PROSPECTS OF INCUBATION IN SUPPORTING AGRO-BASED INDUSTRY: EVIDENCE FROM MALAYSIAN AGRICULTURAL RESEARCH AND DEVELOPMENT INSTITUTE

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FACULTY OF ECONOMICS AND ADMINISTRATION
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Abstract

Agricultural incubation system plays an essential role in fostering the national agriculture systems. This study is mainly based on a single public agricultural research institution in Malaysia, which is, Malaysian Agricultural Research and Development Institution (MARDI). The main objective of this study is to examine the relevance of incubator support system in fostering capabilities development of incubatees. In this regards, the selected four MARDI's agro-based incubatees have been studied qualitatively via in-depth interviews. The emphasis is on assessing the different supports system at different incubation stages since there is lacking comprehensive studies on monitoring the agro-based incubatee business performance during and post-incubation periods. The case studies provide useful insights into the learning process i.e. (knowledge creation, knowledge absorption, and knowledge dissemination) and capabilities building i.e. (marketing, product development, and production technology development) take place in driving incubatee business performance during and post-incubation periods. In addition, the study further examines the challenges faced by incubatees at different incubation phases to develop the essential capabilities in accelerating their business performance. The main findings from the case studies indicated that there are mismatches in terms of services rendered by MARDI incubators to incubatees during incubation period which are significantly hindering incubatee's business performance. This study highlights the variation in terms of organisational learning and capabilities development between graduated and non-graduated incubatees that are significantly reflecting their business performance. The key findings show that in order to strengthen the MARDI incubation system to support new ventures in the agriculture sector, MARDI should advance crucial support services to incubatees particularly during post-incubation period.

Keywords: Agro-based business, Incubation system, Organisation learning, Capability building, MARDI

Abstrak

Sistem inkubasi pertanian memainkan peranan dalam membangunkan sistem pertanian nasional. Berdasarkan kajian kes terhadap MARDI, objektif utama kajian ini adalah untuk meninjau keberkesanan sistem sokongan inkubator dalam membangunkan keupayaan inkubati. Empat inkubati berasaskan pertanian di bawah inkubator MARDI telah dikaji melalui kaedah wawancara. Kajian ini menjurus kepada sistem sokongan incubator yang perlu sepadan dengan keperluan semasa inkubasi pada fasa yang berlainan. Lebih-lebih lagi, tidak ada kajian lepas yang komprehensif terhadap pemantauan prestasi perniagaan inkubati semasa dan selepas tempoh inkubasi. Kajian kes ini memberikan gambaran yang boleh memanfatkan dalam proses pembelajaran iaitu (penciptaan pengetahuan, penyerapan pengetahuan, dan penyebaran pengetahuan) dan pembangunan keupayaan iaitu (pemasaran, pembangunan produk, dan pembangunan teknologi pengeluaran) dalam memacu prestasi perniagaan inkubati. Kajian kes ini juga meneliti cabaran yang dihadapi oleh para inkubati pada fasa inkubasi yang berbeza untuk membangunkan keupayaan penting dalam mencapai prestasi perniagaan yang memberangsangkan. Hasil penemuan utama kajian kes ini menunjukkan terdapat ketidaksesuaian dari segi perkhidmatan yang diberikan oleh pihak inkubator MARDI kepada inkubati semasa fasa inkubasi yang secara signifikannya menjejaskan prestasi perniagaan inkubati. Kajian ini juga menyoroti perubahan dari segi pembelajaran organisasi dan pembangunan keupayaan di kalangan inkubati yang berjaya dan tidak berjaya yang mencerminkan prestasi perniagaan mereka. Penemuan utama kajian ini menunjukkan bahawa untuk mengukuhkan sistem inkubasi MARDI yang akan membawa kepada pembangunan pesat sektor pertanian Malaysia, MARDI perlu mempertingkat mutu perkhidmatan sokongan yang ditawarkan kepada para inkubatinya semasa tempoh pasca inkubasi.

Kata kunci: Perniagaan berteraskan pertanian, sistem inkubasi, pembelajaran organisasi, pembangunan keupayaan, MARDI

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AIS	:	Agricultural Innovation System
BI	:	Business Incubator
DOSM	:	Department of Statistics Malaysia
EU	:	European Union
GMP	:	Good Manufacturing Practices
HACCP	:	Hazard Analysis and Critical Control Points
HALAL	:	Islamic Law based on Shariah Compliance
ICT	:	Information, Communication and Technology
ISO	:	International Organisation for Standardisation
MARDI	:	Malaysian Agricultural Research and Development Institute
MESTI	:	Food Safety is the Industry's Responsibility
MTDC	:	Malaysian Technology Development Corporation
NAP	:	National Agricultural Policy
NPD	:	New Product Development
NTM	:	Non-Tariff Measurements
OEM	:	Original Equipment Manufacturer
PRI	:	Public Research Institute
QC	:	Quality Control
R&D	:	Research and Development
RM	:	Malaysian Ringgit
SME	:	Small and Medium Enterprises
SOP	:	Standard Operating Procedures
TPM	:	Technology Park of Malaysia
UPM	:	University Pertanian Malaysia

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CHAPTER 1: INTRODUCTION

1.1 Background

Innovative entrepreneurs are greatly valued given its importance in propelling economic growth, and one often strategy used globally is to incubatee innovative entrepreneurs to emerge (Schumpeter, 1942). They are nurtured to propel start-ups through an incubation system. An incubator is an avenue whereby shared business services and management assistance are provided for tenant companies. These services and assistances are usually in exchange for rent (often at below-market rates), fees for services, a percentage of sales or royalties, or equity in the company (Eveleens et al., 2017).

The main goal of incubator programmes is to successfully develop start-up companies so that they will leave the incubators financially viable and freestanding. These graduated companies are expected to provide jobs creation, technology transfers, commercialisation of new technologies and wealth creation for the nation. In fact, the resources allocated to start-ups or incubatee by incubators (such as access to funding, office space, access to networks, mentoring availability and credibility) increase the competitive advantage and allow them to perform better than non-incubatee companies (see Eveleens et al., 2017; Arlotto et al., 2011; Chan & Lau, 2005). In the same vein, Allen (1985) described the concept of the incubator as a network of organisations providing skills, knowledge and motivation, provision of business and shared services.

In the agriculture industry, agribusiness incubator is an institution which seeks to harness knowledge and information infrastructures as underlying mechanisms to encourage demand-driven research and for-profit entrepreneurship. “Agribusiness

incubator" is the generic term for the various businesses involved in food production, including farming and contract farming, seed supply, agrichemicals, farm machinery, wholesale and distribution, processing, marketing, and retail sales. These terms are widely used simply as a convenient blend of agriculture and business, referring to the range of activities and disciplines encompassed by modern food production (Wambugu, 2010). Agribusiness incubation system takes place when technical knowledge, such as those derived from research institutions or universities, is combined with knowledge relevant to social problems and demands. Together, these forms of knowledge generate demand-driven innovation, which may later be commercialised (Kwesiga, 2010). The idea behind agribusiness incubators is that through their orchestrating and deliberate linkages among a range of agriculture-associated sectors, the agriculture sector yield benefits from a torrent of creative and entrepreneurial energies (Wambugu, 2010).

Above all, the spillover effect of agro-based incubator programme tends to contribute at the national level via technology transfer particularly in Agricultural Innovation System (AIS). In details, AIS comprises all organisations and individuals (public and private) involved in generating, diffusing, adopting and usage of new farm technology (Hambly, Hall, & Dorai, 2012; Kristin, Ekboir, & Spielman, 2008; World Bank 2006). AIS consists not only of actors directly involved in the agricultural production chain and the agricultural research, extension, and education system, but of a diversity of stakeholders within and outside the agricultural sector who are involved in the development of agricultural innovations (Hermans, Klerkx, & Roep, 2015). AIS recognises innovation is more than adopting new technologies; it involves co-evolution of technologies, societies, economies, and institutions (Klerkx, van Mierlo, & Leeuwis, 2012; Vereijssen et al., 2017). Indeed, innovation involves alternative ways of organising social, economic and

regulatory systems to provide an enabling environment that increases the fit of technologies within a sector, thus enhancing their uptake and impact (Botha et al. 2017; Klerkx, Aarts, & Leeuwis, 2010), so-called co-innovation (Mylan et al. 2015). The co-innovation process has been viewed as 'open innovation' in management science (Hueske, Endrikat, & Guenther, 2014; Traitler, Watzke, & Saguy, 2011).

