the financial risk involved in their new venture.
3. As a result Manu A emphasised more on the technical aspect of the projects by bringing consultants and outside expertise. However the marketing and the financing preparation and planning of the project were based on internal discussions without engaging any outside consultants.
4. Even though the financing and technical aspect of the new venture was different in terms of scale and scope, the notion that financing would be easy influenced the deployment of Manu A's competencies. As a result Manu A had decided to emphasis on their technical competencies but overlooked the importance of adapting/ reconfiguring their financing competencies.
5. Furthermore, in spite of receiving multiple rejections from the banks, any learning from these rejections was not evident.

In the end Manu A was not able to reconfigure their existing competencies to be deployed in the new context.

4.3.3 Case three: Manu B

The case study starts from the project inception and ends at the acquisition of financing from a business angel. The description of case three will explain the background of Manu B in terms of their previous financing and business experience. A narrative of the financing application under the GTFS is also included as a means to compare and contrast Manu B's background with their new business venture and financing application under the GTFS. After several attempts to acquire financing under the GTFS, Manu B chose a different route and acquired financing from a business angel. This case study highlights the contextual influences on the deployment of Manu B's competencies, the necessary competencies needed to acquire financing and how these competencies were developed.

4.3.3.1 *Background*

Manu B was established in 2011 by a returning Malaysian entrepreneur who had resided in Germany for the past 30 years. The owner of Manu B did not have any experience in the manufacturing business and was formerly in the sports retail industry in Germany. However the management team of Manu B comprised of experienced professionals and consultants in various related business fields.

Manu B was established to participate in the growing green technology market in Malaysia. Manu B envisioned to participate in the green technology market by manufacturing

green technology based insulation materials. The licensing technology to manufacture the material is from a high technology German company owned by the German government and established German industrial firms. Manu B was also appointed the sole distributor for Asia (including the middle-east).

The new project embarked by the management of Manu B was different from their previous ventures on several levels including the country context, the new venture itself, and the GTFS context.

4.3.3.2 *Financing application*

The seed funding for Manu B's factory was internally generated from the owner and investors. Manu B was seeking further financing for their factory to manufacture an insulation material based on nanotechnology and green technology. The total financing required is RM 5,983,437 with a projected ROI of 87.00% for 10 years.

The owners of Manu B had limited experience conducting business in the Malaysian market. Therefore they had formed a team consisting of multi-disciplinary business professionals and consultants to help them to acquire financing and run the factory as explained by the managing director (MD) of Manu B:

We have one person, [from] an external company, through our networking she is a finance consultant. She placed one of her staff between six months to one year to help in terms of the finance.
(Managing Director of Manu B)

However in terms of financing and marketing decisions it still rest with the management of Manu B.

Manu B also sent their engineers for training in Germany,

We have engineers, biotechnologist, I sent them to Germany for training, for the last week we already pass bgfurther, manufacturing certification in Germany. We can produce for the world's navies. So we are the only company that can produce for the navy in Malaysia.
(Managing Director of Manu B)

To further fortify their investment readiness Manu B applied for the GTFS certification. Manu B applied for the GTFS certification through the GTFS website. Manu B presented their business plans to the technical committee and the business review committee. In terms of the technical committee, they received good comments (e.g. on the potential of the product). Even though they passed the business review process, there were some cautionary comments (e.g. uncertain buyers). Manu B was eventually awarded the green technology certificate on the 4th of June 2012. Both the presentations were led by the managing director. Here the managing director of Manu B commented that the GTFS certification process was easy.

Manu B and their team of consultants were aware of the existence of a competency gap however they were quite confident they would acquire financing under the GTFS because of the GTFS certification benefits. Furthermore apart from that Manu B also had a pilot project with the Royal Malaysian Navy and a confirmed order from Germany. However to their dismay, their financing applications were rejected by the financial institutions. The managing director

(MD) of Manu B expressed his frustration at this, and then recounted his business experience in Germany. Here he said,

I can sell your product for Germany but I don't have money. It is ok we sent the product first and then use sell. Here it's difficult, here we are so difficult to start, no money to fund no money to buy machine. I have never seen this before maybe this is a culture. Germany is simple, you make a contract, I am selling some marine product, shake hand finish, everyone's ok,

Sometimes in Germany you don't need bank money you can just use credit. (MD of Manu B)

These two quotes illustrate the fact that his business ideas are entrenched in the German way of doing things and also in his previous retail business; he had not adapted to the way things are done in Malaysia. He also commented on the GTFS scheme.

Our product is good; we think that our product is good. During the presentation to Greentech and [the] bank[s], everything was ok, but when the bank came again [they said] our company is too young, [we must] must have three years audited accounts. (Managing Director of Manu B)

This quote illustrates the difference between the GTFS evaluation and the actual financing context during the financing application. This was further compounded by the assumptions by Manu B about the GTFS as illustrated by the quote below:

It is not Greentech it is the bank that decides, that was our problem. (Managing Director of Manu B)

It is noteworthy, this misconception in terms of GTFS is that by applying through the GTFS, funding will be made readily available. This is apparent from the Managing Director of Manu

B suggestion that the funds should be with GTFS instead of the banks. Furthermore this signals a misinterpretation by Manu B in scanning the environment in this case the financing context.

When explaining the reason why they were rejected, the managing director (MD) of Manu B said the reason given was that they did not qualify for financing because they were a young company at that point of time. However Manu B was not satisfied with this answer and even went to see the CEO of the Bank as shown below,

We submitted our loan application to S** bank through a consultant. The Shah Alam branch said it would be hard to get and rejected the application. We [even] went to the CEO of S** Bank. They say that the product is new, a one-time sale item. (Managing Director of Manu B)

It was revealed here that the bank had an impression that the product was unique, and therefore had no potential for a recurring sale. This exemplifies not only the bank's limited knowledge about the product and but it also reflects the knowledge asymmetry of the banks in evaluating new technologies. Even though Manu B had a financial consultant, the financial consultant could not convince the banks.

This was evident during the business pitching session where one of the bankers who had attended the pitching session commented that Manu B had a limited track record. Even though Manu B claimed that the product was good, the bank did not want to spend time verifying the size of the market.

Here the banker, senior credit officer (SCO) Bank 4 said:

[...] without the track record [the] bankers, they don't have the expertise to verify your technology [...] [what about] the buyer, no off-take whether they want it or not [...] it's a little bit tough, financing

new technologies in the market without an off-take [...] (SCO of Bank 4)

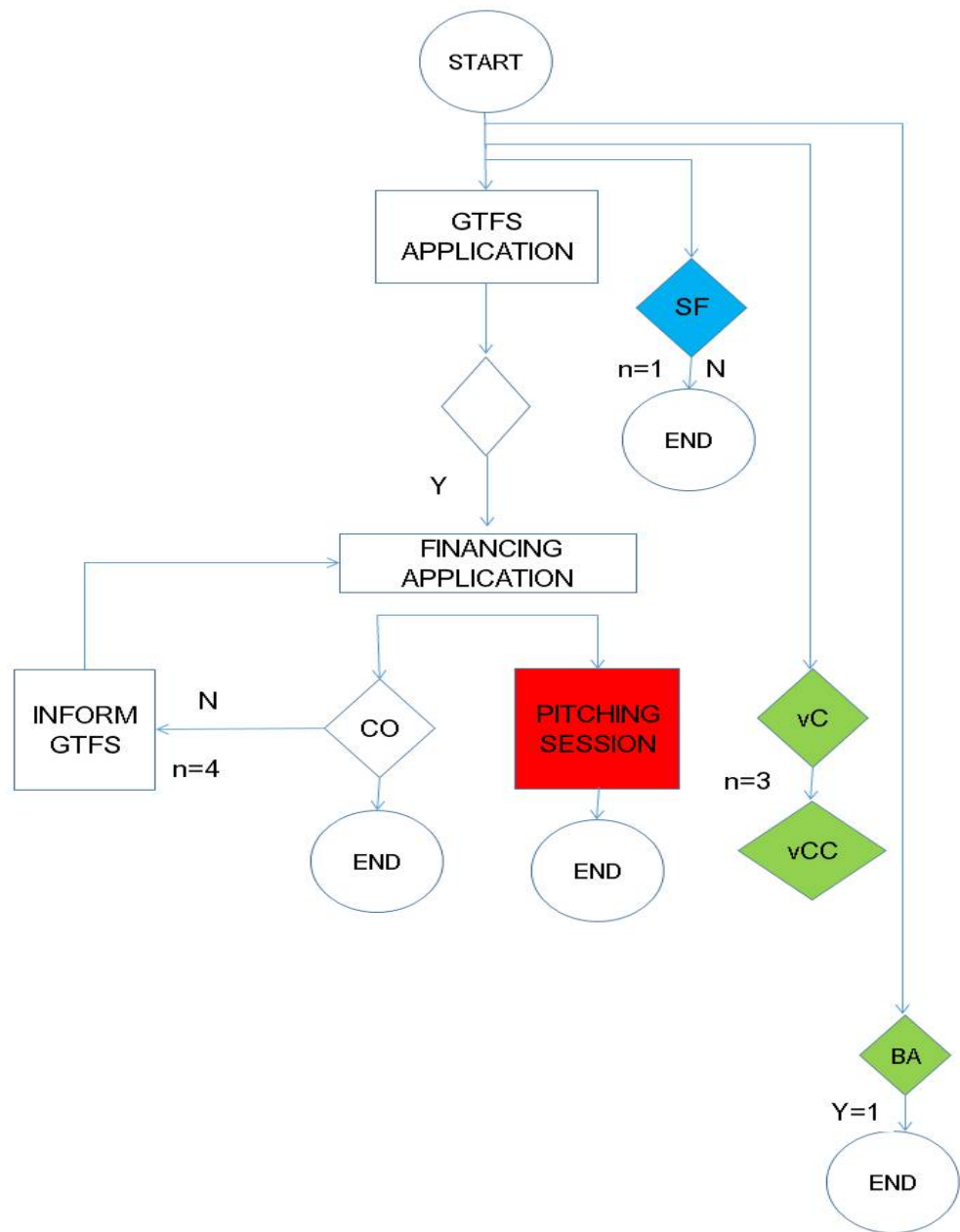
The managing director of Manu B admitted that the product might be new and unique as shown below,

Maybe because of the product [is] new and unique, if I apply something that everybody knows, I will get [financing]. Now I am trying something new, [it is] hard for them to believe. (MD of Manu B)

However he also highlights that the banks have difficulties in believing in the product which indicates the need to refine the opportunity and communicate it to the satisfaction of the banks which Manu B was unable at that point of time because of their competence gap. This quote also shows the difficulties to acquire financing regardless of the government guarantee for the technology.

Manu B had also been soliciting financing from various sources outside GTFS. Even though they were rejected under the GTFS scheme it also offered them to understand the Malaysian financing context. The learning from the financing rejection and the external consultants was not enough to acquire financing under the GTFS context but it helped them to acquire financing from a business angel. Figure 10 shows the financing process of Manu B.

Figure 10 Financing flowchart for Manu B



Legend

CO: Credit officer CC: Credit Committee BA: Business angel
vC: Venture capital VCC: Venture capital committee

4.3.3.3 *Case summary of Manu B*

1. Manu B had existing competencies that was developed in a in a different context. Manu B understood the existence of a competency gap. Here they had with them a management team comprised of experienced professionals and consultants in various related business fields to guide them to understand the new venture and the new context.

2. Even though they were assisted by consultants, Manu B had misinterpreted the environment, which caused a misconception that to acquire financing under the GTFS would be easy. In a way this perception was further aided by the fact that Manu B was awarded the GTFS certification without any difficulties. The notion influenced the full deployment of Manu B's competencies to acquire financing.

3. This notion also led Manu B to a financing rejection cycle in their financing application under the GTFS. The financing rejection cycle highlighted the necessary competencies needed to acquire financing under the GTFS. Here the necessary competencies were concerned with the need to refine the opportunity and the ability to convince and communicate the venture to financiers and bankers.

4. From the financing rejection cycle and external consultants, Manu B managed to develop the necessary competencies. These competencies were later used to acquire financing from a business angel and not under the GTFS.

4.3.4 Case four: Solar C

The case study starts from the project inception and ends after financing was acquired. The description of case four will describe the background of Solar C in terms of their previous

financing and business experience. A narrative of the financing application under the GTFS is also included as a means to compare and contrast Solar C's background with their new business venture and financing application under the GTFS. Solar C acquired financing under the GTFS after several attempts. This case study highlights the contextual influences on the deployment of Solar C's competencies, the necessary competencies needed to acquire financing and how these competencies were developed.

4.3.4.1 *Background*

Solar C was established in its present form in 1998. Over the years Solar C has established itself as an experienced energy service company with strong technical credentials in solar photovoltaic installation and renewable energy consultancy. Solar C is one of the first entrepreneurial firms to be involved in solar technology in Malaysia. They have embark on several notable projects such as the Malaysia Building Integrated Photovoltaic (MBPIV) Project, a national project that saw photovoltaic introduced expansively in Malaysia.

Even though Solar C has wide experience in terms of solar projects, their participation in these projects is either as contractors or consultants. The financing experience that they have is on the based on these projects which is based on contract financing. The current project under the GTFS that Solar C is embarking on is a large scale solar farm. The scope and scale of this project is new to Solar C, especially in terms of their role as an independent power producer and project financing.

4.3.4.2 *Financing application*

Solar C was seeking RM60 million to finance a 17 acre solar farm located in Melaka. The project has an IRR of 15.00% and ROI of 8 years.

As part of their investment readiness Solar C applied for the GTFS certification through the GTFS website. The Managing Director of Solar C presented their business plans to the technical committee and business review committee. Solar C received good comments from both the technical committee and the business review committee. They were later awarded the green technology certificate in 8 Nov 2011. The documentation submitted to the GTFS committee by Solar C was highly technical and accompanied by reports from technical consultants assuring the technical feasibility of the project. There were also financial documentations (e.g. IRR, cash flow analysis) to support the business case of the project. Overall Solar C felt that the GTFS certification process did not present any difficulty for them.

To further refine the venture and strengthen their investment worthiness they had purchased a 17 acre plot of land for the solar farm. Furthermore they obtained the feed in tariff quota on the 1st of December 2011 and subsequently signed the Renewable Energy Power Purchasing Agreement (REPPA) with the national utility. Solar C had taken steps to address the technical and marketing needs. Even though the RM60 million is the biggest loan amount that they had taken thus far, they appeared to be quite confident that with the GTFS certification

and benefits they would be well-placed to acquire the financing from the banks.

For the first, second, third, and fourth attempt at financing, Solar C's application was rejected at the credit officer stage. This included the international bank with which they had relationship as they had funded them for their previous multi-million ringgit project. The reason for the rejection was that the project was new and the bank could not refer to any similar projects in Malaysia.

Solar C persevered and continuously applied for financing, eventually they were called for additional assessment by three banks (fifth, sixth and seventh applied to). By the fifth attempt, Solar C managed to convince the credit officer, however it was later rejected at the credit committee stage due to the "newness" of the project. They continued with the other two financial institutions. Solar C eventually accepted the financial institution that gave the financing approval first from the two.

According to the senior finance executive (SFE) of Solar C, they submitted their application to Bank 2 on the 5th of March 2012. Bank 2 took almost seven months to evaluate their application, in between this there were several presentations and meetings. They finally approved the financing for Solar C on 6th of November 2012. Relating the financing application, senior finance executive (SFE) of Solar C said,

[...] we are in this industry so we just proceed with what we have [...] we thought that the financing application would be easy, looking back it took a year to acquire financing [...] (SFE of Solar C)

This quote also highlights the perceived easiness to acquire financing by Solar C under the GTFS. This misinterpretation of the GTFS context might have been contributed by Solar C's environmental scanning. This contextual influence proved to have a considerable effect in Solar C's deployment of their competencies during the financing application, especially in terms of financing skills.

In a separate interview with the senior credit officer (SCO) of Bank 2, he explained the credit evaluation process will definitely differ between industries including green technology projects. He admitted that in terms of credit evaluation for green technology financing among the banks; bankers need to learn more and the present evaluation process was not sufficient for the banks to finance green technology projects. This argument also indicated that for established entrepreneurial firms to obtain green technology financing under the normal credit criteria be difficult.

When sharing the reason why Solar C obtained financing, senior credit officer (SCO) of Bank 2 explained that Solar C was able to show the whole picture of their project, from the start to the end. They were able to present the business model for the project up to the understanding and comfort of the bank's executives. Here he said:

[That] one I financed; the whole thing is complete. Before you can ask one question, they already answered you everything. Before you can even ask, they will explain to you. They will do the presentation [on the] costing, about the durability of the product. They have all the evidence to show that it's a good product. They showed everything. Even the component [...] how is it made, what's the layering, because we actually learn from them (SCO of Bank 2).

As the evidence from the senior credit officer of Bank 2 illustrates, Solar C managed to communicate the complete picture of the project up to level, where learning took place between the SCO and Solar C. This contributed to minimizing the knowledge asymmetry surrounding the green technology project but also the credit evaluation process for green technology financing. This eventually led to Bank 2 deciding to approve the financing for Solar C. The senior credit officer (SCO) of Bank 2 admitted that Solar C was the first firm that he financed for green technology and this had become a benchmark against which he could compare other applicants. This highlights the importance of the ability to communicate and educate the bankers above their knowledge asymmetry in order to acquire financing.

According to the managing director (MD) of Solar C, they had previously obtained financing from Bank 2; however this was during the early stages of their business. Relating to their financing application to Bank2, the senior finance executive (SFE) of Solar C shared that Bank 2 was not the first bank in their mind. When explaining how they engaged Bank 2, the senior finance executive (SFE) of Solar C said:

Yes, we are directly involved, [in] the presentation, we attend the presentation, the technical meeting, they have technical meeting, they want to resolve some , any questions because they do not have expert so we have to attend, we have to present [...]

[...] we go together with [suppliers to] the banks to convince them that this project is reliable is, is good for the company, is good for the, the industry and the country, we go together with SEDA [FiT regulators] to clarify every enquiries that the bankers have[...]

(SFE of Solar C)

These arguments illustrate the multiple presentations and meetings Solar C had with Bank 2. These were led by the founder of the company; they even brought in their suppliers to this meetings and presentations and on occasions for points of clarification they were able to bring in the Sustainable Energy Development Authority (SEDA) to explain to the banks. For Bank 2, this further strengthened the notion that Solar C would be able to deliver and manage this new venture successfully.

This argument illustrates the extreme measures that Solar C took to dispel any notion of knowledge asymmetry between them and Bank 2. Having reassured Bank 2, they were able to close the gap by presenting the whole picture of the project to address the knowledge asymmetry that existed in their financing evaluation. This in turn educated the credit officer about the project.

To evaluate the reasons why Solar C was financed, it was revealed that Solar C was being coached under the high potential entrepreneurship program called TERAS¹⁸. They were inducted to the program on the 20th July 2012. One of the key

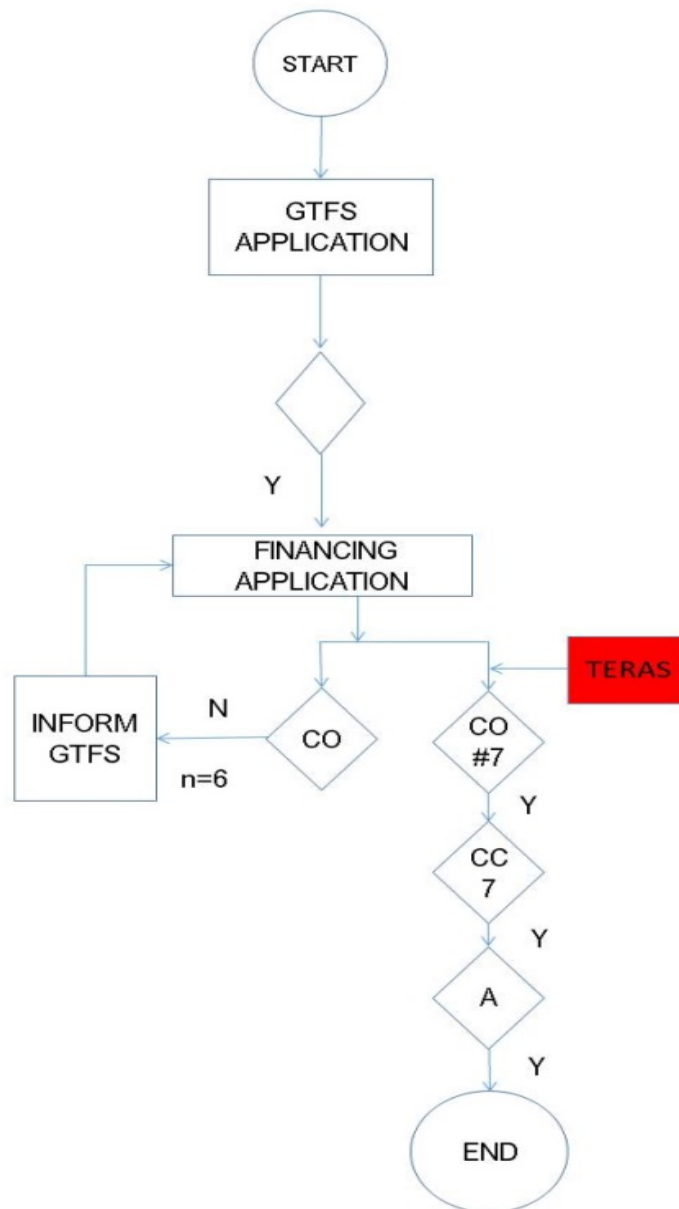
¹⁸ The TERAS programme was launched on 20 July 2011 to help entrepreneurial firms improve their business by supporting them through facilitating human and financial capital (e.g. business coaching)

intentions of TERAS is to facilitate financing. Being coached by TERAS, Solar C was able to raise their level of refining the opportunity through the up skilling of their financing skills. This became evident from the statement from the Managing Director:

Yes, the TERAS program provided business coaching programs. It is conducted by a financial expert from D auditing firm, a senior partner. The sharing of financial experience has helped us in reorganising our financial strategy and manage our taxes better. (MD of Solar C)

This statement also offers insights on how Solar C developed the necessary competencies to bridge the financing gap to obtain financing. Apart from the GTFS, Solar C also used the new financing skills on other financing schemes. The outcome of the coaching was evident as Solar C had also obtained the highly competitive facilitation financing for their project under the government public financing initiative (PFI). This facilitation financing is on a reimbursable basis, specifically for the infrastructure of their project. This further refined the investment readiness of their new venture. Figure 11 shows the financing process of Solar C.

Figure 11 Financing flowchart for Solar C



Legend

CO: Credit officer CC: Credit Committee A: Approval

4.3.4.3 *Case summary of Solar C*

1. Solar C has existing competencies developed during their previous projects. These competencies had helped them to acquire financing and implement their previous projects which were mainly in solar photovoltaic installation and based on contract financing.
2. The new venture was different in terms of financing, technical aspects, scale and scope. These differences in the new venture presented Solar C with a competency gap. However acquiring the GTFS certification gave the impression that financing would be readily be available. Here, the GTFS context influenced the deployment of their competencies in the new venture. There was more emphasis on the technical aspect of the new venture with technical consultants being engaged to help with refining the new venture. However the financial aspect was an in-house matter for Solar C.
3. As a result of the notion that financing would be easy, C tried to leverage on the 60% government guarantee for a larger amount of financing. Due to this notion and their existing competencies, Solar C went into a financing rejection cycle. The financing rejection cycle helped to identify the necessary competencies needed to acquire financing under the GTFS. Here there was a need for more refinement of the new venture, and the ability to convince, communicate and educate the bankers above the knowledge asymmetry of the banks.
4. Initially, Solar C had difficulty bridging the competency gap. However, learning derived from the financing rejections and the TERAS business coaching program helped them to bridge the competency gap. Solar C managed to reconfigure their

existing competencies from the business coaching program as it facilitated their learning process (e.g. new strategies, new funds, failure explanation)

4.3.5 Case five: Biomass D

The case study starts from the project inception and after the acquisition of financing. The description of case five will describe the background of Biomass D in terms of their previous financing and business experience. A narrative of the financing application under the GTFS is also included as a means to compare and contrast Biomass D's background with their new business venture and financing application under the GTFS. Biomass D managed to acquire financing in the first attempt. This case study highlights the contextual influences on the deployment of Biomass D's competencies, the necessary competencies needed to acquire financing and how these competencies were developed.

4.3.5.1 Background

Biomass D was established in 2008 by two established entrepreneurs. They recognized empty fruit bunches' (EFB)¹⁹ potential as a fuel source to generate electricity, but did not

¹⁹ EFB are waste products from the oil palm industry after they have extracted the oil from the palm oil, palm oil mills would pay to get rid of this waste.

have the financial ability to move forward. In 12 October 2009, Biomass D signed an equity investment agreement with a foreign public listed company. While the original owners were familiar with the Malaysian business context and had experience in the supply of the EFB, the new equity partners brought with them technical and financial experience of implementing and managing a power plant. The infusion of capital from the new partners enabled them to start planning for the project.