1.2 Problem Statements

The incubation systems concept has been in Malaysia since 1996, particularly in the sector of information, communication, and technology (TPM, 2017). The incubator programmes have been launched widely throughout the nation to propel entrepreneurship activities and also to support knowledge-driven economy (Malaysia, 1996). Even though the incubation system has been widely recognised as a platform for governments and firms to nurture and stimulate the entrepreneurial activities among start-ups, the mismatch of services rendered by the incubator to incubatee companies is a serious problem that has been highlighted in the existing literature (Autio & Klofsten, 1998). This problem is constantly appearing in facilities and services related to a social support network, along with the lack of trust related to keeping information about innovations and funding sources secure (Cooper et al., 2012).

Another main concern raised by Jusoh (2006) is about the poor management problems that are plaguing the development of incubators in Malaysia. Indeed, Jusoh (2006) added that many start-ups are going out of business, and technopreneurs are incapable of surviving in the long term. This is due to lack of experience of the incubator managers themselves, coupled with the lack of support in terms of other services, business assistance and financing to new and small businesses.

Nevertheless, comprehensive studies aimed at constructing evidence-based policy and management practices in addressing such mismatch of services rendered to incubatees are still limited except a few research studies (e.g., Allen, 1985; Lalkaka, 2001; Malan, 2002; Bruneel et al., 2012; Eveleens et al., 2017). More importantly, most of the past studies did not focus on the process of learning and capability development within a specific sector although these processes are the most crucial part of the incubation system. Conversely, most of the past studies are concentrated on common support services rendered to incubatees such as affordable space, networking, training, and financial assistance to facilitate them to complete the incubation program successfully (Allen & McCluskey, 1990; Bruneel et al., 2012). Indeed, past studies often failed to follow through on incubatees performance after graduation from the incubation program. As a matter of fact, the negligence in tracking incubatee performance during post-incubation period is limiting both incubators as well as policymakers abilities to undertake any significant improvement action plan and policy changes for the incubator programme betterment as a whole.

Above all, targeted policy directions and management practices need to be formulated in order to understand and acknowledge the unique nature of incubatees as well as the overall incubation system. Therefore, this study aims to bridge the gaps inherent in the past studies mainly in terms of support services mismatch, learning activities and capabilities development via using a single case example namely MARDI, while contributing to new insights holistically as a greater pathway to agricultural sector development.

1.3 Research Questions

Within the context of agro-based incubator-incubatee programme in Malaysia, this study aims to address the following research questions:

a) What types of support services are required by incubatees during incubation and post-incubation periods and the relevancy of these support services in accelerating incubatees performance?

b) What types of capabilities had the incubatees developed during incubation and post-incubation periods, and how these capabilities evolved?

c) What are the challenges faced by incubatees in developing each of these capabilities?

d) How do incubator support services, learning process, and capabilities development contribute to the performance of incubatees?

e) How does the promotion of agro-based start-up incubation contribute to the development of a national agricultural system?

1.4 Research Objectives

In order to provide an answer to the research questions stated above, the main objectives of this study are to:

a) Examine the types of services and their relevancy to incubatees over the different phases of development and their contribution to business performance.

b) Determine the learning processes and capabilities development among incubatees during the period of incubation and post-incubation and the challenges to business performance.

c) Identify feasible policies implications for the national agricultural system development through the promotion of agro-based start-up incubation.

1.5 Scope and Limitation of Study

This study applies a single case study on one of the main Public Research Institutes (PRIs) in Malaysian agricultural sector, that is, MARDI. MARDI is the key PRIs in performing R&D and innovation activities within the national agricultural system in Malaysia. This study particularly focuses on the roles of public driven incubator rather than other types of incubators such as business incubators, university incubators, and social incubators. In order to obtain empirical evidence for this study, four agro-based incubatees from MARDI were identified as in-depth case studies to elicit qualitative explanations in addressing the research questions. The four selected cases in this study are from the combination of agro-food production and herbs based cosmetic production businesses. The development of these MARDI incubatees business performances during incubation and post-incubation periods are examined. Nevertheless, as a matter of privacy, this study is unable to provide the four incubatees organisation name and other contact details as MARDI strictly abided to its clients' privacy disclosure policy.

This study prioritised the necessary support services in terms of space, advisory services, networking platform, coaching and training in ensuring the incubatees graduate on-time from their respective incubation program. At the same time, this study focuses on organisational learning by respective agro-based incubatees in developing several essential capabilities namely marketing, product development and production technology development in ensuring their respective business survivability in the market during post-incubation. This is due to incubatees needing different types of services and capabilities to ensure their respective business performance during each development stage, namely the incubation and the post-incubation periods.

In sum, the case study approach deployed in this study enables the researcher to determine a particular phenomenon of the programme given that each case unit has its uniqueness from other cases (see Yin, 2003). The case study approach enables the data analysis process at two different directions notably within each case (similar agro-based incubatee) and across cases (different agro-based incubatee) despite identifying sub-unit cases within a larger case such as MARDI. Similarly, according to Stake (2013), a case study approach is widely recognised to undertake studies related to central administration issues that involve numerous parties notably policymakers, funders, partners, distracters, and competitors.

Nevertheless, there are several limitations of case study research. Stake (2013) stressed the case study generalisation is only applicable for other cases that have similarity in terms of background, operation and economy sectors rather than applying for the whole study population. Besides, Yin (2003) reminded us that the inference and causation drawn from the study data are applicable only for particular phenomena or program.

Comparatively, the generalisation of a single case study is viable from a case to another case perspective rather than from a case to a population (Keneedy, 1979). Thus, since this study focuses only on four selected case studies within MARDI, the analysis in this study is limited has its limitation in terms of generalisation.

1.6 Significance of the Study

This study analyses both phases of incubation program process namely, incubation and post-incubation. At different stages of the programme, the needs of participants or incubatees in terms of services and facilities may vary. Hence, this study identified precisely the real drivers to lead successful incubatees besides revealing the failure factors of incubatees during the incubation period. Only a very limited number of past studies (e.g., Harper & Lewis, 2018; Infodev, 2010; Arlotto et al., 2011) have examined the outcome for incubatees during incubation and post-incubation periods. Hence, this study attempts to bridge the existing literature gap mainly during post-incubation period in terms of learning processes and capabilities building such as, marketing, product development and production technology development.

For firms, such understanding will benefit the management in strategising their product development and business direction in order to increase the business survivability in the market. As for the management of incubator; that is, the case of MARDI in this study, these findings provide useful management and policy insights in fostering the agricultural sector development. The key findings and other insightful recommendations of the study are expected to benefit MARDI by providing evidence to help formulate informed policies for improving its incubator programme.

1.7 Terminologies

The following list states the key terminologies used in this study:

a) An *incubator* is described as an organisation that creates a favourable environment for nurturing fledgling ventures (Bergek & Norrman, 2008; Allen & Rahman, 1985).

b) *Incubation system* is a process which tends to be activated whenever there is a need to support entrepreneurs in developing their own business (Hackett & Dilts, 2004).

c) *Pre-incubator* is a facility for a very early stage of a start-up that has yet to formulate its business plans, develop a prototype, or establish an entrepreneurial team; the pre-incubator leads the embryonic business to an investment or market-ready stage (Kirby, 2004).

d) *Post-incubation* relates to the activities to be carried out when the company has reached the maturity phase and therefore is ready to walk on its own feet (Arrighetti & Vivarelli, 1999).

e) *Services in the incubation stage* are set of general administrative services, including shared office space and equipment as well as facilities-related services and office services such as reception and clerical services (Colombo & Delmastro, 2002).

f) *Organisational learning* is considered a necessity to any company, irrespective of culture or field of activity, increasing the chances for survival on the labour market due to its ability to provide flexibility and adaptability (Ortenblad, 2002).

1.8 Organisation of the Study

The organisation of this study is as follows. Chapter one introduces the background and rationales of this study, namely problem statements, research questions, research objectives, the research significance, and the research limitations of the study. Chapter two critically review the past literature on incubation studies, which comprise different types and roles of incubators besides highlighting the incubation system operations as a whole. This chapter also discusses challenges in the incubation program on the performance of both incubator and incubatee. Chapter three explains the research design and research techniques used in the study. This chapter also presents the conceptual framework and analytical framework. The fourth Chapter presents MARDI historical background and as well as the overview of the agro-based incubator programme. Next, Chapter five highlight findings derived from the case studies notably the support services as well as capabilities required and developed by incubatees during incubation and post-incubation periods. Furthermore, this chapter synthesis the relevancy of incubator support services to incubatee in developing several essential capabilities to drive their business performance and reveal the study contribution towards National Agricultural System. Finally, Chapter six recapitulate the main findings and identified several feasible policy implications for the agro-based incubator programme betterment. Also, this chapter has indicated the research limitation and future research direction for as such similar research scope.

CHAPTER 2: LITERATURE REVIEWS

2.1 Introduction

This chapter critically reviews past literature on incubator support services especially in the context of developing incubation system capabilities. In details, this chapter reviews intensely the roles of incubation system in providing several support services and its relevancy namely space, advisory, networking, coaching, and training to ensure the survivability of the incubatee business after incubation period. At the same time, this chapter provides the review of knowledge flows and learning process (internal versus external) in the agricultural incubation system to develop the capabilities building mainly in marketing, product development and production technology development. It is important to establish such capabilities in agricultural incubation system in order to ensure the business survivability of the respective participants in the incubator-incubatee programme. At the same time, the main objective of this chapter is to develop the conceptual framework and analytical framework of the study. Importantly, this chapter has precisely highlighted the research gaps in the past incubation studies which failed to integrate organisational learning and capabilities development for business sustainability.

2.2 Concept of Incubator

The incubator is defined as, "*an organisation that helps start-ups develop in an accelerated fashion by providing them with a bundle of services, such as physical space, capital, coaching, common services, and networking connections*" Hansen, et al. (2000: 75). Campbell (1988) coined that incubators differ from other entrepreneurial development strategies whereby they offer comprehensive business assistance services and business network capabilities to start-up and young firms in an interactive

environment within a single facility. With this intention, incubators would work with entrepreneurs to accelerate the development of emerging companies and reduce the risk of business failure by assisting small businesses in the early stages of growth. Even though the incubator concept is widely established as a service provider to incubatee during incubation period, but there is some variation in terms of incubator roles based on economic sectors. Taking this as the starting point, the next section reviews some of the important roles of incubator especially the support services. An understanding of the existing incubator's roles is vital to frame the literature on support services into the existing conceptual framework, thus making advancement and significantly contributing to the extant literature on incubatee survivability during post-incubation period.

2.2.1 Business Survivability & Stage of Incubation

Even though survivability is an essential criteria for business development but less prioritised in terms of entrepreneurial development (Woywode 2004; Tama´sy 2005). Therefore, Hannon (2005) and McAdam and Marlow (2007) strongly believed business survivability of their tenant companies should remain as an ultimate goal of the business incubator (BI) programme. In other words, the success of a business incubator programme is measured by their tenant companies survivability in the long-term.

Nevertheless, the success of a business incubator programme is highly neglected several loopholes related to business survivability as well as failure rates. In fact, most of the BI presumed that incubatee's business failure after graduation from incubation is no longer an objective of BI support. In other words, successful graduation is not guaranteed the business survivability at post-graduation phase (Geroski, 2005).

Even though Hackett and Dilts (2004) and Phan et al, (2005) postulated incubator plays a key role during the early stage of incubation period by providing incubatees with several essential support services but most of the BI presumed that incubatee's business failures after graduation from incubation are no longer an objective of BI. Indeed, there is limited empirical evidence specifically examine the incubatee or tenant performance at post-graduation period. Of course, there are certain deficits as indicated by (Colombo and Delmastro 2002; Hannon and Chaplin 2003; Hackett and Dilts 2004; Peters et al. 2004) concerning elementary information of the incubatees or tenants in terms of the current business location address, other contact details and other relevant information or data. However, in general, most studies focusing on business incubator has neglected post-graduation or incubation period.

2.2.2 Malaysian Incubation System

In Malaysia, most of the incubators are established by state or state-related organisations. Many incubators are located in technology parks, either in targeted technology parks or in university-based campuses. Incubators are seen as an attempt to develop the Malaysian economy into a knowledge-based economy and as well as cultivate new technopreneur. This because technopreneur is categorised as a key component of the SME sector (Jusoh, 2006). Likewise, the Malaysian Industrial Master Plan (1996-2005) acknowledges the importance and support of a competitive small business sector. Furthermore, a number of programs highlighted notably strong technological facilities, state funding policies, substantial investment and tax incentives for research and development of capital, modern university-business linking systems, a range of innovative financial instruments and continuous support for technology incubators (Jusoh, 2006).

Nevertheless, limited studies on agricultural incubation system focused in Malaysia unlike technology incubator and business incubator. Moreover, there is a lack of support from the private sector in establishing agricultural incubator unlike technology and business types of incubators. In other words, an agro-based incubator in Malaysia is solely established by the government under the Ministry of Agriculture and Food Industries (MOFI). Therefore, with the help of case study on the Malaysian Agricultural Research and Development Institute (MARDI) incubation system, this study mainly aims to conduct an in-depth investigation to determine the different form of support services and organisational learning in advancing the capability building of incubatees, as well as identify the support services that drive synergy between organisational learning and capability building amongst the incubatees for business survivability at post-incubation period.

2.3 Support Services in Incubation System

In general, incubation system provide comprehensive support services such as affordable space, shared office, and business development assistance in an environment conducive to new venture creation, survival, and early-stage growth (Allen & McCluskey, 1990). The following sub-sections review specifically the roles of a space facility, coaching, training, advisory services and networking in driving incubatee's business performance. Furthermore, these support services are essential for incubatee as a foundation to develop their business successfully during the incubation period and sustaining it after the incubation period.

2.3.1 Space Facility

Shared office service is well suited to young enterprises that require a clerical type of support services and minimal space, but do not possess the resources to hire full-time support staff or rent large quarters (Allen & Rahman, 1985). Most incubators provide space at below-market rents and usually charge for space on a quality basis. Part of the rental rate variation is also due to the inclusion of utility, services, and business assistance costs in the rental fee (Allen & Rahman, 1985). Nevertheless, the space requirement could be varied according to the types of business nature and economy sectors. For instance, the space requirement may vary according to the type of production or activity in agro-based incubation system unlike the general office space for services-oriented incubation system. In fact, the public sector plays an essential role in facilitating agro-based incubation program unlike the private sector plays an active role in facilitating services types of businesses. This due to both agro-based incubator and non-agro based incubator having a different business orientation in terms of graduation period, types of services required and external factor such as climate.

Although this may true, the role of incubators has evolved from providing basic amenities namely advisory services, office space, and other support services toward market-oriented such as extending services in terms of product development assistance, access to first-hand information via networking approach and access to financial assistance (Bruneel et al. 2012). On the other hand, Mian et al. (2016) had emphasised on the business incubator evolution breakthrough over the past several decades via regional integration mechanism. As such integration yield higher value-added support services to tenants comprising counselling and integrated living system. However, there is still a lack of studies in leveraging the support services specified in the agro-based incubator, unlike other business incubators. Therefore, this study attempt to bridge the gap on existing

pieces of literature by specifically identifying the exact support services required in the agro-based incubation system to lead a high success rate after the incubation period.