Even though this was a new venture for Biomass D, it had similarities with the management team previous projects; technically and financial. In technical terms, the management team had experienced being an independent power producer in a neighbouring country. While in terms of financing, the management team of Biomass D had specific power plant project financing experience. Therefore, in the case of Biomass D, based on the management team financing and business experience it was not a transition to a totally new venture.

4.3.5.2 Financing application

Biomass D was seeking a total financing of RM120 million with RM50 million for the green technology component. The IRR of the project is 14% and the payback period estimated to be eight years.

As part of their investment readiness preparation, Biomass D had signed an agreement to supply renewable energy to the national grid under the small renewable energy programme (SREP) in 2010. However in 2011, after the Feed in Tariff (FiT) legislation was put in place, Biomass D migrated to the new

renewable energy power purchase agreement (RePPA) with the national utility company with more competitive rates than SREP.

Aforementioned in 4.3.5.1 Biomass D has relevant experience related to the project. However they still engaged both technical and financial consultants to make their venture investment ready. The technical consultants they engaged were technical consultants who had earlier commissioned the first biomass power plant in Malaysia known as Kina and Seguntor. They also put a retainer on the Managing Director of Kina and Seguntor as their supporting consultant. Based on the consultants' advice, the major component of the power plant was sourced from a world renowned technology company, which had already established themselves in the field. Biomass D also brought in people that had related experience to facilitate various other issues such as development approval from the local authorities. The financial consultants that were engaged had experience in financing power plants in the South East Asian region. They also had a local financing consultant to assist them with their application.

As part of increasing the investment worthiness of the venture, the management team prepared the detailed account of the project by mapping the whole ecosystem of the project (e.g. land, the supply of the material, the technology providers, cash flow analysis, by-products, REPPA etc.). Here, apart from supplying electricity to the national grid Biomass D had successfully applied to be part of the United Nations Clean Development Mechanism (UN-CDM) programme to enter the carbon market and sell their carbon credits. The opportunity

refinement for the venture undertaken by Biomass D saw that they were not only supplying electricity to the national grid but also selling their carbon credits and by-products from the energy generation.

In addition, one of the co-founders owned a sizeable piece of land that was centrally located within the oil-palm plantation zone which made it logistically feasible to transport the EFB to the power plant. While, another co-founder was the former senior director of estates in Malaysia; he brought with him the negotiating power to deal with the surrounding oil palm plantations for the raw material. This made the whole picture of the venture a very solid proposition for the financial institutions that were approached to finance the deal.

Biomass D followed the normal application process for participating in the GTFS. They applied for the GTFS certification through the GTFS website. The Executive Chairman of Biomass D presented to the technical committee and the business presentation review.

In terms of the technical committee, they received positive comments (e.g. good logistics and RePPA) from both the technical committee and the review process by the financial institutions. They received their GTFS certificate on the 4th of January 2011. As they started the project before the GTFS, their overall preparation was not influenced by the GTFS context.

Therefore the GTFS was an unanticipated bonus to the feasibility of the venture and as such, all the previous

preparation increased the investment readiness of their venture for the GTFS scheme

Having received the GTFS certificate Biomass D applied for financing concurrently to two banks in Malaysia. The financing application to the banks began in November 2011. Biomass D had various meetings with the banks and made both technical and financial presentations. During these meetings concerns were raised by the banks about the supply of raw material. They received approval for financing from both of the banks in January 2012. However they accepted only one which was in line with their financing needs. The financing from the other bank that Biomass D rejected was only limited for infrastructure development.

While the financing approval took only three months, the preparation took three years. In describing the long journey the executive chairman of Biomass D said:

We have come a long way since the early days of the project, and this signing of the loan agreement for the Islamic Banking Facilities represents the confidence of M Bank in the project and in the ability of the company to achieve and deliver its business objectives. (Executive chairman of Biomass D)

In reference to the financing application the executive director of Biomass D said

The successful signing of the Islamic Banking Facilities by BIOMASS D is a significant milestone in the development of the power plant project as part of its long term financing plan, and we are pleased that with this under our belt, it shall pave the way ahead for an expeditious completion of the said power plant. (Executive director of Biomass D)

Both these quotes illustrate the commitment behind the planning and the preparation to make Biomass D investment

ready. The significance and importance of obtaining financing for the project was evident as it suggests the bank's confidence both in the project and the ability of Biomass D to manage the venture and ultimately, the ability to pay the bank back.

When accounting for his thoughts about why Biomass D obtained the project financing, the executive chairman attributed it to the financing abilities of the foreign partners. He also acknowledged they had the team to implement the project and Kina and Seguntor as the reference project. This became a powerful example for the banks to project an image of the outcome of the power plant that they were building. This proved pivotal for convincing the bank. The executive chairman of Biomass D stated:

Yes, number one is a financial ability[...] Number two, I think we have the people to run the show [...] and [we have as reference] Kina and Seguntor[...] [they are able] to produce electricity from Empty Fruit Bunches. (Executive chairman of Biomass D)

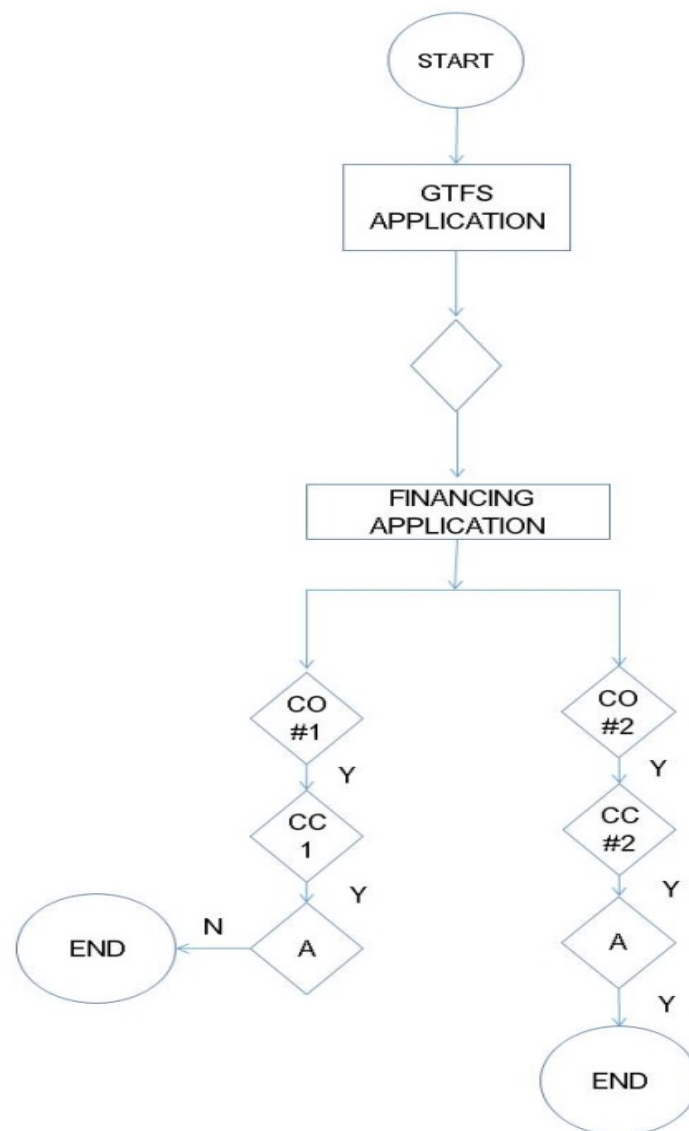
The move by Biomass D in having the Kina and Seguntor power plant project as a project reference was significant. The Kina and Seguntor project represented a successful working model for an EFB based power plant project in Malaysia. Biomass D had used the same technical consultants that were involved and had the Managing Director of Kina and Seguntor as a supporting consultant. The technical consultant helped to prepare the documentation. Biomass D also sent their engineers for training in Kina and Seguntor. The foreign partners had experience of building power plants but Biomass D were using a different raw material. This suggests that the

Kina and Seguntor project helped Biomass D's learning curve; knowledge was transferred through the management and technical attachment programs between Biomass D and Kina and Seguntor. In a separate interview with one of the bankers SCO Bank 3, she described the Kina and Seguntor project as the most successful biomass power plant project in Malaysia.

For the bank, the fact that Biomass D modelled their project on Kina and Seguntor helped them overcome the knowledge gap to understand how an EFB power plant functions. This, combined with the other credit criteria requirement, facilitated the decision to finance Biomass D.

After Biomass D acquired financing, they are currently being courted as partners in other Biomass projects. Figure 12 shows the financing flowchart of Biomass D.

Figure 12 Financing flowchart for Biomass D



Legend

CO: Credit officer CC: Credit Committee CA: Credit Approval

4.3.5.3 Case summary of Biomass D

1. The management team of Biomass D had relevant business and financing experiences in relation to their venture. However there was still a notion of a competency gap.
2. Even though there were contextual influences from the GTFS context, it was not enough to influence the environmental scanning by Biomass D. As a result, Biomass D was less influenced by the GTFS context. Due to this, Biomass D management team had engaged both technical and financial consultants to help refine the opportunity. As a result the management team of Biomass D had extensively refined their business plan according to the credit criteria set by the bank.
3. Biomass D further enhanced their investment readiness by linking their venture with an ongoing Biomass power plant which acted as a demonstration project. By engaging the management of the reference project as their consultant team they were able to learn and train from an on-going biomass power plant. These steps taken by Biomass D alleviated the concerns of the project feasibility by the banks for their venture and helped them to acquire financing.
4. Activities such as on-site training in *Kina* and *Seguntor* power plant also became a part of the competency development process for Biomass D. This aided Biomass D to reconfigure their existing competencies and to refine the opportunity and acquire financing from the bankers.

4.3.6 Case six: Solar D

The case study starts at the time of the project's inception and ends with the acquisition of financing. The description of case six will describe the background of Solar D in terms of their

previous financing and business experience. A narrative of the financing application under the GTFS is also included as a means to compare and contrast Solar D's background with their new business venture and financing application under the GTFS. Solar D managed to acquire financing in the first attempt. Another difference in Solar D's case is that they acquired financing first before acquiring the GTFS certification. This case study highlights the contextual influences on the deployment of Solar D's competencies, the necessary competencies needed to acquire financing and how these competencies were developed.

4.3.6.1 *Background*

Established in 2011, Solar D is a subsidiary of an environmental engineering company specialising in landfill rehabilitation. The management of Solar D is the same as the management team from their parent company. In their previous projects they were concessionaires for landfill rehabilitation. They were the first to move into landfill rehabilitation in the country. The rehabilitation of landfills needed special technical skills and project financing skills.

The present venture that they embarking on is an integrated renewable energy park which compromise mostly of solar energy. This integrated renewable energy park is to be built on rehabilitated landfill. Even though there are some similarities with their previous project in terms of project financing, the scope of their new project was different and presents a new challenge for Solar D's management team.

4.3.6.2 *Financing application*

Solar D was seeking financing for RM75million. The total cost of the project was RM 110,378,949 with an IRR of 8.92% and a ROI of 15 years. The project is a renewable energy park comprising a solar farm and biogas facilities on top of a rehabilitated landfill.

Scanning the environment Solar D recognised that they needed to bring outside expertise (e.g. world established suppliers, technical and project partners). Here, Solar D understood that they were new to this field and to refine this opportunity they would need additional expertise. To do so they brought on board project partners who had experience in gaining renewable energy concessions from the government. To further refine the opportunity, they acquired not only outside technical expertise but concurrently nurtured in house talent. When explaining the need to nurture technical talent within the company, the general manager of Solar D highlighted the fact that the pool of expertise in the market for solar energy during this time was very limited.

All these steps would strengthen their competency base and bridge the competency gap faster. This was explained by the senior finance manager (SFM) who stated that Solar D had the experience of taking on projects outside of their core expertise and internalising the expertise later on. He said that this has proved very beneficial for them. Here he explains,

So, with the experience of the construction in landscaping [...] we also venture into [landfilling]. This is when we started to do landfilling. We don't do it by ourselves...we bring in some expertise...get some technology from overseas. So, all these are actually helping us. Then,

we expend from there. It's not a one, two years change. It's actually taken few years before we actually become [what we are] today [...] (SFM Solar D)

This explanation by the senior finance manager (SFM) of Solar D collaborates with Solar D project partner's explanation of why Solar D picked them as their project partners. Indeed, they explained that Solar D was aware that the process of financing would be lengthy and it was something that was beyond their existing expertise; hence they decided on a project partner that had relevant experience as argued below,

[...]they have in a way significant presence in the green technology, green space , but our strength comes in is that we have structured so many concessions in the past, in fact we have done maybe two dozens [in] the last four, five years so they view our strength to basically be able to handhold them throughout the process because it's a very cumbersome project, it's a very lengthy and you know and a lot pitfalls and a lot of a you know challenges in the process. (Project partner of Solar D)

As part of investment readiness efforts Solar D applied for the feed-in-tariff and were awarded the quota on 1st of Dec 2011 and subsequently signed a Renewable Energy Power Purchasing Agreement (REPPA) with the national utility.

Solar D began the financing process by approaching various financial institutions instead of applying for the GTFS certification. This was in line with Solar D's financing strategy. According to the project partner the rational was that if they were to apply directly through the GTFS it would suggest being "special" in some sense. For them instead of being an advantage it might prove to be a disadvantaged; i.e. the belief was that the label GTFS would mean a more stringent the evaluation by the banks.

The project partners wanted to dispel any notion that the project was unable to stand on its' own two feet and had to be supported by a government programme to be viable. This also indicates that being in a "special" government programme may have adverse impacts instead.

Solar D approached two banks, a leading local bank and an international bank. The application was advanced due to a pre-existing relationship and the fact that the parent company was a public listed company also helped open doors for Solar D. The first part of the application included convincing the credit officer. This was based on the 5Cs as there was no exception to the rule in evaluating Green Technology projects.

The banks deployed the same evaluation criteria set regardless of any government assistance targeted to lower the risk. In other words, it also indicates that it did not matter which route Solar D took, because the viability of the project was the primary concern of the bank. If Solar D could demonstrate the project viability, this would generate sufficient confidence for the bank to finance the venture with or without the GTFS certification.

Even though Solar D was backed by their parent company, the financing process was lengthy. This was not only attributed to the rigidity of the financial evaluation that Solar D had to undergo. As explained by the project partner the length of the process was also due to the learning curve of the banks about green technology in terms of understanding the project and the understanding the financials that are specific to green technology projects. In other words, there was a knowledge

asymmetry in relation to green technology projects at that point of time.

Therefore it was the project partner's task to translate all the technical aspects in order to bridge the knowledge asymmetry of the credit officer, and thus assist their understanding of the project's business case. Solar D presented their case to the banks and they were able to communicate the whole picture of the project to the credit officer, thus bridging the knowledge asymmetry to help the credit officer understand the project holistically.

Helping to explain further the process of convincing the banks, the senior finance manager (SFM) of Solar D said

[...] in order to persuade the banker, we have to tell them our business strategies [...] we have to tell them our plans for the current plant that we build and then we have to explain to them what is solar plant. How they actually generate electricity [...] bring them to the site [...] the technology supplier is also very important. We have to use the top notch [suppliers], the one [that are] reputable in US, Germany, Korean like LG and Toshiba. (SFM of Solar D)

Recalling the project's approval, the senior credit officer (SCO) of Bank 5 shared that Solar D fits the ideal green technology entrepreneur:

The ideal Green Technology Entrepreneur would be somebody with a viable business, fits the credit criteria, have the expertise and experience, support from parent company, collateral, commitment, consultant to help with the completion of the project, able to understand the business without consultant by doing their own research. Really look at the feasibility and the ability to communicate the whole picture. (SCO of Bank 5)

This clarification from the banks also illustrates the additional criteria placed upon green technology entrepreneurial firms to

ensure viability and mitigate any risk. The emphasis is on the reliability of the project and the ability of the entrepreneurial firm to communicate the whole picture (e.g. reliability, the technology, the process etc.) of the project to ensure the credit officer understands and is satisfied.

To further explain the evaluation process, the project partner explained that the two aspects of financing evaluation; the quantitative part (e.g. financing ratios etc.) and the qualitative part. Even if you pass the quantitative part, without the qualitative part obtaining financing would be difficult as the learning gap would not have been bridged. Here the project partners explained:

So you might pass the numbers but [if] you don't pass the qualitative part because [they] don't know what [you] are talking about, there is a lot of unexplained and [everything] suddenly [become] efficiency, extraordinary...things like my IRR is 20% [...] so they kick you out not because you are not bankable or the numbers but they don't trust you as simple as that. (Project partner Solar D)

To sum up the financing process for Solar D, the financial controller of Solar D explained the difficulty of obtaining financing was due to the learning curve, for the banks and for them. Here she explains:

[...] we did, I think we, they have a learning curve, [and] we have a learning curve on how to deal with them as well. They, it's their first renewable energy, or they say it's their first green loan as well, even though this bank that we are talking about is an international bank. (Financial Controller of Solar D).

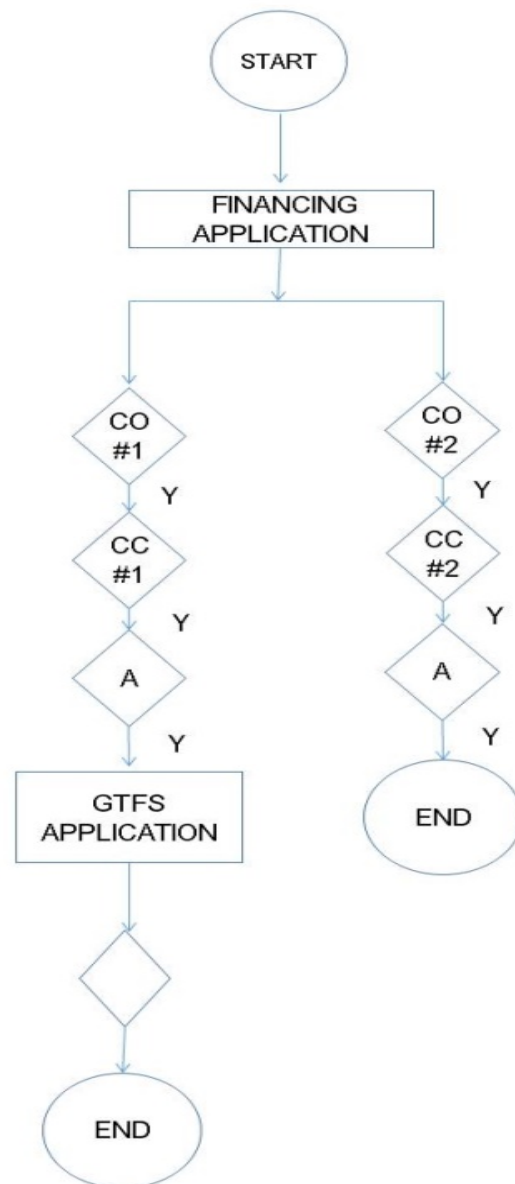
Overall, there was a learning curve for the entrepreneurial firm and the bank, which contributed to the knowledge asymmetry present during the financing application. Solar D addressed

this knowledge asymmetry with the help their project partner, which facilitated Solar D's ability to communicate the "whole picture" of the project, which in turn, contributed to convincing the banks to finance this project.

The next stage of the process was the GTFS application. After acquiring the approval for financing from the bank, Solar D applied for their GTFS certification. No significant problems were encountered at this stage as the purpose of the GTFS was to ensure the business and technology viability of the venture. Since Solar D had already convinced the bank of the venture's viability; this made the GTFS certification process much more straightforward.

Solar D then approached the financial institution that gave them the financing and requested that the terms and conditions (i.e. the benefits) of the GTFS scheme be awarded to them. Currently Solar D has offered their services as a turnkey contractors for renewable energy projects. Figure 13 shows the financing flowchart of Solar D.

Figure 13 Financing flowchart for Solar D



Legend

CO: Credit officer CC: Credit Committee CA: Credit Approval

4.3.6.3 *Case summary of Solar D*

1. Solar D's previous business experience helped them to scan and identify the existence of a competency gap between their existing competencies and that of the new business venture. Based on their environmental scanning, Solar D decided to acquire financing first before applying for the GTFS certification. Because of this decision, the influence of the GTFS context was diverted.

2. Because Solar D chose to acquire financing without the GTFS certification the technical and financial aspect of the project was treated on the same scale. This was partly evident from the external technical and financial inputs. The financing route taken by Solar D avoided the influence of the GTFS context to the deployment of competencies.

3. Here Solar D started by refining the new venture for it to be investment ready. The refinement process was a tedious process and involved multiple parties. In convincing the banks, Solar D also had to convince and educate to overcome the bank's knowledge asymmetry.

4. The insight from this case study is that Solar D developed their competencies by collaborating with experienced project partners, training internal staff and acquiring external expertise in the area.

4.4 *Summary of the Case Studies*

The cases detailed above illustrate the influence of the GTFS context on the process and outcome of financing. While each

of the case studies was situated within the same GTFS context, the diversity amongst the established entrepreneurial firm's experiences of this scheme is noteworthy.

Each case's financing flowchart highlights the critical point of financing rejection, or success, illustrating the dichotomy between the GTFS certification and the financing evaluation process. The analysis of each case brought to light the need to reconfigure existing entrepreneurial competencies (and/or develop new competencies) to acquire financing. As detailed above, there are multiple routes to develop the necessary competencies based on the entrepreneurial firm's previous paths.

Table 15 shows a summary table of the key points across the cases. Appendix 5 is some of the examples of the quotes from the individual cases.

Table 15 Summary of Key Points from the context and cases

	1	2	3	4	5	6
FINANCING PRIORITIES						
Government directive that the banks must follow	X	X	X			
The guarantee is worthless	X	X	X			
Green technology loan have a high risk perception			X		X	
Conventional loan criteria	X	X	X	X		
GTFS is easy money	X	X	X	X		
Malaysian banks are traditional bankers	X	X	X		X	
GTFS is a form of Banking CSR	X	X	X			
BANK KNOWLEDGE ASYMMETRY						
Learning curve for the bank	X	X	X	X	X	
Need to learn new evaluation technique	X	X	X	X	X	
No expertise for technical evaluation	X	X	X	X	X	
The banks are not interested	X	X	X			
GREEN TECHNOLOGY FINANCIAL CRITERIA						
Financial comfort				X	X	X
Whole picture concept				X	X	X

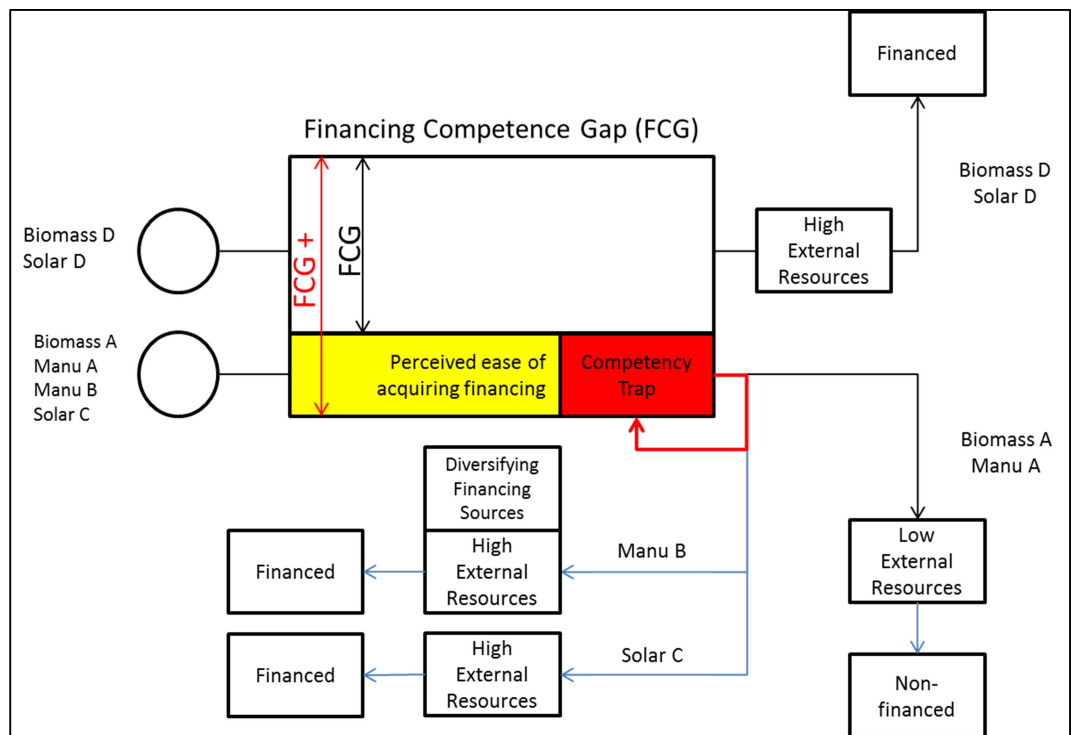
Technical expertise	X	X	X	X	X	X
Financial expertise				X	X	X
Successful financing criteria				X	X	X
PERCEIVED EASE OF ACQUIRING FINANCE						
Previous financing experience	X	X	X	X	X	X
Easy GTFS certification	X	X	X	X	X	X
The perception that GTFS is easy money	X	X	X	X		
Too good an opportunity to miss	X	X	X			
COMPETENCY TRAP						
Financing rejection cycle	X	X	X	X		
Non-learning		X				
Multiple rejection	X	X	X	X		
OPPORTUNITY REFINEMENT COMPETENCIES						
Investment readiness steps by the entrepreneurs	X	X	X	X	X	X
Engagement of technical consultants/business consultants/coaches (external expertise)	X	X	X	X	X	X
Retraining of staff with new competencies	X	X	X	X	X	X
Marketing of products-secured markets	X			X	X	X
Business plan presentation	X	X	X	X	X	X
Upgrading Technical Competencies	X	X	X	X	X	X
Upgrading Financial Competencies			X	X	X	X
RESOURCE ACQUISITION COMPETENCIES						
Educating the bankers				X	X	X
Convincing the bankers to the point of satisfaction				X	X	X
Financial-Technical knowledge				X	X	X
COMPETENCY DEVELOPMENT						
Firm background	X	X	X	X	X	X
Previous financing experience	X	X	X	X	X	X
Previous business experience	X	X	X	X	X	X
Current competencies	X	X	X	X	X	X
Financing Competence gap	H	H	H	H	L	L
GTFS context influence	H	H	H	H	L	L
Non-acquired financing	X	X				
Financing rejection cycle	X	X	X	X		
External Resources/ Learning	L	L	H	H	H	H
Acquired financing			X	X	X	X
Diversify financing sources			X			
Learning-Intervention				X		

H-High L=Low X-present

Based on the case studies and financing flowcharts in Chapter 4, an overview of the findings is depicted in the Figure 14 below. In Figure 14, external resources refer broadly to “those assets-physical or otherwise-that are used by the firm in its

pursuit of growth and over which the firm has no direct ownership” (Jarillo, 1989:135), which in the cases are the consultants, suppliers, and business coaches etc.