2.3.2 Coaching, Training, and Advisory Services

Meanwhile, business support services such as coaching and training are crucial elements of learning within the incubation system provided by the incubator to their tenants (Hansen et al., 2000; Mian, 1996). 'Coaching' refers to one-to-one support initiatives geared to accelerate tenants learning and skill development processes, which involving tenant firms being assigned coaches for a fee or free of charge (e.g., Barrow, 2001; Knopp, 2007). As such coaching typically covers both scientific and managerial areas of expertise (Clarysse & Bruneel, 2007). In fact, coaching interactions between the incubateed company and the incubator management increases tenants understanding of buyer preferences (Scillitoe & Chakrabarti, 2010). Furthermore, business supports also is critical to ensure tenants' graduate on time (Peters, et al., 2004), despite its significant impact on firm development (Robson & Bennett, 2000). Even though several previous studies (Barrow, 2001) highlighted training positively influence incubatees performance (Peters, et al., 2004), but there is still lack of past studies in providing the details of types of training whether internally or externally and its relevancy to incubatee for their business survivability during post-incubation period. Of course, different types of training or seminars are required for different types of incubators based on their business nature and needs.

On top of that, multiple studies emphasised the key role of members of advisory boards that can link client firms to local resources and networks, such as representatives of the financial community, legal experts, business leaders, economic development

professionals, and elected officials (Rice & Matthews, 1995). In reality, only one-third of business development support is included sustainability in their advisory services, but three-forth stated that they do not offer this kind of expertise (Klofsten, Bank & Bienkowska, 2015). As mentioned earlier, the biggest mistake among incubatees is an inability to focus on market dynamics while working on their projects. In this regard, they are unable to develop a proper business model in order to sustain the business operation during post-incubation period. Hence, incubatees need targeted support services in terms of advisory service, training and seminar that are focusing on the particular business sectors to identify their potential customer and product markets.

2.3.3 Networking

Incubator provides new firms with the supportive network necessary to increase their probability of survival during the crucial early years when they are most vulnerable (Mentzas et al., 2001). Networking establishment with other companies also provides firms with greater legitimacy in the market place (Aldrich & Fiol, 1994) which in turn has a positive impact on their survival chances.

Access to networks, mentoring availability and credibility bring them a competitive advantage and allow incubatee to perform better than those non-incubatee (Eveleens et al., 2017; Chan & Lau, 2005). The sustainability of a new venture in the incubation system is attainable via entrepreneurial network approach. Indeed, as such network system can connect and enhance new venture performance gradually over time. Moreover, new venture entrepreneurs in the incubation circle would benefit from a wide range of networking opportunities if incubators begin to undertake advance development plans for their respective tenants' companies.

On top of that, network exploitation provides tenants with preferential access to potential customers, suppliers, technology partners and investors (Hansen et al., 2000; Scillitoe & Chakrabarti, 2010). In fact, Hansen and colleagues (2000) posit that networking is the most important factor in successful incubator programmes, although some empirical evidence suggests that access to networks is critical for tenant companies development (McAdam & McAdam, 2008). In essence, facilitating access to external networks by business incubators eases the acquisition of resources and specialised expertise, provides learning opportunities and allows new firms to build up legitimacy faster.

In providing access to networks, (BIs) are contributing to helping new firms overcome their inherent resource scarcity. The lack of financial capital, experienced management teams, and capabilities impedes incubatee development and subsequent growth. In fact, Larson (1992) argues that entrepreneurial companies use networks to access resources beyond their financial capacity. However, other research shows that these firms can overcome their resource constraints through networking, and thereby accelerate firm growth (Zhao & Aram, 1995). Even though there are plenty of studies related to incubator networking service, but there is still a lack of research in terms scope of incubator network scope either internally or externally. It is important to determine incubatee business success whether the collaboration is from internally or externally. For instance, internal networking is referring to incubator station itself whereas external networking comprises several stakeholders such as research institution, university, public agency, producer, supplier, and consumer. Thus, this study intensely examined the scope of networking for respective incubatee at different phases of incubation period in determining incubatee success or failure during post-incubation period.

Some researchers have concluded that connection to networks determines the success of incubators (Ekholm & Haapasalo, 2002; Hansen et al., 2000). Providing networking opportunity can improved performance (Hughes, Ireland, & Morgan, 2007) and provide moral support for entrepreneurs (Lichtenstein, 1992). Furthermore, networks can save client's time in accessing the information and capital that innovation requires (Campbell et al., 1988; Smilor & Gill, 1986) and create "learning environments" (Bøllingtoft & Ulhøi, 2005; Hughes et al., 2007). Noteworthy, networking is considered as precious net-worth for new incubatees during incubation and post-incubation periods in establishing substantial access to obtain essential resources for their respective business survivability regardless of the business nature.

2.4. Organisation Learning

Organisational learning is a process that includes knowledge acquisition, dissemination, shared interpretation, and organisational memory (Slater & Narver 1993). These learning processes help to create new knowledge internally within an organisation such as experimentation, research, and development (R&D) and knowledge recombination despite influence the search for knowledge acquired from external sources (Turner & Makhija 2006). Thus, this study scope narrowed to three main organisational learning processes among incubatees namely knowledge creation, knowledge dissemination and knowledge absorption from both internal and external sources. This learning process is crucial for incubatees in building several key capabilities to lead successful business performance.

2.4.1 Knowledge Creation

The previous sub-section reviewed intensely the support services rendered to incubatee as a whole in accelerating their business performance. Importantly, the selected support services such as space facility, coaching, training, advisory services, and networking have identified as crucial factors in driving organisational learning that is equally important for incubatee's capabilities development. In this sub-section, the study further explores the mediums of organisational learning specifically knowledge creation, knowledge dissemination, knowledge absorption and the importance of each knowledge elements in contributing to other factors despite business performance such as product development, customer relationship management and so forth.

In general, knowledge creation involves and combines different sources of knowledge (i.e., internal research, market units, external customers, competitors/ innovation partners). Traditionally, acquisition, joint ventures and hiring of new people have been identified as external knowledge sources of learning (Kogut & Zander, 1992). Thus, the locus of knowledge can be found internally within organisational boundaries, or externally through inter-firm collaboration.

Organisational knowledge is typically compiled through collective efforts within teams, such as R&D or service-development teams (Chen et al., 2008). Prior research shows that team-level knowledge has positive impacts on various aspects of organisational performance in terms of product development, customer relationship management, and revenue creation (Menguc et al., 2013). However, in today's competitive business environment, organisational knowledge creation is considered as a primary means for improving firm performance and enhancing competitive advantage (Esterhuizen et al.,

2012). Likewise, knowledge creation helps firms develop new products and services to respond quickly to market requirements. Therefore, it is vital to strengthen the knowledge creation process in steering organisational performance and helps firms to respond quickly to market requirements by developing new products (Nonaka, 1994; Sabherwal & Becerra-Fernandez, 2003).

Besides that, knowledge creation plays an important role at a macro perspective like regional economic performance (Audretsch & Lehmann, 2005; Audretsch, 1995). Comparatively, university and PRI play unwavering roles as knowledge creators for both the organisational level and national level. In details, the university and PRI knowledge spill-over could be witnessed via several approaches namely licensing and spin-offs (Rothaermel & Thursby, 2005). Thus, the knowledge creation at both university and PRI would drive the incubatee business performance via successful commercialisation of its products and services despite ensuring their business survivability in the market.

In respect of the knowledge growth, Nonaka (1994) defines a spiral of organisational knowledge creation through combination, dissemination, internalisation, and externalisation. (Nonaka & Takeuchi, 1995). At the same time, Nonaka and Takeuchi (1995) differentiate between internal knowledge creation through conceptualisation, which requires mutual trust within self-organising teams, and external knowledge creation through concrete forms, such as products or systems with quality standards. As a result, the development and progress of each business entity are relying on continuous learning activity such as knowledge creation at the organisational level.