Figure 14 Overview of findings (from the researcher)



CHAPTER 5: CROSS-CASE ANALYSIS AND FINDINGS

5.1 Introduction

In the previous chapter the detailed key aspects of the research context (e.g. the GTFS) and the individual case studies have been presented. The research now turns to the cross-case analysis and the research findings. Here, the chapter is divided into three: overview of the cross-case analysis, the detailed findings based on the research questions and a chapter conclusion.

5.2 Overview of cross-case analysis

Aforementioned the purpose of this research is to explore and understand the conditions and policies which enable established entrepreneurial firms to acquire green technology financing in the GTFS context.

The GTFS context and case studies described in Chapter 4 illustrate the complexities that exist under the GTFS context. The findings in Chapter 4 were unravelled by examining each case study independently under the GTFS context. In this section, the general overview of the cross-case analysis of the six case studies will be presented.

Firstly, all the cases exhibited a competence gap. The reason for the occurrence of the competence gap is because of the transition from a different industry to the green technology space. The financing competence gap is more prevalent in the cases because of the GTFS context. Here a noted anomaly is

that established entrepreneurial firms have found it challenging to acquire financing through this scheme even when they have a successful track record of securing finance through the banks, success in managing their businesses, a secured market and the GTFS certification. Indeed the influence of the GTFS context plays a huge role in the deployment of the entrepreneurial firms competencies.

Secondly the insights from the financing process which comprise of the investment readiness stage, financing application, financing rejection cycle and financing success and failure of the cases, it was discovered that the necessary competencies needed to acquire financing under the GTFS is centred on two main attributes, the first is the ability to refine the opportunity and the second is the ability to communicate and educate with the aim to fulfil the knowledge asymmetry gap of the bankers.

Finally, it was also discovered that there were four pathways to develop the competencies which were crucial in order to acquire the much sought financing, regardless of the starting point of the financing process. Themes derived from the individual cases have been finalised and presented in table 16.

Table 16 First order concepts, second order concepts and aggregate dimensions (adapted from Gioia, Corley, and Hamilton 2012:21)

1st Order Concepts	2nd Order Themes	Aggregate Dimensions
Government directive that the banks must follow The guarantee is worthless Green technology loan have a high risk perception Conventional loan criteria GTFS is easy money Malaysian banks are traditional bankers GTFS is a form of Banking CSR	Financing Priorities	Financing Competence Gap
Learning curve for the bank Need to learn new evaluation technique No expertise for technical evaluation The banks are not interested	Bank Knowledge Asymmetry	
Financial comfort Whole picture concept Technical expertise Financial expertise Successful financing criteria	Green Technology Financial Criteria	
Previous financing experience Previous business experience Easy certification of stage 1 of the evaluation The perception that GTFS is easy money Too good an opportunity to miss	Perceived easiness to acquire financing	
Financing rejection cycle Non-learning Multiple rejection	Competency Trap	

1 st Order Concepts	2 nd Order Themes	Aggregate Dimensions
<ul style="list-style-type: none"> • Investment readiness steps by the entrepreneurs • Engagement of technical consultants/business consultants/ coaches (external expertise) • Retraining of staff with new competencies • Marketing of products-secured markets • Business plan presentation • New financial criteria 	Opportunity Refinement Competencies	Entrepreneurial Competencies
<ul style="list-style-type: none"> • Educating the bankers • Convincing the bankers to the point of satisfaction • Financial-Technical knowledge 	Resource Acquisition Competencies	
<ul style="list-style-type: none"> • Firm background • Previous financing experience • Previous business experience • Current competencies 	Path dependence	Competency Development Pathways
<ul style="list-style-type: none"> • Financing Competency gap • Non-acquired financing • Financing rejection cycle • Low external resources 	Entrapped	
<ul style="list-style-type: none"> • Financing Competency gap • Acquired financing • Diversify financing sources • Financing rejection cycle • High external resources 	Diverge	
<ul style="list-style-type: none"> • Financing Competency gap • Acquired financing • Financing rejection cycle • High external resources 	Escape	
<ul style="list-style-type: none"> • Financing Competency gap • Acquired financing • High external resources 	Evade	

The next section will detail the findings based on the research questions and the final themes.

5.3 Key Findings

The main research question is “How do established entrepreneurial firms develop competencies to acquire green technology financing in the GTFS context?” The research further breaks the main research question into three sub-research questions: “How does the GTFS context influence the deployment of competencies by established entrepreneurial firms?”; “What entrepreneurial competencies are necessary for established entrepreneurial firms to acquire green technology financing?”, and “How are these competencies developed?”

In the research three significant findings were identified. The first relates to the **financing competence gap**. The second finding highlights two sets of entrepreneurial competencies necessary to acquire green technology financing, which are: (i) **opportunity refinement competencies**, and (ii) **resource acquisition competencies**. The third finding pertains to the **competency development paths**. Taken together, these three findings highlight the nexus of complexities that abound in this research context. The results of the analysis show the significance of a green tech financing competence gap for established entrepreneurial firms. This gap, in turn, influences how competencies (i) and (ii) above are developed in the process of trying to acquire GTFS financing.

In the following subsections, the three findings will be explained in detail, the financing competence gap, and the two sets of entrepreneurial competencies: (i) opportunity refinement competencies and (ii) resource acquisition competencies and the entrepreneurial competency development path.

5.3.1 Financing competence gap

This subsection aims to provide insights to answer the research question: “How does the GTFS context influence the deployment of competencies by established entrepreneurial firms?”

To answer this question, the next subsubsections explain subthemes in the financing competence gap to illuminate how they evolved and influence each other, and then influence the financing competence gap, and in turn how the financing competence gap influences the deployment and development entrepreneurial competencies of the established entrepreneurial firms (Rasmussen et al., 2014). The first subsubsection will highlight the financing priority between the three stakeholders (Meek, Pacheco, and York, 2010), this will be followed by the bank knowledge asymmetry (Bonnet and Wirtz, 2012), the penultimate subsubsection will discuss the financial criteria, highlighting specific financial criteria (Cassar, 2004) identified for green technology ventures and the last subsubsection will discuss two other contextual influence from the GTFS context.

5.3.1.1 Financing Priority

The different financing priorities of the government and the banks were highlighted by several program administrators who expressed their opinions:

I think looking at the financial system, they think differently. They're not [on] the same wave length [in terms of] the way of our thinking. They're talking about dollar and cent only. (PA1)

I really don't understand how the bank thinks, to advise against the GTFS to simplify their own work. In the end, the entrepreneurs will not receive any GTFS benefits. (PA1)

Here another program administrator went on to explained his take on what the bank was prioritizing. The banker argues that:

[...] most of the banks [in] Malaysia are traditional bankers to speak [...] the understanding [of] the industry is important [...] our normal bankers are traditional bankers [...] saving the environment is not part of the agenda. (PA5)

In trying to explain the banks rejection from a credit criteria point of view, a program administrator argues that,

From the feedback I got, those companies that have difficulty in getting financing are based by various reasons. Number one, of course, they have no security to offer to the bank as you know that green technology is new so for the bank, anything that is new is high risk so when is high risk, the bank will look at an alternative. The, the generation of the cash flow would be the primary source of repayment but the bank will also look at the secondary resource of the payment which is the collateral, security so some of these companies, there is no security to offer to banks. Secondly, they have no track record. This is based on the commercial banks criteria. They want to see track record, of course new companies, new set up companies don't have track record and thirdly the credit history of the green technology entrepreneur themselves. Even though they have a viable or bankable project but they not have a very good past history or credit history and then number four would be the commitment as I mentioned, their capital, they are not prepared to commit to the project and expect the whole thing to be finance by the banks. (PA2)

However this highlights the difficulty facing the established entrepreneurial firms in the research and the anomaly of the GTFS context stands out. Even though they have collateral; GTFS certification, corporate guarantee and personal guarantee and excellent financing track record they were not able to acquire financing. This is contradictory to Parker's (2013) suggestion that when established entrepreneurial firms switch industries financing would be still available for them.

In the case of the banks, they had other thoughts; for them, it was business as usual,

Okay. The banks' primary business is you know, our primary commodity is lending money. When we lend, we make money. That, that must be clearly understood – the bank, the primary objective [of the] bank is to lend out money. The moment we lend out, we make money. (HOD Bank 1)

It was also cautiously stated by the banks that:

We fully support green projects. The reason why we want to support is because of the incentives behind it, the 2% rebate and the 60% government guarantee. [...] [However] green technology projects need experience and expertise, too risky, banks are worried, and maybe with a good consultant those risks can be mitigated.[...] Banks do CSR but not for business applications (SCO of Bank 5).

The banks also remarked that would be hard to finance nascent entrepreneurs because it would cost them time and money to verify the technology as argued by senior credit officer (SCO) Bank 4 below,

I have to get a [reputable technology firm] like SGS, I have to look at all the manufacturing file and this thing; so many costs involved, you know, time and money involved and finally, "Oh, your quality's good" and then, [there is the question of the] buyers. They, SGS will only prove one thing... (SCO of Bank 4).

He further argued for established entrepreneurial firms, when they embark on a new venture it will be looked on as a new business because for the banks they consider that these established entrepreneurial firms have no relevant experience.

In the first instance for nascent entrepreneurs financing is difficult because they do not have a track record and the banks will not verify the viability of their technology. While for the established entrepreneurial firms, even if they have a

track record the banks will not finance them because they have no relevant experience.

Contributing to this difficulty to acquire financing is also the notion that when there is a special program such as GTFS, the viability and the business case of the venture comes into question as highlighted by the project partner of Solar D:

[...] [if] something [is] special, there must be something wrong with that, you see if you are commercial viable, why do you get a special program right? [...] when you say that people will become sceptical. Because the basis has to be on the merits and the strength of your organisation ... all [of] this special scheme ... the banks would be [extremely] sceptical. [...] when you are like very persistent give a loan [for] green, I will be very sceptical you know because already [...] there is a lot of persuasion etc. and things like that which means that maybe this thing is not bankable. (Project partner of Solar D)

Furthermore, the way the government promotes the various green technologies by bringing in international experts that not only skews the market but also creates contextual understanding for the banks. Also contributing to this difference in financing priority is the of lack awareness among the banks about the financing scheme. From the data analysis, ascertaining all the causes for the difference to financing priorities is difficult. However, it is apparent that the complexity from the multiple stakeholders contributes to the different financing priorities.

The established entrepreneurial firms argue that the banks should give them the financing as this was a government directive, which in their opinion absolves them from the usually tough credit evaluation of the banks.

This perception had heavily influenced their overall planning for the new venture especially the ease of acquisition of financing. The banks also had noticed this perception:

One, I think one major misconception was when they [the entrepreneurs] obtained the green technology certificate the proprietors thought it was their license to go and borrow. That was one major misconception. (HOD of Bank 1)

However there was also another reason that led to this belief; the lure of easy financing and high profits admitted by executive director of Biomass A,

Because it was a coincidence, I would say. I mean, it was never my interest per se. [...] there was a lot of promotion by the government saying that, [...] a lot of incentives, [...] lucrative revenues out of that (ED of Biomass A).

This impression and appeal of the GTFS will be further explained in 5.3.1.4.

This subsection highlights the difference in financing priorities for the GTFS between the government, banks and the entrepreneurial firms. This difference in financing priorities also distorts the meaning and might influence the financing process of the established entrepreneurial firms. In the next subsubsection, the bank's knowledge asymmetry will be explained in detail.

5.3.1.2 Bank's knowledge asymmetry

The notion of knowledge asymmetry is similar to Bonnet and Wirtz's (2012:94) suggestion that "knowledge asymmetry (or *cognitive heterogeneity*) may be a source of mutual misunderstanding, and it even occurs in circumstances where information is evenly distributed". Based on the data analysis, the bank's knowledge asymmetry is exemplified by the bank's

flat learning curve and the lack of interest in financing green technology ventures. This is illustrated below in several cases in the research.

In the case of Biomass A, they had an excellent track record with banks. However, for the current green technology venture, Biomass A had problems convincing the bank, even though a substantial amount of capital had been invested in the project. The method of evaluation by the banks was a matter of contention for Biomass A. Here the executive director of Biomass A argues that:

For example, *BC, our main banker, for a Green Technology project, they have to send the proposal all the way to Hong Kong, because the Malaysian unit cannot make a decision. That's how the process is. They've got no people here to evaluate whether the project is [viable]. Hong Kong makes the decision without considering the government incentives. The bankers here have to follow. (ED of Biomass A)

Adding to this argument is the senior finance executive of Solar C highlighting the inexperience of bankers to evaluate their project as shown below,

Because their reason is this industry is new in the Malaysia and they are not [familiar] and there is no project to refer to. Our main bankers did not have the confidence and withdrew from financing the project (SFE of Solar C)

Drilling down the banks' evaluation process the project partner of Solar D highlights the role of the credit officer,

[It was] nearly a year and I said "Is it a yes or a no?" [...] It was not a "no" I think the guy doesn't know how to take it up to the credit committee because [...] all questions from committee [the credit officer] has to answer, I'm not there to be defend it, the promoter is not there to defend it, the credit officer has to be able to [defend it]. (Project Partner of Solar D)

Furthering how seemingly whimsical the reason for the rejection can be, the managing director (MD) of Manu A complains that,

And we have to assemble to make our inverter. So the correct word is 'assemble' but once assembled it becomes a manufactured product. But the bank turned us down just because of the word 'assemble'. So it's so difficult [...] to make this bank understand and give this finance (MD of Manu A)

Summing up his argument the managing director (MD) of Manu A has this to share,

You know, maybe [their thinking is], "Oh, you're buying a house. I also got a house so I know what a house is. So I [will] give you financing. This is technology. I don't know so it's too risky," that is the way they think (MD of Manu A)

Based on the analysis, even though the entrepreneurial firms had tried to explain everything, the banks were not able to understand because of the method of evaluation used. It is therefore suggested that this highlights the bank's knowledge asymmetry. This is different to the notion of information asymmetry (Westhead, Wright and McElwee, 2011), where the question of whether all of the information has been provided to the bank by the entrepreneur, in this case, all of the information has been provided, however the banks are not able to properly evaluate the information. (See section 2.3)

This results in frustration on the part of the established entrepreneurial firms because they have an excellent financing track record. They have invested quite a substantial amount of capital and time in the new venture. They have been successful in their previous ventures and they are not nascent entrepreneurs. Furthermore, the banks they were dealing with

are exactly the same banks with which they have an excellent track record. In some instances, the financed amount received previously is much greater than the amount that they requested for their new ventures:

[The] projects run in the couple of millions [...] these projects are much bigger than this GTFS funding, and we have managed all these projects all these years (MD of Manu A).

Based on the data analysis, the bank's knowledge asymmetry is prevalent across all of the banks interviewed. This is exemplified by an admission from the head of department of Bank 1:

Although we are [one of] the lead GTFS supporters, our focus is primarily on our existing customers. That will be an eventuality where we will be sending people to acquire technical expertise on the four main sectors. It's just that it has not reached that desired stage yet. (HOD of BANK 1)

The bank's knowledge asymmetry occurs at all levels of the banking system, from the credit officer who receives the financing application to the top management. There is a "wait and see" attitude before the banks commit resources to green technology financing. As the GTFS is new, the banks admitted they were struggling with it and they needed new tools to evaluate.

I mean, not just to lay blame only on the entrepreneurs. Sometimes, it is the financial institution themselves. When targets are not imposed you know it is human nature, when you're not familiar with something, the best thing to do is avoid. [...] I would not lay blame only on the entrepreneurs. [...] the financial institution also has got to acquire knowledge. [...] knowledge not only at the working level, it's also must be right from the top down because the CEOs must embrace this because the credit committee must embrace, the risk management side must understand. But as it stands now, it's still not [happening] (HOD of Bank 1)

The Senior Credit Officer (SCO) of Bank 2, who was involved in financing Solar C, confessed that the evaluation for green technology financing was different and that there was a learning curve. Here he explains that:

I cannot compare green financing compared to normal financing. It's totally different because from my experience, the ones that we have done are quite huge projects. We have done quite huge projects and it's totally different. For me I had to learn altogether again. My 5Cs²⁰ and I had to add on some more... (SCO Bank 2).

The financial controller of Solar D added that it was a learning curve for everybody involved; banks, established entrepreneurial firms and government dealing in the new financing process.

The findings seem to suggest that the knowledge asymmetry occurs at all levels of the banks. Therefore, the bank's knowledge asymmetry influences the financing process most likely the financial evaluation, which is a key component of the green technology financial criteria. The financial evaluation is where the evaluation of the cash flow assumptions will be pivotal, yet hard to understand because it will be based on unproven green technology. To further understand this, we move to the next section which will discuss the green technology financial criteria in detail.

²⁰ The 5C credit criteria, is a criteria that the majority of the banks use to evaluate financing. The 5C's are character, capacity (cash flow), capital, condition and collateral. The order of the Cs is according to importance.

5.3.1.3 Green technology financing criteria

The Green technology financing criteria is divided into two: (i) the technical criteria and (ii) the financial criteria. Based on documentary evidence, the technical criteria centres on the feasibility of the technology to: (i) minimise degradation of environment; (ii) have zero or low greenhouse gas emissions; be safe to use and promotes healthy and improved environment for inhabitants; (iii) conserve the use of energy and natural resources; and (iv) promote the use of renewable energy resources. In other words the technical criteria focus on the 'greenness' of the venture. The technical evaluation is conducted by the GTFS technical committee which includes government departments and external technology consultants. There is also a requirement for a business model presentation by the applicants based on an open pitching session with bankers. The ventures that successfully fulfil the criteria will receive the GTFS certification, which according to program administrator 4 is a guarantee of the feasibility of the technology:

[The 60% government guarantee] is [for] the success of the business in using that technology (Program Administrator 4).

The fact that the certification is a guarantee for the technology should already be a powerful equation in the financial evaluation of the new green technology ventures.

Aforementioned the financial criteria are generally known as the 5Cs. This is the credit criterion set by the banks globally for conducting their financing evaluation. Even though the credit criteria seem rigid, based on the data analysis, much ambiguity exists about how the financial evaluation is conducted for sustainable entrepreneurship ventures. As the

bank's learning curve reduces, the evaluation criteria will eventually be redefined to the context of green technology financing.

The GTFS is a government based scheme but the funds are sourced from the banks that make the final decision to finance a venture. Rather than adopting their criteria to accommodate green technology characteristics the banks were found to resort to still use the conventional method of evaluating loans.

Based on these criteria, the general bank criteria for green technology financing is generic towards any technology based business. That is to say, they must satisfy the "whole picture" That is to say, they must satisfy the "whole picture" concept as stated by senior credit officer of Bank 5. This indicates the importance for the established entrepreneurial firms to be able to communicate and help the banks visualise the venture's launch, successful completion and operationalization. However, the inclusion of consultants in the criteria underscores the importance of technical knowledge to implement the project and mitigate any technical risk to the project (e.g. technical knowledge such as green expertise in carbon emission and carbon credit calculation, or empty fruit bunch (EFB) burning rate, etc). Further analysis revealed that it is not enough to have the government guarantee as collateral for the new venture. Overall there is an increased perception of risk for green technology ventures. This is in line with the suggestion from the HOD of Bank 1:

Even if you come [...] and tell us you are well-collateralized and we do not see the cash flow coming out of your end products, we will not, we will not take it. [...] Of course, the collateral helps ease our commitment but we are into cash flow financing (HOD of BANK 1).

The senior credit officer (SCO) of Bank 4 stresses that even though the main issue in green technology is the technical knowledge, marketing skills are also important:

[The] main issues with green tech, of course, the most important thing is the technology [...] how capable are these people to run the technology on a mass scale [...] and apart from that, is there a market for this product? [...] the green products are more expensive than a compatible product in the market. So, it makes it difficult for them to sell this product... (SCO of Bank 4).

The argument above underscores the link of the technical knowledge and the marketing skills, producing the product and to sell the product, which will generate the income to pay back the loan. The importance of technical knowledge as highlighted by SCO of Bank 4 seems to be in an agreement with the arguments of HOD of Bank 1 below:

[How] I wish for one thing: technical expertise. The proponents themselves, instead of relying on a third-party, which are not shareholders, they must acquire that, [...] tie them down, by giving some equity because these people can leave. [...] If the proponents themselves have got technical expertise, that's good (HOD of BANK 1).

Banks seek assurance that technical skills are augmented with marketing skills, which are later combined with financial skills that link into the cash flow model. This is exemplified in an argument by the project partner of Solar D:

[...] chloroformic (value) [...] is the major assumption in their cash flow model, I assume my kilojoules of heat value is 2,900 because of the composition of waste, this will generate [how many] megawatt. I need to be able to relate from the composition of the waste and the mild, moisture [...] to whatever energy that I produce [...] a bank looks at that when they don't understand [...] they will kick (you) out because they don't understand [...] (project partner Solar D).

Analysing the statements above, it seems that financial skills and marketing skills are essential parts of the whole picture

concept. However the technical skill stands out as the most critical for the banks, according to SCO of Bank 5, SCO of Bank 4 and HOD of Bank 1.

The banks suggest that technical expertise and the technology are extremely important; however in the previous subsection on the bank's knowledge asymmetry, the method of the banks evaluating the technology is contradictory. This suggests the banks' learning curve in evaluating green technology ventures as explained above in 5.3.1.2.

Another finding as suggested by the evidence from the interviews, documentary, and observation is that there seems to be a dichotomy between the technical and financing evaluation. This stems from the perceived ease of acquiring certification and extreme difficulty to acquire financing as exemplified in the case of Solar C, which gained certification but was then rejected by six banks. This dichotomy in terms of evaluation links back to the financing priorities of the government and the banks as explained above in 5.3.1.1.

Therefore, the evolving nature of green technology financing presents an opportunity for the banks to redefine their financial evaluation and to re-evaluate their learning curve for evaluating green technology ventures. For the established entrepreneurial firms, this finding indicates the need for certain necessary entrepreneurial competencies that could bridge this financing competence gap. This also supports the notion of the difference in financing by sector according to Cassar, (2004) and the need for new and distinct competencies (Parrish, 2010; Worthington & Patton, 2005) which will be discussed in Chapter 6.

5.3.1.4 Effects of the GTFS Context

Adding on to the complexities derived from the different financing priorities, bank's knowledge asymmetry and the green technology financial criteria is two interlinked effects: (i) the perceived ease of acquiring finance and (ii) a competency trap (Levitt and March, 1988). The perceived ease of acquiring finance reinforces the competency trap, which is demonstrated in the form of a financing rejection cycle. The section below explains the two effects.

a. Perceived ease of acquiring finance

The notion of the perceived ease of acquiring finance can be explained from the argument by the managing director of Manu B who felt it was an opportunity to acquire easy funding,

No, there was an opportunity to go, we heard about this [from the] Malaysian German Chamber, we came under the Malaysian group, we came to know about green technology and there is a fund, why not apply (MD of Manu B).

and a program administrator

[Sometimes the entrepreneurs] feel the money is like [from an] Automated Teller Machine (PA 2).

In other words, after receiving their certification from the technical committee, the established entrepreneurial firms feel as though they are entitled to the financing from the banks. This is exemplified by the argument from the Executive Director of Biomass A:

[...] So we always tell, "Hey, come on, you see GTFS, I did this presentation, they agreed to give me the certificate. Otherwise, if the project is not viable, they will never give me this certificate. What is the purpose of this certificate? the project is viable, that's why they give me the certificate.[...] (ED of Biomass A).