Next, learning among team members has been discussed as bleeding to a higher level of knowledge creation (Choo, 2011). Learning culture refers to the extent to which an

organisational environment encourages the learning of its members (Baker & Sinkula, 1999). Employees' positive learning attitudes and a self-renewal climate for continuous change are major parts of learning culture (Jaw & Liu, 2003). Such cultures for learning have positive effects on team creativity by enhancing team members' work quality and team innovativeness (Choo, 2011). Hence, learning culture at organisational level effectively promoting knowledge creation besides boosting the business growth and prosperity in the long term.

2.4.2 Knowledge Dissemination

Knowledge transfer defined as the transmission of knowledge across organisational boundaries (Easterby-Smith et al., 2008). In addition, knowledge transfer improves innovative capabilities (Huizingh, 2011), increases the pace of innovation and strengthens competitive advantage (Foss et al., 2010). In fact, Chesbrough (2003) emphasise knowledge transfer has become critically important due to technological uncertainty and complexity. Consequently, firms are relying on open innovation processes to ensure long-term competitiveness (Chesbrough, 2003). Likewise, the emphasis on knowledge transfer in this study is vital for incubatee to develop certain capabilities for their business survivability. At the same time, the integration of both internal and external sources in knowledge transfer is a key factor in determining incubatee's business performance during incubation and post-incubation periods.

On the other hand, the literature on customer-specific knowledge is increasingly important for the competitiveness of industrial firms, particularly in business-to-business markets (Rollins *et al.*, 2012). In fact, some pieces of literature such as building on knowledge management, knowledge-based view of the firm, customer relationship management and the information processing view of market orientation (Campbell, 2003,

Day, 1994), assists firms in leveraging their unique customer knowledge to improve new product performance, enhance customer service and cut costs (Rollins *et al.*, 2012; Salojärvi and Saarenketo, 2013). In that case, research on customer knowledge management is burgeoning since it has a vital role in leading incubator's production direction to meet the market demand.

The past studies in this area examine customer knowledge transfer within firms and establish a positive relationship not only between customer knowledge use and firm performance in business-to-business markets (Rollins *et al.*, 2012) but also between customer knowledge dissemination and key account performance (Salojärvi *et al.*, 2013). Indeed, companies desiring to develop a well-functioning customer knowledge management but they still face certain challenges (Rollins *et al.*, 2012). In particular, there is a lack of research on how firms should deploy human resources, processes, rewards, and structures to manage customer knowledge and become more responsive to customer needs (Gebauer & Kowalkowski, 2012).

Among the tools used to influence knowledge transfer, the role of rewards is most debated in knowledge management literature, and the research findings remain ambiguous. Consequently, Salojärvi et al. (2013) call for more studies on how firms can establish incentive systems that support customer-specific knowledge sharing and extend beyond sales to all facets of the organisation. Zhang & Zhang (2014) summarise the existing literature and explain that while many studies find a positive relationship between different stages of knowledge transfer and monetary rewards, financial rewards may rupture relationships and undermine interest in knowledge transfer. Thus, there is a gap in examining the most appropriate incentive mechanisms which influence the effectiveness of knowledge management. This means incubatee should devise an

effective reward system to retain and attract the most talented employee for the organisation betterment in the long term.

The ability to transfer and accumulate knowledge across a firm's boundaries is a central element to a firm's growth and performance (Liebeskind 1996; Nahapiet & Ghoshal 1998). Indeed, the competitive landscape typified by intense competition, compressed product life cycles, and disruptive change exerts increasing pressure in particular on small and medium-sized enterprises (SMEs) to more effectively acquire, manage, and make sense of knowledge to survive and be competitive (Turner & Makhija 2006). Similarly, the efficiency of knowledge aggregation is greatly enhanced when knowledge can be expressed in terms of a common language. Statistics is a particularly useful language for aggregating and transferring certain types of explicit knowledge-its efficiency in this role is greatly enhanced through advances in information technology (Grant, 1996).

Nevertheless, the efficiency of which knowledge can be transferred depends, in part, upon knowledge's potential for *aggregation* since knowledge transfer involves both transmission and receipt. Knowledge receipt has been analysed in terms of the *absorptive capacity* of the recipient (Cohen & Levinthal, 1990). Equally important, it is essential for incubator manager in ensuring their tenant background in terms of business experience and academic qualification to achieve greater graduation rate than failure rate. This because both business experience and academic qualification are vital for incubatee to absorb the transferred knowledge and skills during the incubation period for their respective business survivability mainly during post-incubation period.

2.4.3 Knowledge Absorption

At both individual and organisational levels, knowledge absorption depends upon the recipient's ability to add new knowledge to existing knowledge. This requires additivity between different elements of knowledge. A firm's ability to acquire external knowledge and utilise it internally (Cohen & Levinthal, 1990) is captured in the concept of organisational absorptive capacity, which reflects the process above orientation of the resource-based view. It becomes important to establish what types of links may foster firm's absorptive capacity, and increase the level of knowledge received from universities that can, therefore, be integrated into internal existing knowledge (Soetanto & van Geenhuizen, 2015).

If firms develop long-term relationships based on either formal or informal interactions, they tend to share a kind of cognitive proximity that increases their potential absorptive capacity. The development of agreements with a university fosters a firm's propensity to explore new and related knowledge, as it improves their capacity to scan the environment and internally incorporate this (Autio et al., 2000). In addition, universities are not the only source of basic research but also behave as local gatekeepers that connect the firm with diverse sources of knowledge, increasing a firm's capacity to identify and incorporate this into their existing knowledge base (Colombo & Delmastro, 2002). Hence, external knowledge sources significantly influence a firm's absorptive capacity (Zahra & George, 2002).

As a matter of fact, absorptive capacity amplifies the benefits of external innovation sourcing on both innovativeness and financial performance. It speeds the assimilation of external knowledge and commercialisation of such knowledge (Fabrizio, 2009) and provides more benefits for firms seeking knowledge from customers rather than from

competitors (Grimpe & Sofka, 2009). Likewise, this study examined the existing gap between both incubator and incubatee in transferring the most relevant and appropriate knowledge based on their absorptive capacity respectively. Noteworthy, organisational learning which comprises three main elements such as knowledge creation, knowledge dissemination, and knowledge absorption is essential for incubatee to develop numerous key capabilities as a business survival strategy during post-incubation period.

2.5 Capabilities Building in Incubation System

The evolution of firm theory, from its early formation, sees many scholars examine the firm resources (Penrose, 1959; Barney, 1991; Barney & Mackey, 2005) and capabilities (Teece, 2007; Teece, Pisano & Shuen, 1997) as the important dimensions of why firms grow and sustain their businesses. An important point to note is that capabilities emerge from learning as well as by combining resources and exploiting complementary assets. These resources and capabilities can potentially explain why firms grow and sustain their market and business. These capabilities are equally important to develop a more sustainable incubation system mainly for graduated incubatees. Therefore, reviewing and understanding the specific concepts of capabilities and its process of building those capabilities is crucial. In this study, we emphasise four capabilities such as marketing, product development, production technology capabilities. The next section describes the concept and its process of building those capabilities.

2.5.1 Marketing Capability

A widely made distinction is between 'explicit' knowledge or knowledge that can be communicated, and 'implicit' knowledge (Polanyi, 1967, especially pp. 79–108), which a user evidently can demonstrate in practice but cannot articulate to others. On another

study of marketing knowledge, Lee, Acito, & Day (1987) found greater use of marketing research information when it confirmed prior beliefs, regardless of its technical quality. Similarly, the marketing manager's experience has been found positively co-related in marketing decision-making based on the information types (Perkins & Rao, 1990). Thus, it is undeniable that marketing knowledge plays an important role in contributing to incubatee business growth in terms of sales and profit given that marketing knowledge can be documented and disseminated to others.

Besides that, learning intent is defined as the extent of desire and determination of the local partner to acquire marketing knowledge from its foreign partner (Tsang, 2002) and to internalise the other firm's knowledge and skills (Hamel, 1991). In the same vein, Hamel (1991) suggests that a partner's intent to internalise the other's skills is a key determinant of learning. The stronger the intent, the higher the chance for the partner win the learning race because a desire to acquire the other partner's skills is often one of the major motives behind the effort and resources spent for learning. It is noteworthy that, incubatee should develop certain learning capability and prior experience in acquiring marketing knowledge and marketing skill from foreign counterparts. Hence, the acquired marketing knowledge and marketing skill from external parties is essential in accelerating incubatee business performance.

The term "learning capability" is closely related to the concept of receptivity or a firm's ability to absorb new knowledge from its joint-venture partner (Hamel, 1991). An individual with a high learning capability is capable of internalizing the other partner's skills more effectively than someone with a lower capability. Cohen & Levinthal (1990) employ the term absorptive capability for a similar meaning. They argue that the premise of the notion of absorptive capacity is that the organisation needs prior related knowledge

to assimilate and to use new knowledge. In fact, Inkpen (2000) points out that learning performance is possible to enhance when the object of learning is related to what is already known. Thus, effective learning requires not only the combination of different types of knowledge but also the combination of present and past knowledge in developing certain essential capability namely marketing capability. As such capability is vital for a business owner or incubatee in ensuring their respective business growth via meeting customer needs despite business survivability factor.

According to Morris et al. (2002), firm marketing capabilities are determined by the operating environment and entrepreneurial factor. Similarly, intensifying the firm marketing capability is crucial to measure firm growth through sales performance and market share gains (Venkatraman 1989). In the same vein, Varadarajan & Clark (1994) stressed the sustainable firm performance in the long term is viable if firm able to excel in their respective sales growth and as well as market share. Therefore, the previous studies would be a starting point for incubatee to consider the importance of marketing capability by focusing on the details such as new product development, product pricing, product promotion activity, and market survey. By doing these, incubatee able to facilitate their business direction in terms of better sales performance and higher revenue achievement.

2.5.2 Product Development Capability

The value of client participation in the front end of new product development (NPD) is disputable. In other words, some observer claims that customers infrequently provide opulent or diverse information to firms (Granovetter 1982; Krackhardt 1992). Comparatively, Alam (2006) strikes against the seeking solution approach from

customers for problematic products as this approach may mislead and dominate customer benefits beyond firm capacity.

However, there are positive perspectives on customer participation in product development activity. Indeed, the firm may not successfully produce best quality products unless incorporating the insights or inputs from their respective customers at NPD stage (Bacon et al., 1994). By the same token, product development should take place after considering the necessary expectation and desires from the potential customer (Kim & Wilemon 2002b; Smith et al. 1999; Verworn 2006; Verworn et al. 2008). Given that, there is a high tendency for new product development success if as such valuable information from customers incorporated during the product development stages (Cooper 1988; Cooper & Kleinschmidt 1987; Zien & Buckler 1997; Robbins and O'Gorman 2015; Verworn et al. 2008; Murphy & Kumar 1997). Importantly, sometimes customers imagined product ideas at the frontier, unlike firm which never thought about the NPD at all (Cooper et al. 2002; Kim & Wilemon 2002). Likewise, incubatee may engage with their potential customer or client for their invaluable feedback on product since the product is newly launched in the market. In fact, the feedback that received by incubatee from their respective customer at an early stage would benefit the entire business in terms of product development and its reputation.

Besides that, establishing collaboration with another external actor especially suppliers could lead to NPD through valuable insights and feedback according to market trend (Harvey et al. 2015). In fact, Murmann (1994) emphasised the importance of establishing front-end collaboration with competent and experienced suppliers to reduce technological ambiguity. Together with eliminating technological ambiguity, an effective collaboration with the supplier may also lead to marketing time reduction, minimise development

expenditure despite continuously improving the product quality (Kim & Wilemon 2002a, 2002b). Nevertheless, few other firms may look NPD at different perspective whereby integrating with front-end value chain (Khurana & Rosenthal, 1997). Under those circumstances, the respective firms definitely ensure in obtaining valuable insights for NPD by highlighting the necessary conditions to their respective suppliers.

Different from external party collaboration in stimulating NPD, Koen et al. (2001) had emphasised on the different mechanism in the front end of NPD by creating creativity culture at the organisational level. Surely, as such mechanism cultivates innovation-friendly culture in the organisation which eventually lead to front-end in NPD process (Koen et al. 2014; Schröder & Jetter 2003; Smith et al. 1999). By cultivating a creative culture in organisations, the tendency of employees to apply their creativity and talents to develop new products is pretty much higher which eventually lead the firm to attain significant growth in the long term (Kim & Wilemon 2002b; Murphy & Kumar 1997). Similarly, Langerak et al. (2004) stressed on the importance of cultivating a creative culture in the organisation besides strengthening the marketing position in terms of promoting consistency, efficiency, and productivity in the front-end.

A firm's NPD strategy involves the acquisition, creation, information application and knowledge assets as these strategies can be viewed as a learning process (Atuahene-Gima & Murray, 2007; Bierly & Chakarabarti, 1996; Kessler et al., 2000; Moorman & Miner, 1997). Importantly, several scholars highlight the significance of knowledge acquisition, dissemination, and utilisation at various NPD stages in leading to the success of the final outcome (Dougherty, 1992; Kessler, Bierly, & Gopalakrishnan, 2000). The results from several scholarly works suggest that the effect of NPD strategy implementation duration on outcomes is related to the firm's absorptive capacity and its effect on the speed with

which firms can learn as they develop new products (Moorman & Miner, 1997, 1998). Furthermore, existing knowledge from prior learning within an organisation facilitates faster learning processes, enabling a speedy and effective outcome (Cohen & Levinthal, 1990; Eisenhardt & Tabrizi, 1995; Moorman & Miner, 1998). Noteworthy, that NPD strategy consists of a series of actions undertaken by firms to acquire, disseminate, and utilise the information that originates from inside or outside the firm.

However, it depends on what the organisation already knows and new knowledge added incrementally based on their absorptive capacity, ability to identify, acquire, and utilise information (Cohen & Levinthal, 1990; March & Simon, 1958). In fact, nowadays companies acquire access to external knowledge, making it possible to develop products (and technologies) they could not produce or afford themselves and enabling companies to establish industry standards (e.g. Arora, Fosfuri, & Gambardella, 2001; Chesbrough, 2003; Laursen & Salter, 2006), often through product development collaborations (Emden, Calantone, & Droge, 2006). As a result, NPD strategy implementation requires undertaking time-intensive learning processes, such as experimentation, market research, and testing, that help build new technological and market knowledge.

In reality, the results of product development collaborations are strongly influenced by how well companies succeed in knowledge integration whereby bringing together and combining different types of knowledge that enable problem-solving (Berggren, Bergek, Bengtsson, & Söderlund, 2011; Grant, 1996; Olson, Walker, & Ruekert, 1995). The first thing to remember that knowledge integration has its roots in Schumpeter's (1934) view on innovation as combinations of existing knowledge. In other words, knowledge integration is a process of taking advantage of complementary knowledge that exists outside the firm (Enberg, 2012 & Tell, 2011). Similarly, Jayaram & Pathak (2013) coined

knowledge integration is an essential management task in growing company's knowledge base for new product development via strengthening the external collaboration and partnership (Jayaram & Pathak, 2013). At the same time, several scholars have proposed that the creation of organisational interfaces is a key factor to enable knowledge integration in product development (Galbraith, 1973; Griffin & Hauser, 1996; Tell, 2011). In details, the role of organisational interfaces is to enable the sharing of tacit and explicit knowledge that lead to knowledge integration between collaborating companies (Nonaka, von Krogh, & Voelpel, 2006).