Adding to this argument is senior finance manager (SFM) of Solar D that people always think it is easy with government support,

Expertise is not a problem. [The] challenge to me is whether people can accept an environment company in Malaysia [because] this is a very new [here]. Because you're looking at this solar plant everything has been in overseas for so many years. But for our experience, when we want to do this even though with the support of the government, is not easy to get financing. [It] is not easy to get people to understand. But, we have been achieving it. But not in a very easy way like what you, what we always think of like, you know with Government support here you can get financing, no problem with the, with the, the special GTFS fund all this, you can get financing easily. It's not really that way, you know? Because the bankers still looking at [...] the project as a whole thing. (SFM of Solar D)

However contrary to Biomass A, Solar D did not fall under this influence and acquired financing, this will be explained in 5.3.3.4.

The findings suggest that the perceived ease of acquiring financing influences the environmental scanning of the established entrepreneurial firms resulting in a perceived ease of acquiring finance. As a consequence of this effect, the deployment of the entrepreneurial competencies of the established entrepreneurial firms is significantly influenced. This perceived ease of acquiring finance has also been touched in 5.3.1.1 and will be further discussed in Chapter 6.

b. Competency trap

The competency trap in the context of this research is exemplified by the financial rejection cycle that the established entrepreneurial firms experience while trying to acquire financing from the banks using their existing competencies.

The financing rejection cycle is evident in majority of the cases. In the case of Biomass A and Manu A, they were rejected six times by the banks for their financing application before they aborted their venture.

While in the case of Manu B, they were rejected four times by the banks for their financing application before diverting from the banks to other sources of financing. Finally, in the case of Solar C, they were rejected six times before escaping the competency trap to acquire financing from the bank. Here the executive director (ED) of Biomass A shared his experience about the financing rejection cycle,

[...] we have done all this evaluation, and we are confident, yes, that's why we are giving you this certificate now, okay? You proceed on only to finance the project in terms of the loan they're asking for. It should be purely a commercial decision, financial evaluation, rather than going into all the nitty gritty of the project. See, for example, they ask, "Have you secured feedstock?" I show them the feedstock agreement with F***A. They are happy with it, and then they ask another question. They must know that all the risk has been covered. Feedstock covered, GTFS obtained, and in fact this project application, all dah secured, everything they've done, and I've come up with 20 million worth of my own investment to show them...we showed them. I cannot run away from this project anymore, otherwise my 20 million is burnt. So what is their concern? What is their risk? It is a straight forward decision. But even with that I find it very, very tough to convince the bankers. We gave our corporate guarantee. We even went to the extent of giving our own personal guarantee. (ED of Biomass A)

From the quote above it is apparent that Biomass A was repeating the same strategy from their previous financing experience for their financing application with the GTFS as an integral part of their financing strategy which pushed them into the competency trap.

Together the perceived ease of acquiring finance and the competency trap exert their influences on the GTFS financing process of the established entrepreneurial firms. They exert their influences on the deployment of the established entrepreneurial firms' competencies by widening the financing competence gap which inadvertently hinders their competency development. This will be further explained in 5.3.3.

5.3.1.5 Section Summary

The financing competence gap revealed in this research is influenced by the GTFS context which comprises of the (i) financing priorities of the multiple stakeholders, (ii) the banks' knowledge asymmetry (iii) green technology financing criteria and the (iv) effects (perceived ease to acquire financing and the competency trap). The different financing priorities between the government, banks and the entrepreneurial firms, further adds to this complexity. Indeed the government has their vision for mitigating climate change, but the banks argue that CSR does not belong in the financing application despite the government guarantee for the feasibility of the technology. The established entrepreneurial firms are thus trapped between these conflicting financing priorities.

Bank knowledge asymmetry is characterised by the bank's learning curve and interest in the GTFS. The green technology financial criteria are centred on the "whole picture" concept. In this concept the banks want to see that the project can be successfully launched, implemented and most importantly generate income to pay them back. There are also times, where the government contributes to the banks' knowledge asymmetry, by bringing in international experts, thereby reinforcing certain standards that are not applicable to the

local context. The combination of the bank's knowledge asymmetry and the green technology financial criteria then becomes a learning curve for the established entrepreneurial firms to deal with the banks.

The next influence from the GTFS context is two effects on the financing competence gap (i) the perceived ease of acquiring finance and a (ii) competency trap (Levitt and March, 1988). The perceived ease of acquiring finance reinforces the competency trap which leads to a financing rejection cycle. These two interlinked effects influence the financing competence gap. Therefore the GTFS context influences the deployment of competencies by established entrepreneurial firms by influencing the financing competence gap.

In the next section, the research will present the findings on the set of entrepreneurial competencies identified as critical for acquiring green technology financing.

5.3.2 Entrepreneurial Competencies

The financing competence gap and its influence on competency development have been explained above. This section now focuses on the second sub question, "What entrepreneurial competencies are necessary for established entrepreneurial firms to acquire green technology financing in this context?"

Following, Rasmussen et al.'s (2011, 2014) evolutionary entrepreneurial competency framework, the two sets of competencies identified from the analysis are: (i) opportunity refinement competencies and (ii) resources acquisition competencies. The next subsections will explain in detail these entrepreneurial competencies.

5.3.2.1 Opportunity Refinement Competencies

The opportunity refinement competencies are a set of competencies critical for refining and developing an entrepreneurial “opportunity into a clearly articulated, commercially viable business” venture with a high success rate (Rasmussen et.al, 2011:1327).

Opportunity refinement competencies play an important role in the early stages of a venture, starting from the pre-financing stage (Vohora et al., 2004).

In this research the opportunity refinement competencies are particularly important because these cases involve established entrepreneurial firms that are transitioning from their previous projects into new opportunities. Even for the established entrepreneurial firms, it will be extremely difficult to acquire financing if the opportunity refinement process is not properly conducted as argued by senior credit officer (SCO) of Bank 2

[Even if you are a successful business man] in terms of financing it will still be difficult. I have seen a [successful] lawyer [requesting financing] for biomass. How do I look at it? Whereas, if let’s say you have been doing solar since 20 years ago [...] now you want to do [a] big project, that I will consider. But if let’s you’re a lawyer [...] I don’t see the value-added thing there. (SCO of Bank 2)

A critical part of the opportunity refinement competencies is the scanning of the environment. A misinterpretation of the business environment will be detrimental to the future of the venture. A part of this misinterpretation has to do with the divergence between the way banks and established entrepreneurial firms think as shared by the project partner of Solar D,

So bankers think differently than project owners, primarily because project owners are risk takers bankers are totally the opposite you know, they will think of everything that you would not think of you know and what if scenario is, there is always worse case, what if you drop dead, what if things like that [happen] by nature [that is] what banks are, you know you can't force them to change (project partner of Solar D)

It is this kind of understanding of how the banks work that is needed to develop the necessary competencies.

In the case of Biomass A, the firm had mistakenly scanned the financing environment. This misinterpretation of the financing environment influenced their opportunity refinement process. As a result during the special pitching session with the bankers organized by GreenTech Corporation they were not able to answer the banks on the raw material supply and the market for their by-product and eventually led to non-financing of Biomass A.

In contrast, for Biomass D the opportunity refinement process involved a long duration and different approach in thinking as explained by the executive chairman (EC) of Biomass D,

I started the (venture) around 2003. [From my calculations] after the eight year we should be printing money. But you look at it without the government credit [scheme]. (EC of Biomass D)

The executive chairman later expounded on this and explained the extensive planning (e.g. for raw material sourcing, RePPA) and reconfiguration of the existing entrepreneurial competencies by combining the various entrepreneurial competencies across the team as illustrated below,

Managing is not a problem. Because I think we have the team. My role is I am concerned with the government approvals and raw material. George will be running the company. Tan Gan Hua is a contractor. He's looking after the contract. I have a qualified mechanical engineer. I got

Viton [as] General Manager. Goh is a milling engineer and our project manager. We have both civil, mechanical and electrical engineers. We have consultants and the managing director of Kina and Seguntor on retainer. (EC of Biomass D)

[I was the] Director of Estate, [...] [involved in disbursements of] replanting grants. At that time [the] Empty Fruit Bunches, they just throw it away. They just put in the fields, or they just put it along the road, is of no use. [...] (EFB) accumulate into small hills. So, you need to remove them. Now, Empty Fruit Bunch are in high demand, composting for fertilizers. Fibre for pillows and mattresses in China. Now there is also the government renewable energy policy with competitive rates, it started with 16 cents, 18 cents, 21 cents and now 29 cents per kwh. (EC of Biomass D)

Here the reconfiguration of Biomass D's existing entrepreneurial competencies was apparent. The reconfiguration was needed to address issues specific to the venture, this eventually helped Biomass D to acquire financing.

The necessity of the opportunity refinement competencies for established entrepreneurial firms can be seen in these two cases. Fully reconfigured opportunity refinement competencies will enable the opportunity to be refined and eventually acquire financing. Biomass A misinterpretation of the financing environment that the GTFS would be "easy" resulted in them not to acquire financing. While in contrast the case of Biomass D, planning the venture "without the government credit [scheme]", led them to acquire financing. This was later proceeded by Biomass D with a detailed knowledge of the raw material supply chain, both technical and financial expertise helped them in their opportunity refinement process.

In this respect, this research suggests that a fully developed opportunity refinement competencies play a critical role in

addressing these evaluation gaps. Apart from the importance of scanning the environment, the opportunity refinement competencies imply that established entrepreneurial firms have to reconfigure their existing financing, marketing and technical functional skills (Mitchelmore & Rowley, 2010) that are found to be intricately related to address the specificities of the green technology financing criteria.

The link between the three sets of functional skills and the opportunity refinement competencies is exemplified below in this argument by program administrator 2:

I feel the thing that makes the firm good is the planning and the proposal. The whole proposal must be supported, for instance EFB projects must come with the raw material [supply], demand for their product, [...] optimal cash flow for the banks [...] They must have proper plans (PA2).

Adding to the importance of refining the opportunity is the argument by senior credit officer (SCO) of Bank 4,

[...] the strategy of the management is very important. How would the [entrepreneurs] look into [these] loose parameters? [What kind of] mechanisms [do the entrepreneurs] have to curb [and] handle the cost at their end to make it a feasible project. So, there are many [...] areas that they fail to look at. (SCO of Bank 4)

This argument also corresponds to the whole picture concept as explained in section 5.3.1.3.

The technical skills involved in the sustainable entrepreneurship ventures of the respective cases differ according to the technology used by the venture. Indeed, the specifications of the green technology will directly impact on the type of raw material, the raw material supply (including alternative raw material), the technology supplier, the technical operations of the technology, the durability of the

technology. All of this must be considered by the established entrepreneurial firms during the opportunity refinement process. Based on the documentary evidence, the technical requirements for the ventures are critical. For example, in the case of renewable energy generation, the electricity supply to the national grid must be guaranteed, therefore mitigating the offline time from the national electricity grid is a critical factor that must be considered in the opportunity refinement process. This stringent requirement corresponds to the documentary evidence; the technical documentation for submission is highly technical and specific according to the green technology, which includes technical feasibility studies, etc.

As for marketing skills, it is about ensuring that there will be a buyer for the green goods that are produced. For cases such as Solar C, Solar D and Biomass D with renewable energy power purchasing agreements (REPPA), there is a guaranteed buy back of the renewable energy that they produce. However in case of Manu A and Manu B, marketing skills become comparatively critical because they are competing on the open market. This highlights the variation in terms of the marketing skills on the type of sustainable entrepreneurship ventures that the established entrepreneurial firms venture are involved in.

Finally, augmenting all of these skills are the financing skills, which in the context of this research is the ability to translate the technicalities and marketing aspect of the project into financial figures, the language that banks understand. The financing skills are a functional skill that transcends both the opportunity refinement competencies and the resource

acquisition competencies. This will be explained further in the next section.

5.3.2.2 *Resource Acquisition Competencies (RACs)*

The other set of entrepreneurial competencies necessary to acquire financing is the resource acquisition competencies. The notion of the resource acquisition competencies is a cross between Hayton and Kelly's (2006) sponsoring competencies, which centres on deep technological and business knowledge, risk tolerance, persistence and passion, and transformational leadership and Rasmussen et al.'s (2014:94) resource acquisition competencies, that "is the assembly and organisation to exploit the resources"

In the context of this research, the resource acquisition competencies were found to be a set of competencies that centre on deep technological and business knowledge to convince and educate external investors such as the banks about the venture. The key aspect of the resource acquisition competencies is the ability to translate all the marketing, financing and technical details into a 'whole picture' for the banks to understand over above their knowledge asymmetry, making the resource acquisition competencies an extension of the opportunity refinement competencies.

This is exemplified by an argument from the senior finance executive (SFE) of Solar C,

[Once] we declare everything, we open everything, this looks like it is a high risk project, RM 56 million is a big amount. He [Credit Officer] cannot approve the financing just like that. That's why we have to entertain these people until they are satisfied that this project is viable, this project would be able to generate cash and we can pay back the financing amount because banks will normally ask can you

pay? [...] so basically we have to educate the bank officer (SFE SOLAR 1).

Another key point highlighted here is that the resource acquisition competencies involved a learning process in which the established entrepreneurial firms need to educate the banks.

To understand on what to educate the credit officers, the senior credit officer (SCO) of Bank 4 shares his thoughts,

you may have technology on papers, it looks fine but then, you convert it into production, and you don't get the required yield or specification. As a banker, you would not be able to verify this process. (SCO of Bank 4)

Here, highlighted in the quote is a part of the resource acquisition competencies, which is the need for the banks to understand the technological process involved, which unfortunately as stated before this the banks does not have the expertise or the time to do this.

The resource acquisition competencies were primarily identified during pitching sessions and meetings with the banks. The importance of the resource acquisition competencies for the bankers is highlighted by senior credit officer (SCO) Bank 4 while observing a pitching session,

[...] a very good Chief Financial Officer would be able to bridge the business [numbers] into [something the bankers understand]. There was a big gap there. (SCO of Bank 4)

Therefore based on the observational evidence during the pitching session, established entrepreneurial firms such as Biomass A were able to show their technical skills (e.g. explaining the detail of their product-design and production). However Biomass A were not able to translate the

technicalities of their venture in financial language that would communicate and educate the banks over and above their knowledge asymmetry.

This insight highlights the relationship between the technical skills and the financing skills, with the technical and financing skills present in both the resource acquisition competencies and opportunity refinement competencies. This notion seems to resonate with Mitchelmore and Rowley's (2010) notion on the interplay between entrepreneurial competencies and functional skills, which will be discussed in Chapter 6.

5.3.3 Competency Development Path

In the previous section the researcher explained the necessary entrepreneurial competencies needed in the financing process. This section addresses the question, "How are these competencies developed?"

The analysis has shown these established entrepreneurial firms possess competencies from their previous ventures. Therefore the established entrepreneurial firm's previous paths are important. In planning their new venture, the established entrepreneurial firms were already using their existing opportunity refinement competencies and resource acquisition competencies. However some of the cases were not able to fully reconfigure their competencies according to the "distinct competencies" (Parrish, 2010:521) needed to acquire green technology financing. The analysis has indicated that the reason for this inability to fully reconfigure their existing competencies is due to the influence of the GTFS context leading to a competency trap. This relates to Liu's (2006) suggestion that the path and the competency trap are intricately interlinked. Therefore, in order to develop the

necessary entrepreneurial competencies and acquire financing, the established entrepreneurial firms' previous paths play a big role in determining if they are able to bridge the competency gap. In answering the third research sub-question, this section will show how the analysis reveals multiple pathways to competency development. The firms either remains "entrapped" or managed to "divert, escaped or evaded" the competency trap.

In the next section, the research will divide cases according to their specific path dependencies and explain their competency development.

5.3.3.1 Entrapped

The entrapped path is the path of established entrepreneurial firms that remain entrapped in their paths, unable to reconfigure their existing entrepreneurial competencies, thus unable to acquire green technology financing. These established entrepreneurial firms (Biomass A and Manu A) later aborted their ventures. From the analysis, the characteristics of the entrapped firms are that there is a high financing competence gap, high GTFS influence, trapped in the financing rejection cycle and a low external resources which resulted in non-financing of their venture.

Biomass A, an energy procurement construction contractor (EPCC) and Manu A, solar hybrid solution provider, were established entrepreneurial firms that have successfully run their businesses and were embarking on a new venture in a new area. In their planned new ventures, Biomass A would produce renewable energy to supply to the national grid, while Manu A would manufacture solar hybrid inverters for the open

market. This represented a high financing competence gap in terms of technical, marketing and financing.

Here the contextual influence of the GTFS on the financing competence gap is apparent. This is based on the admission from Biomass A that they thought to acquire financing through GTFS would be “easy” and the insistence of Manu A that GTFS was a government directive and should be adhered by the banks,

GTFS [...] is supported by the PM’s Department... so the GTFS is [...] a piece of certificate to say that you can go to any bank and get a financing (MD of MANU A).

This quote highlights the perception that the managing director of Manu A had of the GTFS and that to him the bank must give financing as the directive comes straight from the government.

The GTFS influence was further compounded by Biomass A and Manu A previous business and financing successes. The managing director (MD) of Manu A shared that the bankers will be rushing to see him in his previous business ventures,

They will come and see us [for our financing needs]. I do not have to go to the bank. They will be sitting around me [in my office]. (MD of Manu A)

This quote highlights the business confidence that they had and the reason why the financing for the GTFS was handled internally without any external resources.

As it is the Biomass A and Manu A path dependencies has an influence on the financing competence gap. The GTFS context influenced the widening of the financing competence gap which brought about a competency trap for Biomass A and Manu A, exemplified by a financing rejection cycle as explained

in 4.3.1.2. As a result this prevented Biomass A and Manu A from fully reconfiguring their existing entrepreneurial competencies.

Regardless of the excellent track record with their bankers as shown, they were not able to acquire the GTFS financing. Biomass A had also given corporate guarantees and personal guarantee to the banks, exclusive of the GTFS guarantee, for them to convince the banks, however they were still rejected. In the case of Manu A, even after the multiple-rejection of their financing application could not understand the bank's reluctance to finance them since the amount that they requested was far smaller than the usual amount of financing they acquired from the banks.

From the analysis this is attributed to the low learning from the multiple-rejection of their financing application. This low learning was might have been attributed to low external resources in terms of financing and also because the banks did not disclose details behind the rejection.

It was later confirmed by the Senior Credit Officer of Bank 5 that banks do not share the details of the rejection for fear of encouraging fraudulent applications, as he argued below:

We tell the feedback but not all, since there are Bank and Financing Act (BAFIA) and the possibility of fraud but we tell just common reasons (SCO of Bank 5).

The bank's multiple rejection left both Biomass A and Manu A confused and perplexed. Part of their argument was that it was difficult to convince the banks. From the analysis, the difficulty in convincing the banks is attributed to the path, and the widening of the financing competence gap of Biomass A and Manu A. In the context of the path, the change from

contract financing to project financing also shifted the scope of the loan conditions in terms of duration and also the amount, which intensified the need for reconfiguration of the existing financing skills. In the absence of learning or external resources to help them, they could not get out of the competency trap.

Overall they could not fully reconfigure their opportunity refinement competencies and resource acquisition competencies because they remained trapped in the competency trap.

5.3.3.2 Diverted

The diverted path is the path of established entrepreneurial firms that were initially trapped in the competency trap. However they diverted the competency trap by acquiring green technology financing from other sources of financing mainly venture capitalists and business angels. From the analysis, the characteristics of the diverted firm is that there is a high financing competence gap, high GTFS influence, high external resources, trapped in the financing rejection cycle and finally diversification of financing sources which eventually resulted in the financing of their venture.

Manu B was started by an established entrepreneur with a retailing business from Germany. Sensing a good opportunity to move back to Malaysia, the entrepreneur acquired licensing to manufacture an all-purpose insulation material based on nano-technology and green technology. The stark difference between the entrepreneur's previous ventures and business environment represents a financing competence gap.

Manu B sought to close this competence gap by acquiring the necessary entrepreneurial competencies. The documentary from Manu B showed that they had engaged a management team that comprised of very experienced business executives and consultants. They even had international technical consultants to set up the factory and sent the local engineers for training under a technical training agreement with the international technology licensor. Additionally, they had an agreement to supply to their licensor with the insulation that they manufactured. Manu B also had a financial consultant to assist them in financial matters.

However this did not stop them from falling under the influence of the GTFS context. Here the Managing Director of Manu B had the misconception that financing would be easily acquired based on their success acquiring the GTFS certification. The Managing Director of Manu B admitted that their problem was that they assumed that the program administrators would make the financing decision instead of the bank. Even though they had good technical support from their technology principal, it was their financing assumptions that made their financing competence gap wider and led to a competency trap. Their apparent inability to escape from the competency trap appeared to be related to not only from their inexperience of the Malaysian context but because of the misconception of the funds from GTFS.

After a series of financing rejections from the banks, Manu B opted out the GTFS. However through the financing process and high external resources that they had, Manu B did develop certain competencies to enable them to later acquire financing from a business angel.

This suggests that the level of opportunity refinement competencies and resource acquisition competencies that is required for bank financing is probably higher compared to business angel financing. This will be further discussed in Chapter 6.

5.3.3.3 Escaped

The escaped path is the path of established entrepreneurial firms that were initially trapped in the competency trap. However they were able to fully reconfigure their existing entrepreneurial competencies to fit the requirements of the GTFS and acquire green technology financing. As a result of this reconfiguration, they escaped the competency trap. From the analysis, the characteristics of the escaped firm is that there is a high financing competence gap, high GTFS influence, trapped in the financing rejection cycle, high external resources which resulted in financing of their venture.

Solar C is a successful energy service company specialising in solar. Their new venture is a solar farm to produce renewable energy and supply to the national grid via a RePPA for 21 years. Even though they had experience in solar power installation, with the new venture Solar C will be transformed into independent power producers. This new venture represents a high financing competence gap.

Solar C had the technical skills and a confirmed buyback of the power they generated through a renewable energy power purchasing agreement (RePPA). However the financing amount they were asking for was bigger than the usual amount for their projects and the duration of the loan was longer. Under the influence of the GTFS context, Solar C assumed that

financing would be easy. In fact, there was an initial impression by senior finance executive (SFE) of Solar C, that the GTFS was a government grant and not a loan.

I think in the first place we acquired GTFS certification, I in fact thought it was a government grant (SFE of Solar C)

This quote highlights the assumption of how easily financing was to be acquired by Solar C. Under the influence of the GTFS context, Solar C then used the certification as a leverage to acquire financing from the banks.

The first rejection was by a bank that had financed them before. Despite having a track record with the bank, the bank explained that the solar farm venture they were embarking on was new to the bank and they could not give the financing. They tried several banks, and the same answer was given. They were eventually caught in a financing rejection cycle, even though they had successfully acquired financing in their previous ventures, the same financing strategies for this venture did not bring the desired results. Furthermore from the data it showed that the senior finance executive (SFE) was two-year fresh out from University with an MBA and she was advising the owners on financing strategies.

I'm already involved in this company about 2 years after graduated from MBA majoring in finance. I'm controlling the cash flow compiling all the financial record and advising the directors in terms of the financing strategies. (SFE of Solar C)

This quote highlights the financing competencies of Solar C at the time were acquiring financing. However, in contrast to Biomass A and Manu A, Solar C had also enrolled in a government-sponsored program for high performing entrepreneurial firms. As part of the program, there were two

components: human resource capacity building and financing enablement. In the financing enabler component, Solar C learned better fund sourcing, financing strategies and financial management (e.g. tax management) and why they failed in their previous financing attempts. The senior financing executive (SFE) of Solar C highlighted this:

Yes, the business coaching [...] (was) conducted by TERAS [...] they become our business coach to raise our future potential. (SFE of Solar C)

Apart from the business coach, the countless rejections from the banks induced learning and contributed to Solar C competency development as stated by the managing director of Solar C.

The feedback from the rejection made them aware of their shortcomings in terms of financing skills. The learning process was facilitated through the external resources of both the specialised business coaching program, and the learning from the multiple financing rejection cycle. This helped Solar C to escape the competency trap by escaping their present financing path and fully reconfiguring the opportunity refinement competencies and resource acquisition competencies. This later translated into financing success of their venture. The timing between the rejection and the enrolment on to a business coaching program illustrates the time taken for the competency development (in order to reconfigure their existing competencies) and points to the outcome of “higher-level learning” described by Alvarez and Busenitz’s (2001:759) which will be discussed in Chapter 6.

5.3.3.4 Evaded

The evaded path is the path of established entrepreneurial firms that evaded the GTFS influence and fully reconfigured their existing entrepreneurial competencies in order to acquire green technology financing. From the analysis, the characteristics of the evaded firm is that there is a low financing competence gap, low GTFS influence and high learning, high external resources which resulted in the financing of their venture.

Solar D evolved from a landscape company into an environmental engineering company specialising in landfill rehabilitation before moving into the renewable energy business. Biomass D started as a new venture with a top management team comprised of people with financing, technical and marketing skills in the power generation business. Their team members were also people who had multiple business experiences. The common thread for both of this firms were that they had experience in financing big and long terms concessions. Therefore compared to the other cases, their new financing context was similar to their previous financing experience.