Nevertheless, there are two major challenges associated with knowledge integration between companies (Enberg, 2007; Lhuillery & Pfister, 2009). One is the characteristic of knowledge as organisationally specific, tacit, and ambiguous, and thereby difficult to integrate into product development collaborations (Grant, 1996; Szulanski, 1996). Another reason is the challenges of collaborating across company boundaries (Grandori, 2001; Hamel, 1991). Therefore, what is sound in theory often fails in practice.

Even though, studies indicate that knowledge integration influences product development performance (Iansiti, 1995; Schmickl & Kieser, 2008; Takeishi, 2002), but it is reasonable to think the main question in knowledge integration of why many product development collaborations have failed. This incapability relates to the fundamental dilemma associated with knowledge integration—to strike a balance between high capacity for knowledge integration which is costly, and limited knowledge integration that potentially leads to low product development performance (Enberg, Lindkvist, & Tell, 2010). Likewise, Grant (1996) also stressed the high cost of knowledge integration is a reflection of the difficulties in communicating tacit knowledge (Grant, 1996).

In sum, the "slow is better" argument suggests that although searching, selecting, acquiring, and disseminating information are time-intensive activities; they lead to the acquisition of more relevant information, an in-depth understanding of the market and the products offered. This could be done via the implementation of a broader or more novel range of NPD-related actions, and mindful resource allocation that translates into better products and firm outcomes (Chen et al., 2012; Crawford, 1992; & Sethi, 2000).

2.5.3 Production and Technology Capability

With specific reference to the food industry, on the one hand, the more the sectors are diverse in terms of their respective resource competencies, the more they are forced to learn through interaction in order to increase opportunities for innovation (Enkel & Bader, 2016). On the other hand, knowledge anchored to the past is increasingly recognised as a powerful source of innovation through the identification and re-combination of the most suitable traditional components. Indeed, adopting traditional knowledge may be fruitful only if employed together with an application that is more recent and linked to an open innovation approach (Chesborough, 2003). Thus, it is vital for newly establish start-ups business in verifying to what extent the new technologies and innovations can be applied and how compatible they are with traditional mechanisms or processes.

Past knowledge has a specific meaning in this study, since it refers to the knowledge (both internal and external) that have been acquired during the firm's life and stored in the overall bundle of the firm's resources, thus becoming internal owing to its prior acquisition through learning (this concept is also linked to that of absorptive capacity). This knowledge is also linked to the local culture, with local traditions, with the customs and expertise handed down from one generation to the next. Importantly, past knowledge includes the entrepreneur's experience and expertise who work in the food industry,

demonstrate the ability to develop ground-breaking competitive formulas (Knudsen & Roman, 2004). Under those circumstances, it is important especially for agro-based incubatee to use both past knowledge and new knowledge despite an in-depth understanding of the main sector dynamics which simultaneously can lead to new ideas development and innovative practices implementation.

On top of that, there are two approaches to the technology adoption process. First, adopting a standard technology-pushed approach, whereby innovation can be studied as a process of development and change (Teece, 1996). In this direction, the innovative process is directly influenced by the way R&D is carried out, technological innovation characteristics, tacit knowledge, knowledge accumulation capacity and external innovation adoption (Teece, 1996; Avermaete et al., 2003). Second, from a marketing-pull perspective, concerning firm's innovative ability to satisfy the needs and the preferences of its potential customers, using its resources in a new way, about both production and commercial activities (Traill & Meulenberg, 2002). Thus, these past studies could serve as guidance during incubation and post-incubation periods in stimulating the agro-based incubatee innovation and technological capability mainly in production activities.

Then again, innovation spillover in various industries (e.g. biotech, agriculture and packaging), has spurred the firms operating in the food industry to develop new products and processes in order to profit from the superior capabilities of their suppliers (Tatikonda & Stock, 2003; Di Stefano et al., 2012). At the same time, it is vital for the firm mainly in the food industry to exploit and internalise external knowledge to create new technological innovation and solutions. Indeed, some scholars state that a firm's ability to combine both internal and external sources of knowledge, which traditionally belong

to other industries, is a way forward to compete successfully in the market (Kogut & Zander, 1992). This explains why in both academia and industry, the theme of "cross-industry" innovation is becoming increasingly popular (Brunswicker & Hutschek, 2010). In this perspective, firms are encouraged to introduce external knowledge into their business, generating positive benefits for their innovations. In particular, supplier-driven innovation in the food sector can lead to knowledge spillover which, in turn, can positively affect the implementation of innovative practices despite boosting new knowledge creation (Popadiuk & Choo, 2006).

Knowledge about the past is increasingly recognised as a powerful and unique source of innovation (Messeni Petruzzelli & Albino, 2011). Consequently, firms need to develop capabilities to interiorise and reinterpret the past knowledge to innovate. In this sense, long-standing family firms benefit from their past knowledge and the success of these firms depends on their ability to leverage tradition to innovate (Messeni Petruzzelli & Albino, 2011). Likewise, knowledge anchored to the past is increasingly recognised as a powerful source of innovation through the identification and re-combination of the most suitable traditional components. As a result, adopting traditional knowledge may be fruitful only if employed together with more recent applications, linked to an open innovation approach. It, therefore, becomes important to verify if and to what extent new technologies and innovations can be applied and how compatible they are with traditional processes.

Besides that, knowledge interiorisation allows assimilation and sharing of knowledge pertaining to the firm's traditions or local traditions, as reflected by the different forms of both codified and tacit knowledge used to develop new products (De Massis et al., 2016). At the same time, the use and integration of new sources of knowledge, distributed across

a large number of actors and accessible via various channels, depending on a firm's ability to identify, absorb, and make use of knowledge located outside its organisational boundaries (Cohen & Levinthal, 1990). From this point of view, in today's industry 4.0 era, much of this process is linked to the above-illustrated open innovation approach, where the external party (including the customer) can even become a co-producer and the cross-industry process of knowledge sharing and knowledge-creating a precious source of innovation.

2.6 Summary

While there are numerous studies (Allen & McCluskey, 1990; Mian et al., 2016; Klofsten, Bank & Bienkowska, 2015) examining the role of incubation, there are huge gaps in the literature in the following areas. First, incubation studies focus on the role of incubation process (Eveleens et al., 2017; Arlotto et al., 2011; Chan & Lau, 2005) and seldom emphasize the incubatees as the unit of analysis. It is more so, that studies emphasis is on the relevancy of the support services provided by the incubators to the incubatees (Autio & Klofsten, 1998; Allen, 1985; Lalkaka, 2001; Malan, 2002; Bruneel et al., 2012). Second, the issue of firm survivability has been less focused given that it requires incubator managers to collect adequate data post-incubation process (Schwartz, 2013). This limits the ability of the policymakers and managers to understand the success of the incubation program in a more meaningful way given that the main motives of the incubation are to spear business formation that has larger implications for the whole economy including welfare gains. Third, the notion of organisational learning and capacity building is less studied within the literature of incubation, unlike the support services notion. Importantly, studies on learning and capability building are still lacking especially in an evolutionary sense tracking the incubatees learning and capability dynamics during and after the incubation periods. Fourth, it is seldom that studies cover

the successful and failed incubatees in a single study. Having both would provide counterfactuals if there is any distinction between the successful and failed incubatees.

Above all, this study would contribute to a comprehensive conceptual and analytical framework especially for the agro-based industry by integrating essential support services, organisational learning in terms of knowledge creation, knowledge dissemination and knowledge absorption in building several essential capabilities such as marketing, product development, and production technology development. Hence, this study's framework would bridge the existing literature gaps by initiating a comprehensive guideline for the incubator-incubatee programme during two stages namely during incubation and post-incubation.