In terms of seeking financing from the GTFS, Biomass D and Solar D took a different approach. In the case of Biomass D, they did their opportunity refinement without thinking of the government guarantee scheme. While Solar D took a different route, they applied for the financing from the banks before applying for the GTFS certification. Therefore, unlike the other cases, they were able to evade the GTFS influence.

For Solar D they had anticipated the difficulty of the project they had named their business consultants as project

partners. The decision was in fact path dependent, prompted by Solar D financing and business experience. Solar D had experience embarking in new ventures different from their core business. They had grown from a landscape firm into a landfill rehabilitation-environmental engineering firm and now they were venturing into renewable energy. Their experience in government concessions for the landfill rehabilitation venture also shaped their “scanning” of their environment (Hambrick, 1981:256). Understanding the challenges for the new venture, the senior finance manager (SFM) of Solar D highlighted the competency gap and their measures to mitigate the risk,

[...] with the change to a different nature of business. Definitely the know how [on the new business] is something that we will be lacking. But with the support of new staff, new expertise and also consultants and contractors all these can be resolved.

In pursuing this opportunity, and the measures they took to close the competency gap, Solar D took on a business consultant/project partner which advised them to acquire financing first from the banks before obtaining GTFS certification.

Therefore in the case of Solar D, they managed to evade the influence of the GTFS because of the decision to directly go to the banks first instead of the GTFS. According to the project partner, this idea of a special program is sometimes taken as a signal by the financial community that the project is not viable enough. Thus, that is the reason these projects need additional assistance. Taking this different financing route, Solar D had to reconfigure their existing financing skills to the banks’ credit criteria without the government guarantee. In terms of the technical skills, Solar D had engaged technical

consultants concurrently retraining their engineering personnel to acquire technical expertise in solar and biogas energy. They were also hiring experienced personnel in these two fields to support their technical skills. The need to reconfigure their marketing skills was less critical due to the secured market of the renewable energy power purchasing agreement (REPPA) to supply electricity to the national grid. As for the development of the opportunity refinement competencies, Solar C had a high involvement from external resources; technical and financing. Apart from that, Solar D's experience from previous business ventures guided them in preparing for the new venture.

In the case of Biomass D, the owners started the venture before the GTFS was established. Biomass D received GTFS certification after four years of refining the opportunity. As with Solar C, Biomass D also has a REPPA to supply electricity to the national grid. Therefore in terms of marketing, Biomass D had a secured market. In terms of the technical skills, one of the three owners, the Executive Director of Biomass D, had a background in power generation. He also brought with him his technical and financial team. To fortify the technical skills Biomass D also hired additional staff to support them in terms of technical expertise, including the Managing Director of *Kina & Seguntor*, the first Biomass plant using empty fruit bunch (EFB) as a raw material to generate electricity in Malaysia. Biomass D also engaged the same technical and design consultant to design the biomass plant. Another owner of Biomass D owned the land for the plant. The land is strategically situated to collect the EFB from the surrounding plantation and mills. The other owner, the Executive Chairman

of Biomass D was the former Director of Estates for the government, who helped to secure the contracts of the EFB suppliers. In terms of the financial competencies they also had the services of a financial consultant in advising them in terms of the cash flow assumptions, apart from that their Chief Financial Officer who had experience in energy financing as a business consultant. From the analysis of the financing stages of Biomass D, they had started the venture before the GTFS was launched. Therefore they had already predominantly developed the opportunity refinement competencies and refined the opportunity before applying for the GTFS which minimised the financing competence gap. The explanation will be discussed in Chapter 6.

In the case of Biomass D, the development of the opportunity refinement competencies and resource acquisition competencies was mainly developed together with their foreign partner. They had a long time to develop the relevant competencies together, starting from 2008 to 2012 before they acquired financing in December 2012. This suggests, like Barney (2001), that competency development takes a long time.

Another finding that can be highlighted from this pathway is that Biomass D and Solar D are now total solution providers for other renewable energy firms in the country, which can be interpreted as a sign that they had successfully developed their entrepreneurial competencies to be used by other entrepreneurial firms. Table 17 shows the evolution of competencies between pathways.

**Table 17 Contrasting the evolution of competencies between pathways
(adopted from Rasmussen et.al 2014:100)**

	Opportunity Refinement Competencies (ORCs)	Resource Acquisition Competencies (RACs)
Non-financed cases		
Biomass A	Biomass A used existing financing skills, even though change of financing environment and venture. Over emphasis on technical skill, used new hard to verify technology.	Biomass A relied heavily on GTFS certification was not able to convince banks with their new technology.
Manu A	Manu A used existing financing skills and marketing skills, even though change of financing environment and venture.	Manu A relied heavily on GTFS certification, was not able to convince banks with their venture.
Non GTFS Financed		
Manu B	Manu B developed new competencies with external resources but not fulfilling GTFS requirement.	Manu B developed new competencies with external resources but not fulfilling GTFS requirement.
GTFS Financed cases		
Solar C	Solar C developed competencies with business coaches, regulators, and multiple financing rejections.	Solar C developed competencies with business coaches, regulators, and multiple financing rejections.
Solar D	Solar D reconfigured their competencies with the help of technical, business consultants, industry partners, new personnel. They had started retraining new staff in anticipation of launching the new venture.	Solar D reconfigured their competencies with the help of technical, business consultants, industry partners, new personnel. They had started retraining new staff in anticipation of launching the new venture.
Biomass D	Biomass D took time to reconfigure/developing their competencies through mergers and acquisition, engagement with consultants, industry partners and acquiring the necessary expertise (technical, financial and marketing)	Biomass D took time to reconfigure/developing their competencies with foreign expertise, engagement with consultants, industry partners and acquiring the necessary expertise (technical, financial and marketing)

5.4 Summary and conclusion

This research reveals the intricate link between the financing priorities, bank knowledge asymmetry, green technology financial criteria and the contextual effects which together make the financing competence gap. Here the deployment of

competencies of the established entrepreneurial firm is dependent on the financing competence gap. A high degree of financing competence gap will lead to a competency trap (Levitt and March, 1988). In the cases that were unable to escape from the competency trap, the entrepreneurial firms were unable to develop the necessary entrepreneurial competencies and were locked in the cycle of financial rejection. This also explains York and Venkataraman's (2010) and Hockerts and Wüstenhagen's (2010) apparent contradiction on established entrepreneurial firms embarking on sustainable entrepreneurship ventures, which will be discussed in chapter 6.

The competencies necessary for the established entrepreneurial firms to acquire financing are based on Rasmussen et al.'s (2014) evolutionary competency framework. These were found to be: (i) opportunity refinement competencies and (ii) resource acquisition competencies. Based on the analysis, competency development is path dependent on the previous financing and business experience of the established entrepreneurial firms. This in turn will lead to different pathways for the established entrepreneurial firms in dealing with the impact of the financing competence gap, i.e. entrapped, diverted, escaped and evaded. These pathways will be further discussed in chapter 6.

In the next chapter, the research will discuss the findings with the literature in detail and the contribution of the research.

CHAPTER 6: DISCUSSION

6.1 Introduction

The previous chapter described the findings which emerged from the data analysis. This chapter discusses the findings in relation to the literature and presents the contribution of the research. The chapter is divided into four sections. The first provides the overview of the discussion and contributions. This is followed by a section detailing the discussion in relation to the findings; the penultimate section is on the contribution to sustainable entrepreneurship and the final section provides a summary and conclusion.

6.1.1 Overview

By considering the background of a developing country's climate change mitigation program, this research has explored the entrepreneurial competency development of established entrepreneurial firms as they seek green technology financing. The context also offered an opportunity to explore the influence of multiple stakeholders from a competence gap perspective in sustainable entrepreneurship financing.

The research relates to the call by Hall et al. (2010) for research to explore the conditions and policies that influence sustainable entrepreneurship. Here the focus is on green technology financing in a developing country context. This research is able to bridge the arguments of York and Venkataraman (2010) and Hockerts and Wüstenhagen, (2010) about established entrepreneurial firms embarking on sustainable entrepreneurship ventures by focusing on an entrepreneurial competencies perspective. Guiding the research is the evolutionary entrepreneurial competency

framework (Rasmussen et al., 2014) as it explains the influence from the context, and entrepreneurial competencies development by retroduction as explained in section 3.5.

Section 6.2 will discuss the findings in relation to the three sub-research questions. The discussion centres on the financing competence gap (6.2.1). Whilst the initial conception of the competence gap (Danneels, 2007) is straightforward, the involvement of multiple stakeholders, suggests much complexity in relation to the financing competence gap. This will be followed by a discussion of the entrepreneurial competencies (6.2.2), and finally the competency development paths (6.2.3) which includes the opportunity refinement competencies and the resource acquisition competencies alongside the equifinality (Eisenhardt and Martin, 2000) of the competency development paths.

Section 6.3, discusses the research contribution, focusing on the primary contribution to the sustainable entrepreneurship literature. Specifically this includes explaining the key contextual differences of sustainable entrepreneurship financing in a developing country context, Malaysia. A further contribution relates to the entrepreneurial competencies development literature. Here an extension to the evolutionary competency framework (Rasmussen et al., 2014) into the sustainable entrepreneurship literature is proposed. Finally in section 6.4 this chapter ends with the summary and conclusion.

6.2 Discussion of the findings

The main guiding research question is “How do established entrepreneurial firms develop entrepreneurial competencies to acquire green technology financing in Malaysia?” This main research question has been broken into three sub-research questions:

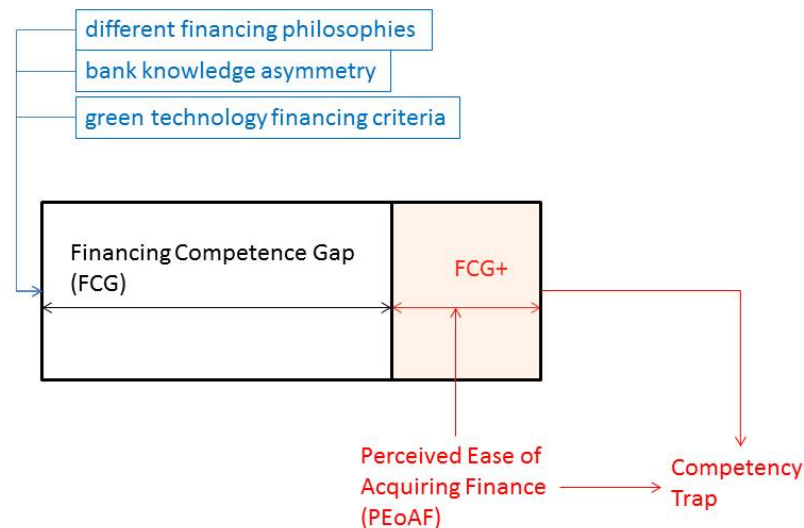
- (i) How does the GTFS context influence the deployment of competencies by established entrepreneurial firms?
- (ii) What entrepreneurial competencies are necessary for established entrepreneurial firms to acquire green technology financing in this context?
- (iii) How are these competencies developed?

These discussions on the findings from this three sub-research question are discussed in the subsequent subsections.

6.2.1 Financing Competence Gap

The findings have highlighted the financing competence gap which answers to the first sub research question, “How does the GTFS context influence the deployment of competencies by established entrepreneurial firms?” Components of the financing competence gap are depicted in Figure 15.

Figure 15 The financing competence gap: components and influences (from the researcher)



The financing competence gap builds upon Parrish's (2010) claim that sustainable entrepreneurship is different compared to conventional entrepreneurship and Cassar's (2004) suggestion that financing requirements are specific according to sector or context. Taking the above in consideration the researcher's initial conception of a financing competence gap was based on the notion of the competence gap described by Danneels (2007), with the gap being the difference between the ideal competencies needed to venture into a new field and the actual competencies possessed by the established entrepreneurial firms.

However, the analysis revealed a much greater level of complexity in relation to the financing competence gap. The research finds that the financing competence gap is in fact a nexus of complexities made up of the difference in financing

priorities (see 5.3.1.1.) of the stakeholders which consist of the government, banks and the established entrepreneurial firms; this is followed by the bank's knowledge asymmetry (see 5.3.1.2), green technology financial criteria (see 5.3.1.3) and the contextual effects of the GTFS (see 5.3.1.4). These complexities helps to explain and understand the institutionalisation of barriers for sustainable entrepreneurship (Meek et al., 2010) in terms of financing because it lies outside the social norms of financing (e.g. the 5Cs). This supports the assertion by Linnanen (2002) and Choi and Gray (2008) that conventional and sustainable entrepreneurs' financing are not on equal footing.

Additional to the first three components, the research has discovered two distinct effects to the financing competence gap, the first is the "perceived ease of acquiring finance" and the second is the "competency trap" for the established entrepreneurial firms. These two effects widen the financing competence gap of the established entrepreneurial firms that two out of three of these characteristics; different core business, different financing experience or low external resources before financing.

The "perceived ease of acquiring finance" can be attributed to the misinterpretation of the business environment for green technology (see 6.2.2) by the established entrepreneurial firms. This notion can be explained by the risk perception and how it effects the planning of a venture. Mullins & Forlani (2005) suggests that as long as financing is perceived to be available and it is externally financed, the decision to launch a new venture will be positive, despite of the unsuitability of the entrepreneur's current skill sets.

Here the attraction is, less risk and more profit, which suggest “the opportunist” from Linnanen's (2002:78) sustainable entrepreneurship typology. However this may also be less about being “green” and more towards to the economic opportunities from environmental degradation (York and Lenox, 2014). From this insight more relevant and concrete programs can be formulated to develop the necessary competencies to embark on sustainable entrepreneurship ventures.

This idea of perceived ease of acquiring finance is interrelated with the competency trap. The idea of a competency trap was introduced by Levitt and March (1988:322) which suggests that a “competency trap can occur when favourable performance with an inferior procedure leads an organisation to accumulate more experience with it, thus keeping experience with a superior procedure inadequate to make it rewarding to use.” York and Venkataraman (2010), hinted at this notion of a competency trap by describing the case of established entrepreneurial firms embarking on sustainable entrepreneurship ventures. By virtue of strong forces of inertia it would be difficult for them to alter their existing strategies, even though there is public demand for such products. York and Venkataraman's (2010) rationale is that established firms have invested substantially in plant and personnel specialised in producing products and services, which can lead to a competency trap.

Both the perceived ease of acquiring finance and the competency trap influence competency development at different points in time. The influence of the perceived ease of acquiring finance on competency development is salient to

efforts to scan the environment (Hambrick, 1981) during the opportunity recognition stage. However, the influence of the competency trap on competency development becomes more prevalent during the financing acquisition stage. The perceived ease of acquiring finance reinforces the competency trap; this is akin to the notion of self-reinforcing processes in path dependency (Koch, 2011; Schreyögg and Sydow, 2011; Sydow et al., 2012), which explains the strong influence of the financing competence gap on the competency development process.

In summary, due to the influence of the GTFS context: there is a financing competence gap which influences the deployment and development of the necessary competencies. The financing competence gap consists of four elements: the difference between stakeholders financing priorities, bank knowledge asymmetry, green technology financial criteria and the effects (perceived ease of acquiring finance and competency trap). These two effects influence the financing competence gap. Key characteristics of these two influences are that the former reinforces the latter. Here the perception of easy financing reinforces the established entrepreneurial firms to believe that their existing competencies (e.g. financial skills) will suffice to acquire financing, and are good enough, reinforcing the notion of a competency trap. This leads to deploying the existing competencies to acquire financing. It is these influence that hinder the deployment and development of the necessary competencies to acquire financing.

In the next section the research will discuss the necessary entrepreneurial competencies identified as important for acquiring green technology financing. This will be followed by

elaborating the competency development paths brought to light in the findings.

6.2.2 Entrepreneurial Competencies

To answer the second research question: “What entrepreneurial competencies are necessary for established entrepreneurial firms to acquire green technology financing in this context?” the research primarily utilises the evolutionary competency framework (Rasmussen et al., 2014). A consideration in this framework is the concept of the credibility threshold. This suggests that if an entrepreneur acquires financing, it indicates that they have developed the necessary competencies for venture success (Rasmussen et al., 2011, 2014; Vohora et al., 2004). Extending this notion, the research briefly studies the entrepreneurial firms’ post-financing acquisition activities. Thus the competency development path in the research takes into account the pre-financing, financing and post-financing stages of the established entrepreneurial firms.

Therefore, based on the evolutionary competency framework, the research has identified two sets of entrepreneurial competencies that are essential to acquire green technology financing: (i) opportunity refinement competencies and (ii) resource acquisition competencies.

Based on the findings, the opportunity refinement competencies comprise of three functional skills (Mitchelmore and Rowley, 2010): the technical, financial and marketing skills of the established entrepreneurial firms. This notion that entrepreneurial competencies comprises a combination of skills – knowledge acquisition, assimilation, transformation, and exploitation – is also highlighted by Zahra and George

(2002) and more recently Teece (2014). Having identified these technical skills as the primary skills needed for the venture to acquire financing, this research goes further than Brinckmann et al. (2009) suggestion that strong financial skills would be a competitive advantage to acquire financing. However the findings also suggest that an over-concentration on reconfiguring the technical skills to prepare for the new venture can result in adverse effects. Indeed, the result of such adverse effects, in the cases of Biomass A and Manu A, emerged as being unable to fully reconfigure their existing opportunity refinement competencies.

While the resource acquisition competencies are similar to Hayton and Kelley's (2006) "entrepreneurial competencies of sponsoring" which centres around the deep financing skills and educating the investors. The resource acquisition is a continuation of the opportunity refinement competencies, with the financing skills as integral part of both of these sets of competencies. The resource acquisition competencies are a set of competencies that are pivotal to convince and to educate the bankers over and above their knowledge asymmetry to acquire financing.

The idea of entrepreneurial competencies was introduced in the research as a means of explaining the contradiction between York and Venkataraman (2010) and Hockerts and Wüstenhagen (2010). The contradiction centers on the transition of established entrepreneurial firms into sustainable entrepreneurship ventures. Either established entrepreneurial firms will have difficulty in embarking on sustainable entrepreneurship ventures due to organizational inertia (York and Venkataraman, 2010) or they will outpace nascent firms

because of their “superior market power”, “financial resources” and “process innovation capabilities” (Hockerts and Wüstenhagen, 2010:487).

Empirically, this contradiction exists in the GTFS, with some established entrepreneurial firms having acquired and some having not acquired green technology financing. Parrish's (2010:521) suggestion that there are “distinct competencies” in overcoming organizing tensions in sustainable entrepreneurship ventures alludes to a new skill set for designing sustainable entrepreneurship ventures.

However Parrish's (2010) assumptions were based on nascent entrepreneurs. In the case of established entrepreneurial firms, existing entrepreneurial competencies come into play. Based on the findings, there is a need to reconfigure (Karim and Mitchell, 2000) these existing entrepreneurial competencies to address the financing competence gap aforementioned in section 5.2.1.

Now that the research has identified the opportunity refinement competencies and the resource acquisition competencies, next the research turns to the competency development path in the next subsection.

6.2.3 Competency Development paths

The discussion about the competency development paths of the entrepreneurial competencies relates to the third sub-research question, “How are these competencies developed?”

Drawing upon Rasmussen et al.'s (2014) evolutionary entrepreneurial competency framework, the research was able to identify and explain the different developmental pathways for entrepreneurial competencies based on the cases' financing

processes. The multiple entrepreneurial competencies development pathways are entrapped, diverted, escaped, and evaded. These pathways are independent of each other and influenced by the cases' previous paths and the GTFS context. The pathways are labelled according to how the established entrepreneurial firms interact and manage the competency trap to develop the entrepreneurial competencies necessary to acquire green technology financing.

The table 18 below shows the pathways and the established entrepreneurial firms.

Table 18 Pathways and established entrepreneurial firms (from researcher)

	Path	Established entrepreneurial firms
1	Entrapped	Biomass A and Manu A
2	Diverted	Manu B
3	Escaped	Solar C
4	Evaded	Biomass D and Solar D

Path-dependence plays an important role in a firm's competencies base (Barney and Arikan, 2001; Lockett, Thompson, and Morgenstern, 2009). Prior studies on path dependence were primarily on a technological based path (e.g. product development), with the QWERTY keyboard and the Betamax (Vergne and Durand, 2010) as frequently cited examples in case studies for path dependence (Sydow, Schreyögg, and Koch, 2009). However Sydow, Schreyögg, and Koch (2009) assert that there is also a need to expand path dependence research in other areas such as process studies and organisational practices. As such, this research suggests aspects of the financing acquisition process for sustainable entrepreneurship in Malaysia and details some key practices that established entrepreneurial firms use to acquire financing.

The idea of path dependence suggests that the firm is dependent on the technology, institutions or organisational forms after it has been locked in, i.e. history matters (Lockett et al., 2009). Therefore, in the context of this research, path dependence means the established entrepreneurial firms predominantly relying on their existing financing skills and business experience to embark on their new sustainability venture.

This path dependence can be seen in all the cases. As established entrepreneurial firms the cases were quick to recognise the opportunities offered by green technology, and the GTFS. According to the findings, the decision during the initial stage of the venture suggests that it was influenced by the established entrepreneurial firms' previous paths and the GTFS context especially the perceived ease of acquiring finance. Here, in refining their opportunities, Biomass A, Manu A and Solar C made the decision to concentrate on the technical aspects of the ventures (e.g. hiring of technical consultants only). In contrast Biomass D and Solar D, made a different decision, they decided to engage both business and technical consultants to help them refine their ventures, with Solar D appointing their consultant as project partners. While, in the case of Manu B, as new entrants to the Malaysian business environment, they too had appointed both financial consultants and technical consultants.

These decisions would later be pivotal in the development of the cases' entrepreneurial competencies and acquisition of resources (Vohora et al., 2004). Even though, the findings point to a strong contextual influence on the initial decisions, it

still supports the notion of strong path dependencies in competency development in this research.

This notion is supported by the interplay between strategic logic, opportunity recognition, and paths (Freiling, Gersch, and Goeke, 2008) and scanning of the environment (Barringer and Bluedorn, 1999; Danneels, 2008; Freiling et al., 2008; Hambrick, 1981). Strategic logic is an integral part of opportunity recognition and is constrained by the previous path (Freiling et al., 2008). The strategic logic interacts with the environment by scanning (Barringer and Bluedorn, 1999; Danneels, 2008; Freiling et al., 2008; Hambrick, 1981). An increase in the scanning activities, increases opportunity identification and increases the ability of established entrepreneurial firms to enter new domains (Danneels, 2008). However, influenced by the perceived ease of acquiring finance, the initial scanning of the environment can have detrimental effects by inducing a false sense of security (Barringer and Bluedorn, 1999) for the established entrepreneurial firms, as in the case of Biomass A, Manu A, Manu B and Solar C. This false sense of security is distorts the opportunity refinement and is detrimental to the ventures. Sharing his thoughts on this is the senior credit officer (SCO) of Bank 5,

GTFS is not government funds, big misconception [...] Whatever money comes from the banks. The government needs to educate the entrepreneurs. The announcement by the government is misleading [...] (SCO of Bank 5)

However the research argues that path dependence is still dominant, as in the case of Biomass D and Solar D, because their previous paths helped them to scan the environment during the initial stage of recognising and refining the

opportunity. This suggests that the efficiency of scanning the environment is tied to the cases' previous paths, which is supported by Bingham, Eisenhardt, and Furr's (2007:42) suggestion that in opportunity rich dynamic environments: "organisational heuristics as improvisational referents to provide a flexible constraint within which opportunity capture may unfold".

The four developmental pathways identified from the findings are independent of each other, and each follows a specific route in managing their competency trap to develop (or not develop) their entrepreneurial competencies.

For firms Biomass A and Manu A that were entrapped in the competency trap, their path dependence led them to a competency trap. However because of their competency trap they were unable to break from their path dependency. This happened because Biomass A and Manu A only partially reconfigured their existing competencies. In other words, while still dependent on their existing competencies they tried to acquire financing, which led them to a financing rejection cycle. The cycle serves as a self-reinforcing mechanism that induces lock-in (Schreyogg and Sydow, 2011; Sydow et al., 2009) between the path and the competency trap (Liu, 2006). Because of this lock-in, Biomass A and Manu A were unable to break the path to fully reconfigure the necessary competencies to acquire green technology financing, which led them to eventually abort their ventures.

Similar to Biomass A and Manu A, Manu B, which diverted from the original path was trapped in a competency trap because of its path dependence and this led it to a financing rejection cycle. Unlike Biomass A and Manu A, Manu B had

both technical and financial consultants to help them in refining the opportunity. In the context of acquiring finance under the GTFS, Manu B did partially develop their competencies in refining their opportunity to achieve GTFS certification. However they were rejected at the next stage of the GTFS which is the application to banks to finance the venture. Learning from the rejection, they decided to pursue other financing options which proved successful. This indicates they managed to break from their competency trap by diverting away from the GTFS context and reconfigured the necessary entrepreneurial competencies under a different financing context.

Similar to Biomass A, Manu A, and Manu B, the firm Solar C was trapped in a competency trap but managed to escape. Similar to Biomass A and Manu A, Solar C had only engaged technical consultants to help them to refine the opportunity. After a series of financing rejections they enrolled in a business-coaching program that helped to reconsider their financing strategies. Apart from that, Solar C also learned from the multiple financing rejections. The intervention by the business coaches and the learning from the financing rejection cycle helped Solar C to escape the competency trap as they reconfigured their existing entrepreneurial competencies to acquire green technology financing under the GTFS. The effects of the intervention by the business coaches supports the notion of “positive shocks” (Shepherd, Douglas, and Shanley, 2000:401). Positive shocks are external events that positively alter the degree of novelty of the venture and decrease the venture’s mortality risk (Shepherd, Douglas, and Shanley, 2000). In the case of Solar C, unlike Biomass A and

Manu A, where there was no similar intervention, this positive shock in the form of the business coaches' assistance helped Solar C to break from the competency trap. Also unlike Manu B, Solar C had a good business and financial track record in Malaysia, which did not force them to seek alternative financing sources beyond the GTFS.

However, in contrast to all the other cases Biomass D and Solar D, because of their path dependence had evaded the competency trap. For Biomass D, the principals had embarked on the venture in 2008 before the GTFS was launched in 2010, thus the firm had started to refine the opportunity and develop the necessary competencies to acquire financing before making the financing application. Solar D, based on their previous path, had engaged technical and business consultants, who became their project partners to guide them in the venture. This among others made them decide to go through the financing application without the GTFS certification.

Based on the discussion of the pathways above, the cases support Rasmussen et al.'s (2011) suggestion that to develop new competencies there is a need to create new paths, except in the cases of Biomass D and Solar D.

For the cases that support the notion that the creation of new paths will lead to development of new competencies, there seems to be a tipping point that triggers the decision (McAdam and Marlow, 2011) that leads to a full development or reconfiguration of the competencies. Based on the findings, it seems to suggest that this tipping point occurs before path-breaking (Karim and Mitchell, 2000) from the original path. In the case of Manu B, and Solar C which diverted and escaped

from their original paths, the idea of a tipping point seems to be true and also supports Ahuja and Katila's (2004) argument that competence evolution (Rasmussen et al., 2011) occurs because of *idiosyncratic scenarios* which they attribute to competitive pressure and market expansion. However in the case of Biomass A and Manu A, the tipping point does not seem to occur even though the notion of *idiosyncratic scenarios* (Ahuja and Katila, 2004) are present. In explaining this difference, the notion of "positive shock" (Shepherd, Douglas, and Shanley, 2000:401) was present in Manu B and Solar C, in contrast to Biomass A and Manu A. This made the difference to help Manu B and Solar C break from their path dependency. This helps to support Rasmussen et al.'s (2011) suggestion for new path creation to develop new competencies.

Aforementioned, in contrast to all the other cases, the need to create a new path to reconfigure or create new competencies does not occur in the case of Biomass D and Solar D because of their previous path that has similarities with their present venture. The similarity of the path might also attribute to the low degree of variation in terms of the necessary competencies to embark on the present venture. Another plausible explanation could be because of the similarity in terms of the path, the scanning of the environment gave them a better picture in terms of the resources and knowledge (Vohora et al., 2004) and did not result in a false sense of security (Barringer and Bluedorn, 1999) as in the other cases which warranted the need for Biomass A, Manu A, Manu B and Solar C to break from their existing paths. In other words the path difference between the previous and present venture will

attribute to a variation in terms of needs assessment of the new project and will affect the deployment and development of the established entrepreneurial firm's competencies in their new venture. This is consistent with Rasmussen et al.(2011,2014) work on the need for new paths to develop new competencies and expands it by highlighting the influence in terms of the variation in the path difference between the previous path and the new venture path.

Another finding that emerged from the research is the duration of the competency development based on different paths. The preparation for acquiring finance starts in the very beginning of the venture, thus it is important that both of these competencies are developed as early as possible. The findings of the research show that both of these competencies were being developed before financing was acquired. It also indicates that a key difference between the firms is the development time and at which stage they were able to fully reconfigure their competencies. Barney (2001) mentions that the development of competencies has always been assumed to be time consuming because it was not clear how competencies are developed in the short or mid-term. Therefore this research argues, depending on the level of the existing competencies and the learning process during the financing rejection cycle, the reconfiguration of the competencies as new entrepreneurial competencies can be relatively quick to develop or reconfigure. This notion occurs in Solar C that escaped from the competency trap. Solar C had a high degree of technical skills and backed by a secured market because of the renewable energy power purchase agreement (RePPA), which meant that they only had to reconfigure their financing

skills as part of their opportunity refinement competencies. Solar C was able to reconfigure the necessary entrepreneurial competencies to acquire green technology financing because of the specialised business coaching and the learning process from the financing rejection cycle. As a result they escaped from the competency trap and fully developed (reconfigured) the necessary entrepreneurial competencies and finally acquired financing.

The combination of the business coaching and the learning from the financing rejection cycle helped them to reconfigure their existing competencies in a relatively short time. The business coaching and consultants helped Solar C to “connect the dots” (Baron and Ensley, 2006:1341). The presence of intermediaries in this case is similar to the launch of new ventures (McAdam and Marlow, 2011; Vohora et al., 2004). In this case the business coaches helped them to re-evaluate their financing strategies based on their failure, which is important in learning especially when the failure is pinpointed (Holcomb, Ireland, Holmes Jr., and Hitt, 2009). In helping to pinpoint the problem, the business coaches had already reduced the time in identifying the problem. Indeed, business coaches have a role in competency development through enhancing knowledge transfer by learning (Bingham, Heimeriks, Schijven, and Gates, 2014)

The change in financing strategies by Solar C points to the notion of higher-level learning. Cope (2005) highlights that higher-level learning (Alvarez, 2001; Cope, 2003, 2005, 2011; Fiol and Lyles, 1985; Lei, Hitt, and Bettis, 1996) is based on “critical events that generate a renewed understanding or redefinition of organisational processes and

strategies.”(Cope,2005:383). In the case of Solar C, the critical event is the financing rejection cycle. As such failure, or in this case the financing rejection cycle, triggered the higher-level learning (Cope, 2003), the outcome for Solar C was to redefine the strategies of the firms, and their approach to financing.

By pinpointing the problem, the reconfiguration of the competencies became faster; another complementary explanation is that the concept of higher-level learning involves heuristics. Heuristics are simple (Alvarez & Busenitz, 2001; Bingham et al., 2007), and with the help of coaching to connect the dots (Baron and Ensley, 2006), facilitating knowledge transfer, and adjusting to idiosyncrasies (Bingham et al., 2014), the learning occurs at an increased rate (Holcomb et al., 2009), thus shortening the duration for reconfiguring the competencies. Further to this, starting from 2014, Solar C is offering their services as a total solution provider for solar projects with financing options, which illustrates that the sustainability threshold (Vohora et al., 2004) had been achieved and that the competencies had been reconfigured.

In the case of Biomass A and Manu A as they remained trapped in the financing rejection cycle, their ventures were later aborted. Without any “positive shocks” (Shepherd, Douglas, and Shanley, 2000:401) to assist them identifying the problems in their financing rejection, and re-strategizing their financing strategies, regardless of the presence of idiosyncratic scenarios (Ahuja and Katila, 2004) the tipping point that leads to decision to break from their path and reconfigure their competencies does not occur. On the

assumption that Biomass A and Manu B realigned their pathways according to either diverted or escaped paths, it would be theoretically possible they would be able to fully reconfigure their existing competencies to acquire green technology financing from the GTFS.

In summary the established entrepreneurial firms possess entrepreneurial competencies that have proven to be relevant in their previous business success. However, when established entrepreneurial firms enter into a new environment (i.e. a green financing context) there is a need for “distinct competencies” (Parrish, 2010:521) which in these cases are reconfigured from their existing competencies to make the sustainable entrepreneurship venture a success.

Based on the findings, the previous paths of the established entrepreneurial firms remain dominant in influencing the ability for them to fully reconfigure their existing entrepreneurial competencies. This remains the case until the intervention of positive shocks that leads to a tipping point to decide to break from the path.

Table 19 Evolution of the opportunity refinement competencies and resource acquisition competencies (adopted from Rasmussen et.al 2014:104)

Elements	Opportunity Refinement Competencies (ORCs)	Resource Acquisition Competencies (RACs)
Main source of competency	Reconfiguration of existing ORCs with external resources	Reconfiguration of existing RACs with external resources, after reconfiguration of ORCs
Nature of competency	Refining business case according to new venture specifications	Convince and educate the banks the whole picture concept for the new venture business case above the knowledge asymmetry
Context of FCG Influence on the evolution of entrepreneurial competencies	Perceived ease of acquiring finance. Competency trap.	Perceived ease of acquiring finance. Competency trap.

6.3 Research Contribution

The research contributes to both the sustainable entrepreneurship literature and the entrepreneurial competencies development literature.

The research contributes to the sustainable entrepreneurship literature in two interconnected ways. Firstly, it fleshes out details about how sustainable entrepreneurship activity is shaped by policy (J. K. Hall et al., 2010). Secondly, it offers a means to explain how existing entrepreneurial firms can translate their experience as they enter the sustainable entrepreneurship space.

The next contribution relates to the evolutionary competency literature. Firstly by supplying this framework to a new context, it offers detailed insight into the two sets of competencies necessary for green technology financing (i.e.

sustainable entrepreneurship). Secondly the research is able to demonstrate the equifinality nature of the competency development paths; this suggests that entrepreneurial competencies evolve differently according to decisions made about financing.

The next subsection will discuss these contributions and will offer some propositions.

6.3.1 Sustainable entrepreneurship literature

The research contributes to the sustainable entrepreneurship literature by elaborating upon Hall et al.'s (2010) questions "under what conditions and policy will sustainable entrepreneurship ventures thrive?" By focusing on established entrepreneurial firms transition into sustainable entrepreneurship ventures in the context of the GTFS also provides insight into the contradiction between York and Venkataraman's (2010) and Hockerts and Wüstenhagen's (2010) arguments about how established entrepreneurial firms are placed to embark upon sustainable entrepreneurship.

The research findings indicate that for established entrepreneurial firms to embark on sustainable entrepreneurship ventures, concentrated effort is needed to reconfigure their existing competencies (Hitt, Ireland, Sirmon, & Trahms, 2011). It is only through doing so that firms were able to acquire GTFS financing. Reconfiguring the entrepreneurial competencies is necessary due to different requirements and contextual considerations for green technology financing. The manifestation of these differences is the financing competence gap. To reconfigure their existing entrepreneurial competencies the established entrepreneurial

firms need to follow three pathways either by diverting, escaping or evading the competency trap.

This reconciles York and Venkataraman's (2010) and Hockerts and Wüstenhagen's (2010) arguments about established entrepreneurial firms embarking on sustainable entrepreneurship ventures by proposing that distinct competencies (Hart, 1995; Parrish, 2010; Worthington and Patton, 2005) are needed for them to embark on sustainable entrepreneurship ventures. The reconfiguration of the established entrepreneurial firms to these distinct competencies according to green technology financing also supports Cassar's (2004) suggestion that financing is according to sectors and is industry specific. The findings also suggest that the notion of a competency trap influences the reconfiguration process. Therefore, the research proposes the following proposition,

Proposition 1: Established entrepreneurial firms are more likely to acquire green technology financing contingent on their ability to develop distinct competencies according to green technology financing under the conditions of a competency trap.

Thus, to answer Hall et al.'s (2010) call about what conditions and policy will help established entrepreneurial firms to pursue sustainable entrepreneurship ventures in the context of the GTFS, the research proposes that established entrepreneurial firms ability to acquire green technology financing, is contingent on their ability to reconfigure their existing competencies into distinct competencies according to green technology financing under the conditions of a competency trap. This is unpacked again in the next section.

6.3.2 Financing competence gap and competency development.

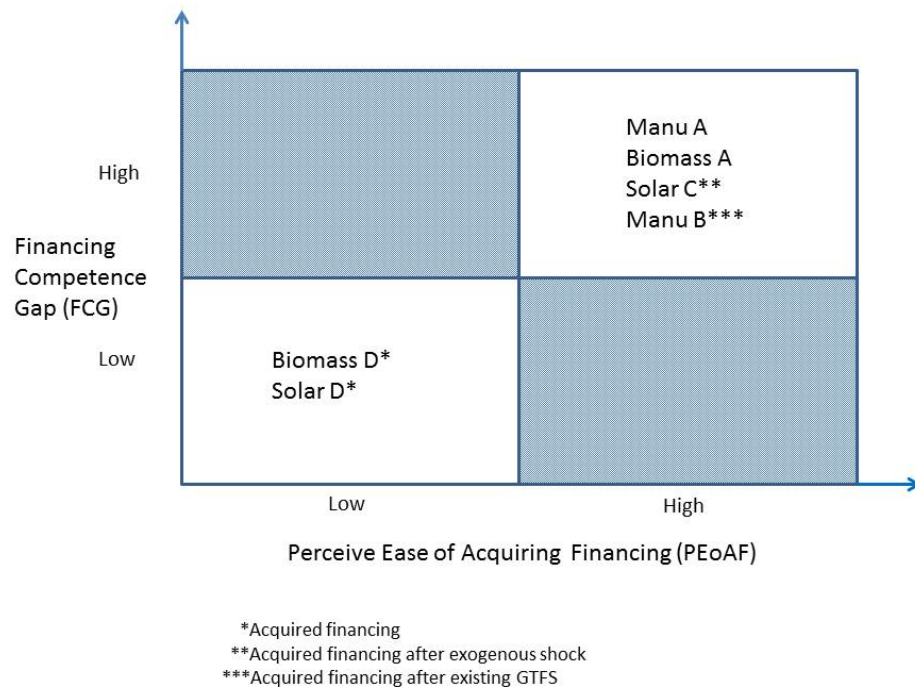
The next contribution centres on the financing competence gap and the GTFS context. As mentioned in 6.2.1, the financing competence gap is influenced by the context. This is similar to Leca & Naccache (2006) and Rasmussen et al. (2014) suggestion about the influence of context in their respective articles.

In this section, the research extends our knowledge on the influence of context on competency development (Barney et al., 2011; Rasmussen et al., 2014; Zahra and Wright, 2011). This in turn adds on the existing knowledge on competency development for sustainable entrepreneurs (Parrish, 2010; Worthington & Patton, 2005).

Under the GTFS context, the research has observed the variation in financing performance of established entrepreneurial firms. The variation of their financing performance is due to certain contextual factors that effects and influences more on certain established entrepreneurial firms more than the rest. However this might be limited to the Malaysia/ GTFS context only.

To highlight this variation, the research adapts Kerr & Nanda's (2011:97) "two dimensional space for entering business" matrix as a graphical expression of the empirical results. This is shown in the Figure 16.

Figure 16 Financing competence gap and perceived ease of acquiring finance (from the researcher)



In Figure 16, the vertical axis is the financing competence gap (see 5.3.1 and 6.2.1), while the horizontal axis is the perceived ease of acquiring finance (see 5.3.1 and 6.2.1).

As shown in Figure 16, a high perceived ease of acquiring finance corresponds to a high financing competence gap. While a low perceived ease of acquiring finance corresponds to a low financing competence gap. By mapping the cases to the quadrants, the cases that are in the upper right hand quadrant represent cases that did not initially acquire financing. In Kerr and Nanda's (2011:97) "two dimensional space for entering business" matrix this quadrant is known as the valley of death for green technology financing.

From the analysis, the four cases that are in the quadrant exhibited certain commonalities during their pre-financing period such as perception that the GTFS is easy money,

different financing and business experience with their new venture.

From the research the inability to acquire financing is due to a competency trap thus hindering the cases to develop the necessary entrepreneurial competencies which is supported by Danneels (2002, 2007). The competency trap does occur in all of the cases in the valley of death quadrant, inducing this competency trap is the contextual influence from the GTFS (Raisch and Birkinshaw, 2008). In turn this competency trap hinders the development of the necessary competencies to acquire financing. This notion is similar to Autio, George, & Alexy (2011) competency development for entrepreneurs from an internationalization context. Here Autio and colleagues suggest that the context induces competencies development. However the analysis shows that this can also work in reverse with contextual influence, hindering the development of competencies development (Rasmussen et al., 2014).

The research believes, based on Forlani and Mullins (2000) and Mullins and Forlani (2005) conceptualization of risk that the "perception of GTFS will be easy money" has more impact than the other known contextual influence on competencies development. This gives rise to the notion that there are certain contextual factors impact firms more as in the case of Biomass A and Manu A. This supports and also expands Rasmussen et.al (2014) work. While from the perspective of financing performance this resonates with Mullins & Forlani (2005) suggestion on risk with the notion of "other people's money" among entrepreneurs.

As highlighted in chapter 2 of the literature review, there is a contradiction in the sustainable entrepreneurship literature

between York and Venkataraman (2010) and Hockerts and Wüstenhagen (2010). Here the cases mirror the contradiction in the sustainable entrepreneurship literature between York and Venkataraman (2010) and Hockerts and Wüstenhagen (2010). York and Venkataraman (2010) suggested that established entrepreneurial firms' will experience difficulty to embark on sustainable entrepreneurship ventures due to organizational inertia. While Hockerts and Wüstenhagen (2010) agree, they further assert that once established entrepreneurial firms have decided on sustainable entrepreneurship ventures, they will outpace nascent firms because of their 'superior market power', 'financial resources' and 'process innovation capabilities'.

The research findings supports York and Venkataraman (2010) suggestion on the notion of a competency trap as seen in cases which failed to acquire financing. However the same findings also supports Hockerts and Wüstenhagen (2010) assertion that established entrepreneurial firms will also be successful because of their existing competencies. From the mapping of the cases, the firms that initially acquired financing and did not suffer from a competency trap exhibited certain common characteristics; high external resources and a low difference in financing experience between ventures. Therefore to explain the contradiction between these scholars, the research offers this explanation. The interplay between the established entrepreneurial firm's characteristics and certain contextual factors influences the ability of established entrepreneurial firms to deploy and reconfigure the necessary competencies in their transition to sustainable entrepreneurship ventures.

In line with this explanation, the research proposes:

Proposition 2: The GTFS contextual influence will have a strong positive influence on the financing performance (acquisition) of established entrepreneurial firms that have high external resources and relevant financing experience.

6.3.3 Entrepreneurial competency development pathways

This research has identified two entrepreneurial competencies needed for established entrepreneurial firms to acquire financing (see 5.3.2) transitioning to sustainable entrepreneurship: the opportunity refinement competencies and the resource acquisition competencies.

In this section the research firstly supports the work of (Rasmussen et al., 2011, 2014) by using the evolutionary entrepreneurial competency framework to reaffirm these two competencies within a different setting and supporting the notion that there are multiple pathways of competency development (Barney et al., 2011; Eisenhardt & Martin, 2000b; Rasmussen et al., 2011, 2014).

Under the GTFS context four pathways have been identified. Based on the credibility threshold (Rasmussen et al., 2011; Vohora et al., 2004) three of these pathways lead to the acquisition of financing and the fourth one leads to the discontinuation of the project. As these entrepreneurial firms are already established, it was assumed that they would possess existing entrepreneurial competencies (Brinckmann et al., 2009). Competency development for these established entrepreneurial firms is the reconfiguration (Karim and Mitchell, 2000) of their existing competencies to adapt to the context of green technology financing.

The four paths are as follows: entrapped, diverted, escaped and evaded. From the analysis these pathways have specific characteristics as shown in the table 20 below.

Table 20 Pathways and characteristics

	Pathway	Characteristics
1	Entrapped	High Financing Competence Gap
		High GTFS influence
		Financing rejection cycle
		Low external resources involvement
		Non-acquisition of financing
2	Diverted	High Financing Competence Gap
		High GTFS influence
		Financing rejection cycle
		High external resources involvement
		Diversify financing sources
		Acquired financing
3	Escape	High Financing Competence Gap
		High GTFS influence
		Financing rejection cycle
		High external resources involvement
		Acquired financing
4	Evaded	High Financing Competence Gap
		High GTFS influence
		High external resources involvement
		Acquired financing

The common denominator for these pathways is their path dependencies (Barney, 2001; Beckman & Burton, 2008; Schreyogg & Sydow, 2011; Sydow et al., 2009). The path dependencies play an important part in determining the financing competence gap (Alvarez & Busenitz, 2001; Danneels, 2002). Based on the established entrepreneurial firm's previous paths, the level of the financing competence gap can be relatively estimated. If the business and financing experience of the established entrepreneurial firms is totally different, it is more likely that the financing competence gap is high. However if their business and financing experience is similar, it is more likely that the financing competence gap is

low. In the context of the research the financing experience is assumed to be more important.

The next critical stage of the competency development pathways is the interplay between the financing competence gap (Danneels, 2007) and the context (Autio et al., 2011; Rasmussen et al., 2014). Here the influence from the effects of the perceived ease of acquiring finance might influence the financing competence gap of the established entrepreneurial firms based on the firm's scanning of the environment (Hambrick, 1981). Depending on the level of influence from the effects of the perceived ease of acquiring finance it will either widen the financing competence gap (high) or maintain the financing competence gap (low) as explained in section 6.3.2. The widening of the financing competence gap will lead the established entrepreneurial firms into a competency trap which is manifested by a financing rejection cycle. Breaking away from the competency trap will be dependent on the established entrepreneurial firm's strategy (Danneels, 2002; Hitt et al., 2011) to remain entrapped or divert, escape or evade the competency trap.

In the case of Biomass A and Manu A that followed the entrapped pathway, they were caught in the competency trap. Under the influence of the perceived ease of acquiring finance, Biomass A and Manu A were unable to escape the competency trap thus incapable to fully reconfigure their existing entrepreneurial competencies to acquire financing. The idea that a self-reinforcing mechanism that induces lock-in (Schreyogg and Sydow, 2011; Sydow et al., 2009) between the path and the competency trap (Liu, 2006) explains this dilemma. Here the research expounds further by identifying

the trigger (Vergne & Durand, 2011) behind this dilemma which is the widening of the financing competence gap because of the contextual influence, and Biomass A and Manu A's reliance on internal resources (Kathuria & Joshi, 2007) even though in idiosyncratic situations (Ahuja & Katila, 2004).

In the case of Manu B and Solar C both had utilised a path-breaking strategies to acquire financing. Even though the financing context is the same with Biomass A and Manu A, the impetus for Manu B and Solar C to use path breaking strategies is a reflection of Karim & Mitchell (2000:1068) "expansion incentives and competitive pressures outweigh path dependence". This pushed Manu B and Solar C after failing several times to acquire financing to seek external resources to help with their financing.

Refining this further, since Manu B is relatively young compared to the other cases, the banks were very strict, thus increasing competitive pressures (Karim & Mitchell, 2000). They were more willing to diversify their financing sources (e.g. venture capitalist, business angels) and diverting from GTFS to expand their venture. When Manu B opted out of the GTFS, the benefits that come with certification were also nullified. By diverting from the GTFS and diversifying their financing resources they also changed the environment (Hitt et al., 2011; Zahra and Covin, 1995) from GTFS to alternative financing. Aided by past failures from the GTFS experience and a high involvement of external resources (e.g. technology principal, consultants) they diverted from the competency trap, developed the necessary competencies and were able to finally acquire financing but with equity sharing

In the case of Solar C, they had been involved for a long time in the solar industry which imbued them with technical expertise, expanding their venture was the next logical step for them (Karim & Mitchell, 2000). However they faced financing difficulties to expand their venture. Difficulties in to acquire financing under the GTFS resulted in a financing rejection cycle. Aided by high involvement of external resources (e.g. business coaches, special entrepreneurial program) this helped Solar C to rescan the environment (Hambrick, 1981) and learn from their financing failures (Cope, 2011) to escape their competency trap and developed the necessary competencies to acquire financing without equity sharing.

Lastly, for Biomass D and Solar D that followed the evaded pathway, they were not caught in the competency trap due to their previous path that has some similarities with their present venture. Because of the similarity in terms of the path, the scanning of the environment gave them a better picture in terms of the resources and knowledge (Vohora et al., 2004). Aided by a high involvement of external resources (e.g. consultants, suppliers) they were able to reconfigure their existing entrepreneurial competencies to acquire financing.

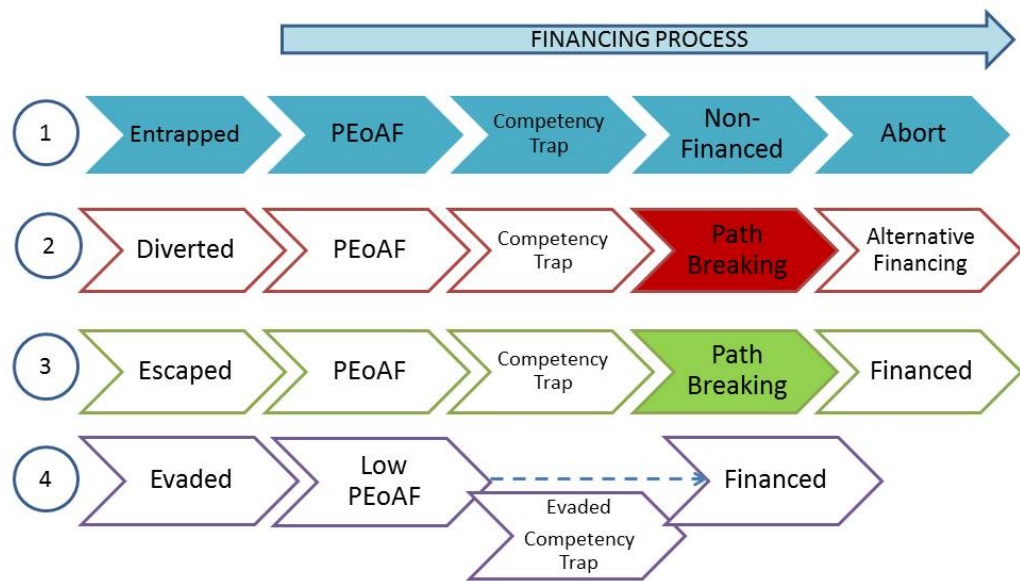
The four pathways illustrate the multiple routes to competency development that can be used to develop the necessary entrepreneurial competencies to acquire financing. This finding is consistent with Eisenhardt and Martin's (2000) notion of equifinality of the paths in the entrepreneurial competencies development. However it also gives credence to Zahra, Sapienza, and Davidsson (2006) assertion that the chosen

route and the speed of which established entrepreneurial firms reconfigure their existing entrepreneurial competencies is a form of competitive advantage.

Another observation from these pathways is that the emphasis is not only on the environmental context and the influence that it has on the development of the entrepreneurial competencies but also the path breaking strategies to change the environmental context (i.e. alternative financing). By changing the environmental context it effects the resource orchestration of entrepreneurial firms (Hitt et al., 2011). This was illustrated by the importance of different factors such as the point of intervention (e.g. business coaching) (Cope, 2011) in the entrepreneurial competencies development process.

In summary, the analysis and findings demonstrate the changing complexities for the established entrepreneurial firm's journey in response to its challenges to develop their entrepreneurial competencies in relation to the financing competence gap. Figure 17 summarizes the pathways and the different routes of the cases.

Figure 17 Summary of four pathways of entrepreneurial competency development (from the researcher)



PEoAF: "Perceived Ease of Acquiring Finance"

6.4 Summary and conclusion

The chapter discussed the financing competence gap and its components. This was followed by the entrepreneurial competencies that are necessary to acquire financing. The discussion also touched on the multiple pathways to competency development in relation to the competency trap: entrapped, diverted, escaped and evaded.

The research contributes primarily to the nascent sustainable entrepreneurship literature by answering Hall et al.'s (2010) question regarding the conditions and policies for sustainable entrepreneurship ventures to thrive. Here the research proposes that, in the context of Malaysia specifically and government green financing initiatives generally, established entrepreneurial firms ability to acquire financing, is contingent

on their ability to reconfigure their existing competencies into distinct competencies according to green technology financing under the conditions of a competency trap.

Secondly, the research extends our knowledge on the influence of context on competency development (Barney et al., 2011; Rasmussen et al., 2014; Zahra and Wright, 2011). This in turn adds on the existing knowledge on competency development for sustainable entrepreneurs (Parrish, 2010; Worthington & Patton, 2005).

The research also contributes to the entrepreneurial competencies literature by extending Rasmussen et al.'s (2011,2014) evolutionary competency framework to a different context: established entrepreneurial firms in a developing country. This furthers the utility of the framework and highlights the influence of the context on the financing competence gap and the effects on the competency development.

Finally, the research also identifies multiple pathways to develop the necessary entrepreneurial competencies to acquire financing, consistent with Eisenhardt and Martin (2000) conceptualisation of equifinality in competency development (Eisenhardt and Martin, 2000). From these multiple pathways the research has also illustrated that through path breaking strategies the environmental context (i.e. alternative financing) can be changed and that the chosen route and speed of reconfiguration influences competency development and the acquisition of green technology financing.

Chapter 7: CONCLUSION

7.1 Introduction

From the outset, this research aimed to contribute to the sustainable entrepreneurship literature by focusing on the conditions and policies (Hall et al., 2010; Hockerts and Wüstenhagen, 2010) that may facilitate or hinder sustainable entrepreneurship ventures. To this end, the research focused on a financing scheme in Malaysia (GTFS) to unpack how sustainable entrepreneurship ventures might obtain financing. Financing is a key barrier facing all new ventures (Cassar, 2004; Colombo and Grilli, 2005, 2006). So by explaining how it is acquired, it was anticipated that knowledge could be generated to better understand government financing in facilitating sustainable entrepreneurship.

Theoretically the research builds upon prior work by Ahuja and Katila (2004) that suggests the evolutionary emergence of competencies, to orientate the research theoretically and augments Rasmussen et al., (2011,2014) evolutionary entrepreneurial competency framework. Thus the research also seeks to contribute to this stream of literature, by advancing the evolutionary competency framework through its application to a new setting, sustainable entrepreneurship in developing countries.

The findings and contribution of the research also offer insights to financing green technology projects in a developing country context, a tertiary motivating factor behind this research.

Below the highlights of the key findings and contributions will be presented, followed by policy recommendations, limitations of the research and implications for future research.

7.2 Key findings and contributions

7.2.1 Financing Competence Gap

The first key finding answers the sub-question, “How does the GTFS context influence the deployment of competencies by established entrepreneurial firms?”

The GTFS context induces a financing competence gap that influences the development of the necessary competencies. The financing competence gap consists of four elements: the different financing priorities of stakeholders, bank knowledge asymmetry, green technology financial criteria and the effects from the context. Here the financing competence gap hinders the deployment and development of the necessary competencies to acquire financing.

7.2.2 Entrepreneurial Competencies

The second key finding answers the sub-question: ‘What entrepreneurial competencies are necessary for established entrepreneurial firms to acquire green technology financing in this context?’

Following Rasmussen et al.'s (2011, 2014) evolutionary entrepreneurial competency framework, the research has identified two sets of entrepreneurial competencies that are needed to acquire financing, the first is opportunity refinement competencies and the second is resource acquisition competencies.

The opportunity refinement competencies (Rasmussen et.al, 2011) are a set of competencies critical for refining and developing an entrepreneurial opportunity into a clearly articulated, commercially viable business venture with a high success rate. In the context of this research, the opportunity refinement competencies, involve three functional skills (Mitchelmore and Rowley, 2010) that are found to be intricately linked: financing, technical and marketing skills. These functional skills represent the concept of the whole picture that the bankers seek from established entrepreneurial firms.

While the resource acquisition competencies (Rasmussen et al., 2011, 2014) are a set of competencies to convince and educate the banks about green technology in detail, the financial assumptions being used, project constraints from various perspective (e.g. raw material, technology) and to convince the bankers of the success of the venture by both visualising the projects and implementation planning.

7.2.3 Competency development path

The third key finding answers the sub-question: "How are these competencies developed?"

The established entrepreneurial firms have existing entrepreneurial competencies that have proven relevant in their previous business successes. However they are entering a new environment and a new financing context. Instead of a need for establishing or developing distinct competencies (Hart, 1995; Parrish, 2010; Worthington and Patton, 2005) this transition calls for reconfiguring (Karim and Mitchell, 2000) the existing competencies to develop, the sustainable entrepreneurship venture.

The path-dependence of the established entrepreneurial firms will influence their ability to initially reconfigure their existing entrepreneurial competencies. This is because their path has a causal relationship with the competency trap (Liu, 2006). This research has identified four pathways to competency development under this context: entrapped, diverted, escaped, and evaded. Each pathway implies a different strategy for attempting to manage the competency trap and a different approach to reconfiguring their entrepreneurial competencies.

7.3 Contributions and research implications

The transition of established entrepreneurial firms into sustainable entrepreneurship ventures is difficult regardless of their “superior market power”, “financial resources”, and “process innovation capabilities” (Hockerts and Wüstenhagen, 2010:487) and government incentives (York and Lenox, 2014; York and Venkataraman, 2010).

As a part of this transition, the research has illustrated the difficulty to acquire financing, from managing the contextual differences in terms of financing, to the reconfiguration (Karim and Mitchell, 2000) of their existing entrepreneurial competencies according to green technology financing criteria.

Here, the research contributes primarily to the nascent sustainable entrepreneurship literature by answering Hall et al.’s (2010) question regarding the conditions and policies for sustainable entrepreneurship ventures to thrive. Here the research proposes that, in the context of Malaysia specifically and government green financing initiatives generally, established entrepreneurial firms ability to acquire financing, is

contingent on their ability to reconfigure their existing competencies into distinct competencies according to green technology financing under the conditions of a competency trap.

Secondly, the research extends our knowledge on the influence of context on competency development (Barney et al., 2011; Rasmussen et al., 2014; Zahra and Wright, 2011). This in turn adds on the existing knowledge on competency development for sustainable entrepreneurs (Parrish, 2010; Worthington & Patton, 2005). Under the GTFS context, the research has observed the variation in financing performance of established entrepreneurial firms. The variation of their financing performance is due to certain contextual factors that effects and influences on certain established entrepreneurial firms more than the rest. However this might be limited to the Malaysia/ GTFS context only.

The research also contributes to the entrepreneurial competencies literature by extending Rasmussen et al.'s (2011,2014) evolutionary competency framework to a different context: established entrepreneurial firms in a developing country. This furthers the utility of the framework and highlights the contextual difference influencing competency development in the form of a financing competence gap.

Finally, the research also identifies multiple pathways to develop the necessary entrepreneurial competencies to acquire financing, consistent with Eisenhardt and Martin (2000) conceptualisation of equifinality in competency development. From these multiple pathways the research has also illustrated that through path breaking strategies the

environmental context (i.e. alternative financing) can be changed and that the chosen route and speed of reconfiguration influences competency development and the acquisition of green technology financing.

7.4 Policy recommendations

Climate change mitigation is an issue that cuts across national borders, with implications for both developed and developing countries. Programmes to address climate change operate on multiple levels, from international to local programmes ranging from awareness generating programmes to new technological innovations.

One of the essential factors for furthering the agenda of climate change mitigation is financing for sustainability projects. Thus at the international level, during the Conference of Parties (COP) 17 in Durban, 2011, a fund of USD 100 billion was launched to help mitigate climate change. In developed countries like the UK, the Green Development Bank was launched in 2011 with an allocation of GBP 3 billion. While in Malaysia the GTFS was launched in 2010 in lieu of the commitments made in COP 15 in Copenhagen to reduce by the year 2020 Malaysia's carbon emission by 40% against business as usual levels in 2005. Apart from Malaysia, there is a multitude of developing countries that have launched similar financing initiatives such as ENCON in Thailand, while in China, Bangladesh and Indonesia these green financing initiatives are spearheaded by state owned banks.

Given the importance of financing to climate change mitigation, the research offers insights to local policy makers in terms of managing multiple stakeholders' expectations in

financing sustainable entrepreneurship in developing countries. In translating these insights to concrete and comprehensive policy-based programmes, the research recommends the following:

- (i) Based on the finding of the financing competence gap, the first action that can be taken is to reinforce the business case via opportunity refinement programmes for new sustainable entrepreneurship ventures. One of the ways this can be fulfilled is to mitigate contextual influences (i.e. the perceived ease of acquiring finance). This can be implemented with awareness programmes targeting the entrepreneurs, highlighting the fact that to acquire financing will not be easy and step by step guides as to what exactly entails to acquire GTFS or similar projects/schemes. This can also include dedicated incubation programmes or business clinics at different levels for both nascent entrepreneurs and for established entrepreneurs who are currently, or considering embarking on sustainable entrepreneurship ventures.
- (ii) The second action that can be taken is to restructure the GTFS programme by streamlining the financing priorities of the government and the banks, which include a review of current practices and benchmarking best practices, including the establishment of a dedicated Green Development Bank such as in the United Kingdom.
- (iii) The third action is to alleviate bank knowledge asymmetry by training key employees within the banks. The target group should be a mixture of junior to senior officers. This can be conducted through executive

courses by higher learning institutions or the Malaysian Green Technology Business Association. However from the findings of the research, training should also include reviewing case studies of green technology ventures. Imposing a quota for the banks to finance green technology ventures will help to speed up learning curve;

- (iv) It is necessary to create stronger demand for green technology related products from the public, private and the government sector. This can be implemented by awareness campaigns and public, private and government procurement activities; and finally
- (v) Finally, gradually opening the green technology market by promoting and not limiting equity participation from international entities including international funds and international firms. This will further develop the green technology market by exposing the local market to new ideas, building capacities of local players to eventually go to the international stage.

7.5 Research limitations and future research

The research has illustrated that established entrepreneurial firms transitioning to sustainable entrepreneurship ventures need to reconfigure their existing entrepreneurial competencies in the GTFS context. In light of this future research is needed to understand further the conditions and policies needed after the GTFS expires. This resonates with Muñoz and Dimov (2014) research to understand further supportive (non-supportive) environments for sustainable entrepreneurship ventures. While another future research in

the present context would be to also explore the influence of multiple stakeholders involvement in the other process of sustainable entrepreneurship.

The research draws from the evolutionary entrepreneurial competency framework (Rasmussen et al., 2011, 2014) and expands the credibility threshold to include the post-financing activities. As a result, the research briefly touches on the sustainability threshold (Vohora et al., 2004) of the new sustainable entrepreneurship ventures. Further research into this area will extend the scope of the evolutionary entrepreneurial competency framework (Rasmussen et al., 2011, 2014) and further refine competencies identification.

The context of the research focuses on acquisition of financing for sustainable entrepreneurship ventures, two sets of entrepreneurial competencies and three functional skills were identified. Future research could ascertain more functional competencies in different context and also the interplay between these skills in the evolution of these entrepreneurial competencies (Mitchelmore and Rowley, 2010; Teece, 2014).

The financing competence gap was derived from the combination of four elements: financing priorities, bank knowledge asymmetry, green technology financing criteria and the contextual effects. Although the research has identified these four elements, there might be other contributing elements involved. By reframing financing as an evolutionary process (Vanacker et al., 2014) a future research that can be considered is the relationship between the path and these elements.

7.6 Conclusion

This endeavour has advanced the understanding of the conditions and the policies for sustainable entrepreneurship ventures with a focus on financing within the context of Malaysia. Overall, the GTFS has helped to further Malaysia's agenda in fulfilling their carbon emission reduction targets. Now there should be more concentrated efforts from the key stakeholders especially the government and banks to push this agenda forward by implementing the recommendations proposed in section 7.4.

Finally, the research argues that in Malaysia, established entrepreneurial firms are likely to develop the necessary entrepreneurial competencies to acquire green technology financing. However this is contingent on their ability to reconfigure their existing entrepreneurial competencies to adapt to the contextual differences emanating from the GTFS context under the conditions of a competency trap.

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Appendix I: Information for Research Participants

Thank you for agreeing to participate in the research project. Your participation in this research is voluntary, and you may change your mind about being involved in the research at any time, and without giving a reason.

This information sheet is designed to give you full details of the research project, its goals, the research team, the research funder, and what you will be asked to do as part of the research. If you have any questions that are not answered by this information sheet, please ask.

What is the research project called?

The Green Technology Financing Scheme (GTFS) in Malaysia
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Who is carrying out the research?

<p>The principal investigator for this research will be Mr.Mohd Azlan Zaharudin.</p>
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<p>He was formerly attached to the Ministry of Energy, Green Technology and Water. He is currently on study leave and now is a PhD Candidate from the University of Nottingham Institute of Entrepreneurship and Innovation (UNIEI) under the supervision of Professor Simon Mosey, Director of UNIEI and Dr.Isobel O'Neil, Lecturer in Entrepreneurship and Innovation.</p>
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<p>His doctoral research is sponsored by the Government of Malaysia through the Public Service Department as part of the Government Management Training Program.</p>
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What is the research about?

The purpose of the research is an attempt to study and understand the role of **entrepreneurial competencies** within **sustainable (green technology) entrepreneurs** in **obtaining financing** in Malaysia. The aim of the research objectives are as follows:

- (i) to outline the entrepreneurial competencies within sustainable entrepreneurs in Malaysia ;
- (ii) to understand the barriers to financing from the sustainable entrepreneurs perspectives; and
- (iii) to understand the factors needed to support sustainable entrepreneurs in Malaysia for them to thrive.

Primarily the feedback and the output from this study will be utilised as inputs for the purpose of fulfilling the requirements of the Nottingham University Business School Doctoral research program. However these inputs are hoped to also help in the continuous improvement of sustainable (green technology) entrepreneurship development in Malaysia.

What groups of people have been asked to take part, and why?

Individuals from the following categories will be participating:

- (i) GTFS applicants (founding member and/or senior managers) of entrepreneurial business.

(ii) Banks providing financing under the GTFS

(iii) Ministry/GTFS Official

These groups have been selected to obtain a holistic view of the value and significance of entrepreneurial competencies within sustainable (green technology) entrepreneur businesses.

What will research participants be asked to do?

Take part by face to face interviews/telephone/follow-up email
Interviews will last for about an hour, and will be audio taped (only with permission).

Observation of the "pitching process" (only with permission).

You have the right to withdraw from the research study at any time if you need to.

What will happen to the information provided?

Interviews will be transcribed.

The information will be used as inputs for the study.

Data storage-voice recording, stored in password protected personal pc

Data will be confidential and anonymous. All aspects of the study, including results, will be strictly confidential and only the researchers will have access to information on participants.

What will be the outputs of the research?

The research outputs will be for the thesis in fulfilling the requirements of the Nottingham University Business School Doctoral research program. Journal articles

Contact details

Researcher:

(i) Mohd Azlan Zaharudin

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Complaint procedure

If you wish to complain about the way in which the research is being conducted or have any concerns about the research then in the first instance please contact (see above).

Or contact the School's Research Ethics Officer:

Adam Golberg

Nottingham University Business School

Jubilee Campus

Nottingham NG8 1BB

Phone: 0115 846 6604

Email: adam.golberg@nottingham.ac.uk

Appendix II: Interview Consent Form

- The research is being carried out on behalf of Nottingham University Business School.
- Interviews will last for about an hour, and will be audio taped (with your permission).
- Interviews will be transcribed. You may request a copy of the notes.
- Interview notes will be analysed only by researchers employed on this project. This analysis will only be used in publications associated with this particular research project.
- All aspects of the study, including results, will be strictly confidential and only the researchers will have access to information on participants.
- While the entire transcripts will not be used, selected quotations will be used in publications associated with this research. In written material associated with this research project, your identity will be disguised by the use of a pseudonym. Any direct quote will be published using this pseudonym.
- Please indicate any quotes you wish to keep off the record, we will ensure these are not included in any published material.
- You have the right to withdraw from the research study at any time if you need to.

I have read and understand this consent form, and any questions I have asked have been answered to my satisfaction. I understand that my participation is voluntary

and I agree to participate in this research, knowing that I may withdraw at any time.

Participant's

Name:.....

(block capitals)

Participant's

Signature:.....

Date:.....

Appendix III: Example of semi-structured questions:

Entrepreneur

A. Business Background

1. When was this company established?
2. Tell me about how long have you been with this company?
3. What is your role in the company?
4. Could you please explain the company's core business?

B. Management Practice

1. How is the business run?
2. How did the company develop since starting up?
3. How have things changed overtime?
4. How did management/you cope with these changes?
5. Could you describe the toughest experience in this company?
6. What would you say to be the major contributing characteristics that brought this company to the current stage?

C. Financing

1. Who is in charge of financial matters in the company?
How long have you/ they been dealing with financial matters? What kind of financial evaluation and assessment do you use? Has these changed?
2. What do you think about access to financing for entrepreneurs in Malaysia?
3. How does the company usually finance projects?
4. Is this the first project that you are asking under the GTFS? What did you view as the benefits of GTFS?

5. How did you present your business case to the committee and the banks in particular?
6. What contributing factor made the impact for you to obtain financing from GTFS?
7. Any recommendations to improve the GTFS from your point of view?

Final Comment

1. What advice would you give to somebody who is also vying to obtain financing from the GTFS?

Financial Institutions

1. Can you please tell me about yourself?
2. How long have you been in the Banking Industry?
3. What is exactly your role in the Bank?
4. Can you please share with me about the financing landscape in Malaysia?
5. Can you tell me your involvement with GTFS? How do you feel about GTFS?
6. How many green technology financing has the banks approved?
7. What are your comments on the entrepreneurs seeking green technology financing?
8. Any advice to entrepreneurs seeking final comments?
9. Any advice for the government on GTFS?
10. Any final comments?

Appendix IV: Summary Form

Figure 18 Summary Form (adapted from Miles and Huberman, 1994:53)

A. Contact Summary Sheet ■ 53

Figure 4.1
Contact Summary Form:
Illustration (excerpts)

<p>Contact type:</p> <p>Visit <u>X</u></p> <p>Phone _____</p> <p style="padding-left: 40px;">(with whom)</p>	<p>Site: <u>Tindale</u></p> <p>Contact date: <u>11/28-29/79</u></p> <p>Today's date: <u>12/28/79</u></p> <p>Written by: <u>BLT</u></p>
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1. What were the main issues or themes that struck you in this contact?

Interplay between highly prescriptive, "teacher-proof" curriculum that is top-down imposed and the actual writing of the curriculum by the teachers themselves.

Split between the "watchdogs" (administrators) and the "house masters" (dept. chairs & teachers) vis a vis job foci.

District curric. coord'r as decision maker re school's acceptance of research relationship.
2. Summarize the information you got (or failed to get) on each of the target questions you had for this contact.

<u>Question</u>	<u>Information</u>
History of dev. of innov'n	Conceptualized by Curric. Coord'r, English Chairman & Assoc. Chairman; written by teachers in summer; revised by teachers following summer with field testing data
School's org'l structure	Principal & admin'rs responsible for discipline; dept chairs are educ'l leaders
Demographics	Racial conflicts in late 60's; 60% black stud. pop.; heavy emphasis on discipline & on keeping out non-district students slipping in from Chicago
Teacher response to innov'n	Rigid, structured, etc. at first; now, they say they like it/NEEDS EXPLORATION
Research access	Very good; only restriction: teachers not required to cooperate
3. Anything else that struck you as salient, interesting, illuminating or important in this contact?

Thoroughness of the innov'n's development and training.

Its embeddedness in the district's curriculum, as planned and executed by the district curriculum coordinator.

The initial resistance to its high prescriptiveness (as reported by users) as contrasted with their current acceptance and approval of it (again, as reported by users).
4. What new (or remaining) target questions do you have in considering the next contact with this site?

How do users really perceive the innov'n? If they do indeed embrace it, what accounts for the change from early resistance?

Nature and amount of networking among users of innov'n.

Information on "stubborn" math teachers whose ideas weren't heard initially -- who are they?

Situation particulars? Resolution?

Follow-up on English teacher Reilly's "fall from the chairmanship."

Follow a team through a day of rotation, planning, etc.

CONCERN: The consequences of eating school cafeteria food two days per week for the next four or five months...

Stop.

Appendix V: Example of Quotes from Cross Case Analysis

Appendix V are the example of quotes/evidence from the cross case analysis. The initial analysis/ interpretation is included.

Aggregate Dimensions	2 nd Order Themes	1 st Order Concepts	Example Quotes	Analysis
Financing competence gap	Financing priority	<p>Government directive that the banks must follow</p> <p>The guarantee is worthless</p> <p>Green technology loan have a high risk perception</p>	<p>“With all these guarantees, whatever we say, they still want to look at the entire account in the group. I think the government has to tell the bank, This is a directive whereby you have to honour.” (MD of Manu A)</p> <p>“(The 60% government guarantee) is (for) the success of the business in using that technology. (PA4)</p> <p>“Since the day, we got the certificate, it’s been one year, no bank is interested. So to the bank, what the government say doesn’t mean anything.” (MD of Manu A)</p> <p>“Nobody is having that confidence, and there is no parties, who are able to convince the financiers that this technology is workable. “ (ED of Biomass A)</p>	<p>The program administrator argues that the Malaysian banks are traditionalist and the climate change mitigation should be part of the banks social responsibility. While the banks argue otherwise, that business applications should not be treated on the basis of CSR, regardless of the guarantee, regardless of the previous success; established business should be treated as nascent entrepreneurs. The entrepreneurs’ suggests that since this is a government program, the banks should be more supportive and to some extent the guarantee is not honoured by the bank. The financing priority contributes to the financing competence gap and influences the entrepreneurs’ competency development via a perceived ease of acquiring finance and a competency trap (Levitt and March, 1988) which is illustrated in a financing rejection cycle.</p> <p>See Link:</p>

		<p>The evaluation of green technology loan will be based on the same criteria as conventional criteria</p> <p>Malaysian banks are traditional bankers</p> <p>GTFS is a form of Bank CSR</p>	<p>“The way that we finance green and the other projects are not (any) different (we still use the) 5C. We are in the business to make money, credit mitigation. [...]Banks do CSR but not for business applications”(SCO of Bank 5)</p> <p>“It’s going to be looked at on the platform of a new business. New business because they have no experience, [...]. They are starting from scratch so [we] evaluate them the same with newcomers [...](SCO of Bank 4)</p> <p>“Malaysian are traditional bankers [...] the energy saving, saving the environment is not part of the agenda.[...] the government, (PA 6)</p> <p>“The bank does not see this, but the government feels the project is viable”.(PA3)</p> <p>[in] my opinion the government is looking at the social responsibility for the financial institution to give back to the society.”(PA 6)</p>	<p>Competency Development</p> <p>Opportunity Refinement Competencies</p>
	Bank’s knowledge asymmetry	Learning curve for the bank	<p>“GTFS is still new. The general market has yet to fully embrace it. The financial institution is still (grappling) with it.” (HOD Bank 1)</p> <p>“[...] I think we, they have a learning curve, (and) we</p>	The learning curve of the bank will affect the ability to understand the green technology venture even though all the relevant information has been presented to bank, this phenomenon in the research is a similar

		Need to learn new evaluation technique	<p>have a learning curve on how to deal with them as well. They, it's their first renewable energy, or they say it's their first green loan as well, even though this bank that we are talking about is an international bank." (Financial Controller of Solar D).</p> <p>"I cannot compare green financing compared to a normal financing you know. It's totally different because from my experience, the ones that we have done are quite huge projects. We have done quite huge projects and it's totally different. For me I had to learn altogether again. My 5Cs and I had to add on some more..." (SCO Bank 2)</p> <p>"The other factor that GTFS need [...] is to give knowledge as [in] ways to evaluate and access a project. I think how to convince the banks [is] another story. Because [they the banks] don't understand the technology. Maybe from the business plan it is ok but what about the technology risk? How do we evaluate? Some projects have good technology but the entrepreneur does not have a good business plan. The bank does not see this, but the government feels the project is viable. They cannot link the technology with the business plan, that's the area we need to train the credit officers." (PA3)</p>	<p>concept of the knowledge asymmetry concept suggested by Bonnie and Wirtz (2012)</p> <p>See Link:</p> <p>Competency Development</p> <p>Opportunity Refinement Competencies</p> <p>Resource Acquisition Competencies</p>
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		<p>No expertise for technical evaluation</p> <p>The banks are not interested</p>	<p>“Most credit officers either not equip or they do not have the confidence to actually do it so, what they do is just (shelf) it” (Project partner of Solar D)</p> <p>“[...] they (Banks) think, you’re buying a house. I also got a house so I know what a house is, so I give you financing. This is technology. I don’t know...it’s too risky...”(MD of Manu A)</p> <p>“They (Banks) go and do research on the technology provided. This is exactly what they did they asked me who is the supplier and I told them. They checked the website, then the banks asked the suppliers annual statement and they came back to me to say that the project is not viable” (ED of Biomass A)</p> <p>“Although we are (one of) the lead GTFS supporter, our focus is primarily on our existing customers. That will be an eventuality where we will be sending people to acquire technical expertise on the 4 main sectors. It’s just that it has not reached that desired stage yet.” (HOD of BANK 1)</p>	
	Green technology financial criteria	Financial comfort	<p>Even if you come, if you come back and tell you are well-collateralized and we do not see the cash flow coming out of your end products, we will not, we will not take it. [...] Of course, the collaterals help eases our clean portion but we are into cash flow financing. (HOD of BANK 1)</p>	<p>The financing criteria from the banks emphasis the financing skills (e.g cash flow-technical assumptions), technical skills and marketing skills are of importance to the bank. These skills make up the opportunity refinement competencies (Rasmussen et.al, 2014)</p> <p>See Link: Competency Development (Path)</p>

		Whole picture concept	<p>“...one more thing; why we were a bit sceptical because we were not able to see a complete picture. [...] they want to produce something, we’re not able to see the potential because if you are able to sell, they will get money when they get money, in all probability, pay the banks but in most of these cases, we are not able to see a complete picture.” (HOD of BANK 1)</p>	<p>Opportunity Refinement Competencies Resource Acquisition Competencies</p>
		Technical expertise	<p>“To receive certification from the GTFS and qualify for the benefits the firms must show the carbon emission reduction”-GTFS website</p> <p>“how I wish the one thing technical expertise. The proponents themselves, instead of relying on a third-party which are not shareholders, they must acquire that, [...] tie them down, by giving some equity because these people can leave. [...] If the proponents themselves has got technical expertise, that’s good” (HOD of BANK 1)</p>	
		Financial expertise	<p>“[...] chloroformic (value) [...] is the major assumption in their cash flow model, I assume my kilojoules of heat value is 2,900 because of the composition of waste, this will generate (how many) megawatt. I need to be able to relate from the composition of the waste and the mild, moisture [...] to whatever energy that I produce[...] a bank looks at that when they don’t understand [...] they will kick (you) out because they don’t understand [...]” (Project</p>	

		Successful financing criteria	<p>partner Solar D)</p> <p>“The ideal Green Technology Entrepreneur would be somebody with a viable business, fits the credit criteria, have the expertise and experience, support from parent company, collateral, commitment, consultant to help with the completion of the project, able to understand the business without consultant by doing their own research. Really look at the feasibility and the ability to communicate the whole picture.” (SCO of Bank 5)</p>	
	Perceived ease of acquiring finance	Previous financing experience	<p>“Financing, we are fortunate that we had the support of the local banks because the project is (National Electricity Company), so there’s a lot of confidence from the local institution... payment is never an issue. Therefore, financing was not too much of an issue because all the projects are contract financed.” (ED of Biomass A).</p> <p>“...but if let’s say I call a bank today and say, “I’m getting a 40 million dollar contract, can you finance?” They will be (here) tomorrow, they will be sitting here. You know, so that’s not an issue.” (ED of Biomass A)</p> <p>“I think we have approached almost six to seven banks, and these are bankers who have financed me [before], and these are the same people who are telling me today that, “Oh, for this Biomass A we have got concerns”...How much of convincing we have done</p>	<p>The perceived ease of acquiring finance influences the financing competence gap, it makes the entrepreneurs feel that this will be easy financing and big profit. This feeling is at the start of the venture before the financing process. (Opportunity recognition-environment scanning).</p> <p>See link Financing Competence Gap Competency Trap Opportunity Refinement Competencies Resource Acquisition Competencies</p>

			<p>and still we are not able to penetrate through their barriers or their thoughts.” (ED of Biomass A)</p> <p>“You see, the funds from the facilities we’ve done it all our projects. Some our own money, and some are through the facilities, right, because the projects run in the couple of millions [...] and these projects are much bigger than this GTFS funding, and we have managed all these projects all these years. So this is only a small portion, why they’re reluctant I don’t understand.” (MD of Manu A)</p>	
		<p>Easy certification of stage 1 of the evaluation</p>	<p>“[...] So we always tell, “Hey, come on, you see GTFS, I did this presentation, they agreed to give me the certificate. Otherwise, if the project is not viable, they will never give me this certificate. What is the purpose of this certificate? the project is viable, that’s why they give me the certificate.[...] [its] affecting people like us because we cannot come on board fast. We secured the land more than eight months.”(ED of Biomass A)</p>	
		<p>The perception that GTFS is easy money</p>	<p>“(Sometimes the entrepreneurs) feel the money is like (from an) Automated Teller Machine”(PA2)</p> <p>“[...] we failed to realise, we thought it was so easy because at that time we thought, if GTFS agree, everything will be good.” (ED of Biomass A)</p> <p>“Because it was a coincidence, I would say. I mean, it</p>	

		Too good an opportunity to miss	<p>was never my interest per se. [...] there was a lot of promotion by the government saying that, [...] a lot of incentives, [...] lucrative revenues out of that.” (ED of Biomass A)</p> <p>“No, there was an opportunity to go, we heard about this Malaysia German Chamber, we came under the Malaysian group, we came to know about green technology and there is a fund, why not apply.” (MD of Manu B)</p> <p>“I’m sure there a lot of other businessman out there, who are producing something that are good to the environment. But they are not focusing on being Green, but they’re just focusing on making money. I’m sure.” (Technical Expert GTFS)</p>	
	Competency trap	<p>Financing rejection cycle</p> <p>Non-learning</p>	<p>I think we have approached almost six to seven banks, and these are bankers who have financed me [before], and these are the same people who are telling me today that, “Oh, for this Biomass A we have got concerns”...How much of convincing we have done and still we are not able to penetrate through their barriers or their thoughts. (ED of Biomass A)</p> <p>A direct question to the executive director of Manu A whether she learned anything from the multiple rejections, she replied “No”.</p>	<p>A competency trap is indicated as a financing rejection cycle. This financing rejection cycle occurs with the banks that have financed these established entrepreneurs in their previous projects with even with bigger amounts of loans. The entrepreneurs do not understand why they are being rejected because they were successful using the same financing strategies before this. This competency trap is influenced by the financing competence gap of the entrepreneurs.</p> <p>See link Financing Competence Gap Opportunity Refinement Competencies Resource Acquisition Competencies</p>

Entrepreneurial competencies	Opportunity refinement competencies		<p>“I feel the thing that makes the firm good is the planning and the proposal. The whole proposal must be supported, for instance EFB projects must come with the raw material (supply), demand for their product, [...] optimal cash flow for the banks.[...] They must have proper plans. “ (PA 2)</p> <p>“by design although the target return is about 11%, you have to structure a proposition that gives you at least about 15%, there’s some, there’s ample buffer and then when it’s translated into their calculation of debt service coverage ratio it will probably hits about 1.5 you know so that’s where the creativity of the promoter has to comes into play, it cannot be a straight forward process because when Sustainable Energy Development Authority (SEDA) release the quota, it was a straight forward process.”(Project partner of Solar D)</p> <p>“[...]my background, I was Director of estates (for the government)” (EC of Biomass D)</p> <p>“because a shareholder, he’s a local, owner of the land(location)[...]this C Energy got the knowledge of the power [...] another partner they know a lot of palm oil mill (raw material sourcing). Our consultants, they are, they, they have this experience. And they’re pioneer; they are pioneer of the trial two plants in Sandakan. Already tried it.(technical)” (GM of</p>	<p>The opportunity recognition stage is where scanning the environment is important, this followed by the opportunity refinement stage. In this research, the opportunity refinement competencies are comprised of three functional skills financing, technical and marketing and all of this is intricately linked. The financing skills, takes into consideration the financing strategies including the cash flow assumptions and design. The technical skills are important and will differ according to the technology being used, which is then linked to the financing skills because of the assumptions that are involved. The marketing skills will complete the cash flow model.</p>
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			Biomass D)	
	Resource acquisition competencies		<p>“ there is a qualitative side to the valuation ...they (will) kick you out not because you are not bankable or the numbers but they don't trust you as simple as that[...]because (of) how you come out with the figures” (Project partner of Solar D)</p> <p>“...once we declare everything, we open everything (and) this looks like it is a high risk project, RM 56 million is a big amount. He [Credit Officer] cannot approve the financing just like that. That's why we have to entertain this people until they are satisfied that this project is viable, this project would be able to generate cash and we can pay back the financing amount because banks will normally ask can you pay? so basically we have to educate the bank officer.” (SFE of Solar C)</p> <p>“[...] that one I financed; the whole thing is complete. Before you can ask one question, they already answered you everything. Before you can even ask, they will explain to you. They will do the presentation [on the] costing, about the durability of the product. They have all the evidence to show that it's a good product. They showed everything. Even the component [...] how is it made of, what's the layering, because we</p>	The Resource Acquisition Competencies are centred on bringing the whole picture to the bankers (e.g. give them a new picture and explain to them until they understand or give a picture that conforms to their understanding) and educate the bankers on the venture/technology to their satisfaction.

			<p>actually learn from them.” (SCO of Bank 2)</p> <p>“[...] in order to persuade the banker, we have to tell them our business strategies. We have to tell them our plans for the, the current plant that we build and then we have to explain to them the, what is [a] solar plant. How they actually generate electricity by just putting a lot of panel on top of a landfill. [...] you need some explanation.” (SFE of Solar D)</p> <p>[...]How much of convincing we have done and still we are not able to penetrate through their barriers or their thoughts.” (ED of Biomass A)</p>	
Competency development	Path	<p>Firm background</p> <p>Previous business experience</p> <p>Current</p>	<p>Solar D was a environmental engineering firm specialising in landfill rehabilitation</p> <p>“Way back in, way back in 2004, we were the only one who were doing it [landfill rehabilitation], but obviously during the past few years, since we did the first project people are looking into [...] their approach is let them be the first mover, let us learn from them, [...] see whether they can make money, once they see that we can make money[...] [they jump in].(GM of Solar D)</p> <p>Yes, number 1 is a financial ability[...] Number 2, I</p>	The competency development path is dependent on the financing experience (e.g. contract financing, facilities financing) and the business experience (e.g. first mover experience) of the established entrepreneurs

		competencies	think we have the people to run the show...and then we have people to run the show[...] and [we have as reference] Kina and Seguntor[...] [they are able] to produce electricity from Empty Fruit Bunches. (Executive chairman of Biomass D)	
	ENTRAPPED	<p>Financing process</p> <p>Non-acquired financing</p> <p>Financing rejection cycle</p> <p>Low external resources</p>	<p>Biomass A applied GTFS financing from 6 banks and were rejected.</p> <p>Biomass A and Manu A did not acquire financing</p> <p>Manu A applied GTFS financing from 6 banks and were rejected “No [...] I did not learn so much because they just turned off like that and not giving me what is the reasons why..” (ED Manu A)</p> <p>Financing was handled internally</p> <p>[...] when the bank turns down our application, they didn’t give us very concrete reasons but I called and I emailed them why [...] they didn’t help us. They didn’t give such a concrete answer. Nothing. (ED of Director of Manu A)</p>	The established entrepreneurial firms were caught in a financing rejection cycle, but were not able to learn from the rejection.

	Diverted	<p>Financing process</p> <p>Acquired financing</p> <p>Diversify financing sources</p> <p>Financing rejection cycle</p> <p>High External resources</p>	<p>They applied from various sources. They multiple consultants to help them.</p> <p>They acquired financing from a business angel.</p> <p>They were also rejected by a series of banks. They applied from banks, special Rural Ministry based funds and solicited business angels</p> <p>They were rejected by several banks.</p> <p>Manu B business plan: management team comprised of multiple business executives and consultants.</p>	The established entrepreneurial firm employed a path breaking strategy, by diverting to other financing sources that were more acceptable to the current firm stage.
	Escaped	<p>Financing process</p> <p>Acquired financing</p> <p>Financing rejection cycle</p> <p>High External resources</p>	<p>They applied to several banks, in-house expertise.</p> <p>They acquired GTFS financing.</p> <p>We applied from seven banks and were rejected by six” (SFE of Solar C)</p> <p>Yes, the business coaching [...] (was) conducted by a “Teras company is a high performance high pontential</p>	The established entrepreneurial firm employed a path breaking strategy, by escaping from the competency trap with help from business coaches and learning from the financing rejections.

			<p>Bumiputera company , they become our business coach to raise our future potential” (SFE of Solar C)</p> <p>financial expert from D audit firm by a senior partner. The sharing of financial experience has helped us (to) reorganise our financial strategy...</p> <p>Yes, I have learned a lot of lessons from each bank rejection. (Managing Director Solar C)</p> <p>“Our people is very young people, we have very young, from fresh graduate until me, like me and then and we have a strongest, we cooperate each other.” (SFE Solar C)</p>	
	Evaded	<p>Strong team</p> <p>Acquired financing</p> <p>High External Resources</p>	<p>“ We have a strong team” (EC of Biomass D)</p> <p>They acquired GTFS financing.</p> <p>Technical and Financial Consultants, including demonstration project in Kina and Seguntor.</p> <p>Business consultant as project partner to guide in new business venture</p>	The established entrepreneurial firms were able to evade the competency trap to acquire GTFS financing.

Appendix VI: Green Technology Policy Malaysia

Background

Technology is an invention or tools that would improve the lives of human kind. The term 'technology' has a Greek origin of "technologia". The inventions, developments and uses of technology have progressed tremendously over the last century, starting from the industrial revolution in the 18th century. However, the excessive exploitation of our natural resources through these technologies, have led to the production of unwanted by products such as waste and pollution. Consequently, we are now facing bigger challenges in finding solutions to overcome the problem of depleting natural resources, climate change, energy supply, and food security. Today, the world is more circumspect. Green Technology application is seen as one of the sensible solutions which are being adopted by many countries around the world to address the issues of energy and environment simultaneously. Green Technology is a technology that allows us to progress more rapidly but at the same time minimizes the negative impact to the environment. However, the world needs to find more efficient and effective ways to adopt Green Technology against other technologies which have been widely used and though cheaper, not necessarily benevolent. As a rapidly developing nation, Malaysia is not excluded from the challenges. Malaysia, too has initiated strategies to minimize the negative environmental impacts in the energy supply

chain. In 1979, the National Energy Policy was formulated to ensure adequacy, security and cost-effectiveness of energy supply, as well as to promote the efficient utilization of energy. This was further emphasized in the Ninth Malaysia Plan where efforts in the utilization of renewable energy (RE) resources and efficient use of energy were further promoted. The establishment of the Ministry of Energy, Green Technology and Water reflects Malaysia's seriousness in driving the message that 'clean and green' is the way forward towards creating an economy that is based on sustainable solutions. The National Green Technology Policy will provide guidance and will create new opportunities for businesses and industries to bring a positive impact to our economic growth. It will also be the basis for all Malaysians to enjoy an improved quality of life, in line with the national policies, including the National Outline Perspective Plan, where the growth objectives for the nation will continue to be balanced with environmental consideration.

Definition

Green Technology is the development and application of products, equipment, and systems used to conserve the natural environment and resources, which minimises and reduces the negative impact of human activities.

Green Technology refers to products, equipment, or systems which satisfy the following criteria:

It minimises the degradation of the environment;

It has a zero or low green house gas (GHG) emission;

It is safe for use and promotes healthy and improved environment for all

forms of life;

It conserves the use of energy and natural resources; and

It promotes the use of renewable resources.

Policy Statement

Green Technology shall be a driver to accelerate the national economy and promote sustainable development.

Four Pillars

The National Green Technology Policy is built on four pillars:

Energy

Seek to attain energy independence and promote efficient utilisation;

Environment

Conserve and minimize the impact on the environment;

Economy

Enhance the national economic development through the use of technology; and

Social

Improve the quality of life for all.

Objectives

The National Green Technology Policy embodies elements of economic, environment and social policies, as reflected in the five (5) objectives as follows:

To minimise growth of energy consumption while enhancing economic development;

To facilitate the growth of the Green Technology industry and enhance its contribution to the national economy;

To increase national capability and capacity for innovation in Green Technology development and enhance Malaysia's competitiveness in Green Technology in the global arena;

To ensure sustainable development and conserve the environment for future generations; and

To enhance public education and awareness on Green Technology and encourage its widespread use.

National goals

The national goals of the Green Technology Policy is to provide direction and motivation for Malaysians to continuously enjoy good quality living and a healthy environment.

Short-Term Goals-10th Malaysia Plan

Increased public awareness and commitment for the adoption and application of Green Technology through advocacy programmes;

Widespread availability and recognition of Green Technology in terms of products, appliances, equipment and systems in the local market through standards, rating and labelling programmes;

Increased foreign and domestic direct investments (FDIs and DDIs) in Green Technology manufacturing and services sectors; and

Expansion of local research institutes and institutions of higher learning to expand Research, Development and Innovation

activities on Green Technology towards commercialisation through appropriate mechanisms.

Significant progress and major improvements in the following four (4) key areas:

Energy Sector

Energy Supply Sector:

Application of Green Technology in power generation and in the energy supply side management, including co-generation by the industrial and commercial sectors; and

Energy Utilisation Sector:

Application of Green Technology in all energy utilisation sectors and in demand side management programmes.

Buildings Sector

Adoption of Green Technology in the construction, management, maintenance and demolition of buildings.

Water and Waste Management Sector

Technology in the management and utilisation of water resources, waste water treatment, solid waste and sanitary landfill; and

Transportation Sector

Incorporation of Green Technology in the transportation infrastructure and vehicles, in particular, biofuels and public road transport.

Mid-Term Goals-11th Malaysia Plan

Green Technology becomes the preferred choice in procurement of products and services;

Green Technology has a larger local market share against other technologies, and contributes to the adoption of Green Technology in regional markets;

Increased production of local Green Technology products;

Increased Research Development and Innovation of Green Technology by local universities and research institutions and are commercialised in collaboration with the local industry and multi-national companies;

Expansion of local SMEs and SMIs on Green Technology into the global market; and

Expansion of Green Technology applications to most economic sectors.

Long-Term Goals-12th Malaysia Plan and beyond

Inculcation of Green Technology in Malaysian culture;

Widespread adoption of Green Technology reduces overall resource consumption while sustaining national economic growth;

Significant reduction in national energy consumption;

Improvement of Malaysia's ranking in environmental ratings;

Malaysia becomes a major producer of Green Technology in the global market; and

Expansion of international collaborations between local universities and research institutions with Green Technology industries.

Strategic Thrust

Strategic Thrust 1- Strengthen the institutional frameworks

In nurturing the adoption and growth of Green Technology, it is critical to have strong institutional arrangements to promote Green Technology applications through:

Formation of a Green Technology Council chaired by Y.A.B. Prime Minister or Y.A.B. Deputy Prime Minister for high-level coordination among Government Ministries, agencies, the private sector and key stakeholders for effective implementation of the Green Technology Policy;

Establishment of a Cabinet Committee on Green Technology chaired by Y.A.B. Prime Minister or Y.A.B. Deputy Prime Minister;

Establishment of the Malaysia Green Technology Agency for the effective coordination and implementation of Green Technology initiatives and programmes;

Review and establish legal mechanisms to foster an accelerated growth of Green Technologies in line with National Objectives and Goals; and

Enhancement of institutional clarity so that all agencies are aware of their respective roles and responsibilities.

Strategic Thrust 2-Provide Conducive Environment for Green Technology Development

The growth of the Green Technology industry, either in manufacturing or service sectors, is critical towards fulfilling the objectives of the Green Technology Policy.

This industry would supply the Green Technology to the local and global markets, create jobs, and contribute towards the national economy. This could be achieved through:

Introduction and implementation of innovative economic instruments, supported by the necessary monetary and fiscal measures to foster an accelerated growth of Green Technology in line with the National objectives and goals;

Strengthening the understanding of local players in Green Technology industries and their value chain, including the supporting industries through various industries' enhancement programmes;

Promotion of foreign direct investments (FDIs) on Green Technology which foster domestic direct investments (DDIs) and local industry participation and development;

Establishment of strategic Green Technology hubs throughout Malaysia, expanding from the core value chain to the upstream and downstream of the industry; and

Establishment of Green Technology funding mechanism.

Strategic Thrust 3-Intensify Human Capital Development in Green Technology

Skilled, qualified, competent and productive human resources are crucial to Green Technology development.

This could be achieved through:

Design and enhancement of training and education programmes to improve human resource capacity related to Green Technology;

Provision of financial and fiscal incentives for students to pursue Green Technology disciplines at undergraduate and postgraduate levels;

Implementation of retraining programme and apprenticeship scheme to enhance competency of semi-skilled labour to meet the demands of the Green Technology industry;

Formulation of grading and certification mechanisms for competent personnel in Green Technology; and

Exploitation of brain gain programmes to strengthen local expertise in Green Technology.

Strategic Thrust 4-Intensify Green Technology Research and Innovations

Research, Development, Innovation and Commercialization (RDIC) is very crucial in creating new technologies, techniques and applications which would be able to reduce the cost of Green Technology and promote its usage. Research, Development and Innovations (RDI) could be enhanced through:

Provision of financial grants or assistance to public and private sector in RDIC;

Implementation of Green Technology foresight;

Establishment of an effective coordinating agency for RDI and Centre of Excellence or new research institute for Green Technology development;

Enhancement of smart partnerships between the Government, industries, and research institutions; and

Establishment of strong linkages between local research institutions and regional and international centres of excellence in Green Technology RDI.

Strategic Thrust 5-Promotion and Public Awareness

Effective promotion and public awareness are two of the main factors that would affect the success of Green Technology development. This is particularly significant as such adoption requires the change of mindset of the public through various approaches including:

Effective, continuous promotion, education and information dissemination through comprehensive roll-out programmes to increase public awareness on Green Technology;

Effective involvement of media, non-governmental organizations and individual stakeholders in promoting Green Technology;

Inculcation of a culture that appreciates Green Technology among students at all levels through the development of effective syllabus in the education system;

Demonstration programmes of effective Green Technology applications; and

Adoption of Green Technology in all Government facilities and Government-linked entities.

National Key Indicators

The National Key Indicators are a set of criteria to measure the success of Green Technology Policy and its initiatives. This would provide the Government a feedback mechanism and the opportunity to improve or strengthen the initiatives as

necessary. The National Key Indicators below would be further refined into quantitative and qualitative key performance indicators (KPIs) for each Malaysia Plan, and annual plan for various Government ministries and agencies.

Environment

Initial reduction in the rate of increase of GHG emission, and subsequently progressing towards reduction in the annual GHG emission;

Progress of the rise in ranking of environmental performance by 2030; and Improvement in air quality and river water quality.

Economy

The Green Technology industry contributes a significant value and percentage to the National GDP;

Sizeable amount of investments are made in Green Technology industry through foreign direct investments (FDIs) and domestic direct investments (DDIs);

Increased number of certified Green industries and revenue in the country;

The Green Technology industry creates increasing number of jobs in the manufacturing and services sectors, as well as SMEs/SMIs; and

Increasing values of spin-off and supporting industries from the Green Technology industry.

Social

More cities, townships and communities are embracing Green Technology and are being classified as Green Townships;

More Malaysians appreciate Green Technology and Green Technology culture becomes a part of their lives; and
Improved quality of life in Malaysia.