CHAPTER 3: RESEARCH METHODOLOGY

3.1 Introduction

Firstly, this chapter discusses the research design components of the study namely inductive approach, qualitative approach and narrative case study approach. Secondly, the conceptual framework and analytical framework of the study demonstrated in this chapter. In details, the conceptual framework is established by combining the incubation system literature and organisational learning as well as capability building of the theory of firms. The conceptual framework focuses on the different phases in the incubation system, i.e., incubation and post-incubation. While the two analytical frameworks are constructed to examine the support services relevancy and business performance of incubatee through organisational learning and capabilities development. Next, the details of cases selection and data collection procedures are provided in this chapter. Finally, the credibility and generalisation of the case study are briefly discussed in this chapter.

3.2 Research Design

In general, the research design is defined as a medium to examine research study by establishing solid reasoning between research questions and research data (Yin, 2014). Likewise, this study mainly explores and understands two important issues of the incubation system as constructed in the research questions. First, is regarding the support services provided by incubators and its relevancy to the respective incubatees. Second, is about the capabilities building via organisational learning approach whereby as such research is viable to be conducted qualitatively as emphasised by Yilmaz (2013).

Besides that, the construction of conceptual and analytical frameworks of the study was solely based on literature reviews.in Chapter 2. This due to the gaps in the previous studies were catalysed the construction of an improvised version of conceptual and analytical frameworks mainly for agro-based incubation study. In details, the conceptual framework is constructed to highlight the incubation system key requirements at two different phases notably during incubation and post-incubation to sustain the business survivability. Despite conceptual framework, there are two analytical frameworks constructed in this study mainly to examine the incubator support services relevancy and secondly to access the learning process among incubatees in developing several capabilities for the business survivability reason. Furthermore, the findings from this study are constructed based on the proposed analytical frameworks by conducting an in-depth analysis of each respective cases and variables.

The following subsections discuss and justify the use of inductive approach, qualitative approach and a narrative case study in this study.

3.2.1 Inductive Approach

The study incorporates theory-building via inductive reasoning methodology. Inductive reasoning allows the study to undertake the observation and applied it in various similar circumstances or different scenarios. Noteworthy, this study has less intention in verifying existing theories unlike begins with observations and other relevant theories. In this respect, this study has been undertaken inductively via interviewing several key participants of MARDI's incubator programme as well as the program management.

Importantly, this study deployed inductive approach because it allows working with probabilities and getting various options of variables in the cases (Miles & Huberman,

1994). In addition, a starting point could be established via inductive approach by both observations and experiences since this approach was widely used consciously and naturally by people in routine life. Inductive reasoning approach is equally important for case study analysis because it fuels more exploration to test if the judgment or probable inference is right or wrong (Miles & Huberman, 1994). This kind of exploration is not only good for investigation or studying probabilities, but it also helps the person indulging in inductive reasoning to understand how accurate or inaccurate the initial assessments and inferences have been (Miles & Huberman, 1994).

Although, inductive reasoning approach is lacking in terms of external validation (Ruzzene, 2015) due to single observation drawn from the very specific institution (i.e., MARDI in this case) which limited the study outcome generalisation, but importantly the study outcome can be helpful for policy-makers only if valid in the target contexts. Thus, this study focuses on policy-making and planning for MARDI rather than mere prediction. Furthermore, an inductive approach had undertaken in this study because the agro-based business industry is subjected to uncertainty in terms of climate, resource scarcity and commodity price volatility whereby the conclusion applies to the particular agro-based industry only (Copi et al., 2016). Therefore, high external validity turns out to be a much less pressing concern in this study.

3.2.2 Qualitative Approach

The analysis process initiated via a grounded theory approach. The analysis constructed with data that deployed several approaches notably communications, observations and other primary information. Noteworthy that, none of the variables and themes is derived from existing theories or previous related studies (Hsieh & Shannon, 2005). Conversely, this study began with a first-phase interview session that is based on data from within a

case (Miles & Huberman, 1994). Interestingly, grounded theory methods have the additional advantage of containing explicit guidelines that show us how we may proceed with the research systematically.

Apart from that, the grounded theory is essential in terms of sorting and synthesising the data via qualitative data coding mechanism. In details, coding is referred to the detail of data based on its segments or themes. Some categories in the data-coding scheme are straightforward and could be easily identified based on manifest content, while others are harder to identify because they are partially based on the latent content of the texts. The categories are expected to be mutually exclusive (distinct from each other) and exhaustive (Miles & Huberman, 1994).

Above all, this research adopts qualitative approach by undertaking the systematic collection, organisation, analysis, and interpretation of people's words from conversations, written texts, or other visual forms about the incubation program as experienced by incubators and incubatees in their respective organisation landscape setting (Grossoehme, 2014). At the same time, this research design based on a human-centric approach which aims to delve deeper into people's experiences, perceptions, behaviours throughout the incubation program (Given, 2015). In this regard, involving people such as incubator managers and incubatees as participants in this study is important. The engagement with people can be done in very direct ways, such as through interviews, which enable engage directly with participants (Yin, 2014).

Qualitative researches recognise its subjective ways of knowing at the heart of their investigations (Yin, 2014). Likewise, this study is designed to understand the agro-based incubation system process based on both the incubator manager and incubatees

perspective. In this regard, objectivity is not seen as possible or necessary to achieve in as such study. This is because qualitative researches embrace subjectivity as the various ways that people engage with the topic under study including the researcher are placed at the heart of data collection and analysis (Given, 2015).

Unlike quantitative studies where the goal is to generalise to a larger population, qualitative research is typically designed using non-probabilistic sampling methods (Given, 2015). Nevertheless, the sampling approach designed to recruit participants and texts in this study allowed analytical explanations of the topic. This approach requires a purposive, selective approach to sampling that fits with the inductive (i.e., theory-building) intensions of qualitative research (Yin, 2014). In short, purposive sampling is an approach where people, sites, and documents are chosen because they meet specific inclusion criteria for the study (Given, 2015).

3.2.3 Narrative Case Study

According to Catherine (2000), a detailed 'portrait' of a specific event could be narrated via a case study approach. Similarly, the case study research approach is known as "*an empirical inquiry that investigates a contemporary phenomenon within its real-life context; when the boundaries between phenomenon and context are not clearly evident; and in which multiple sources of evidence are deployed (p.23)".*

In general, the case study research can be viewed at three different lenses namely exploratory case study, descriptive case study and explanatory case study (Yin, 1984). The exploratory case study leads researchers to obtain data that serves their point of interest by exploring any phenomena. While descriptive case study explains the natural

phenomena which occur within the data of the study. The explanatory case study explains the phenomena in the data by closely examining the data at a glimpse and deep levels. This study deployed all these three types of case study approaches in order to address the research questions. There are three reasons which motivated this study to undertake all these three types case study approaches as suggested by Yin (2014), namely the type of research questions whether begin with 'how' or 'why', control over the event or respondent and the focus of the study is contemporary based which means an event exists at the present period.

In the context of business studies, Mariotto, Zanni, & DeMoraes (2014) postulates that case study as a detailed description and most appropriate method when study the overall business operation ecosystem. Likewise, the subject for this study is the agro-based industry which is established via the MARDI incubator-incubatee programme. Therefore, this study used a multiple case study design to describe the in-depth experiences of four incubator stations' managers and incubatee business owners respectively. This study also examined the business strategies of the business owners who managed to sustain their businesses beyond five years after graduated from the incubator and incubatee programme. At the same time, the study discovered the key reasons for several business failures during and after the incubator programme.

3.3 Conceptual and Analytical Framework

Figure 3.1 exhibits the conceptual framework used in this study. The conceptual framework is vital to conceptualising the three interactive core elements requirements – (a) support services, (b) organisational learning process, and (c) capability building at two different phases, namely during incubation and post-incubation. The conceptual framework is useful in explaining the importance of three core elements linkages in

facilitating the participant of the incubator programme to graduate on time without unnecessary delay. As a whole, it is essential for an incubation system to equipped with these three crucial components in shaping and leading incubatee business performance and its survivability especially during the post-incubation period

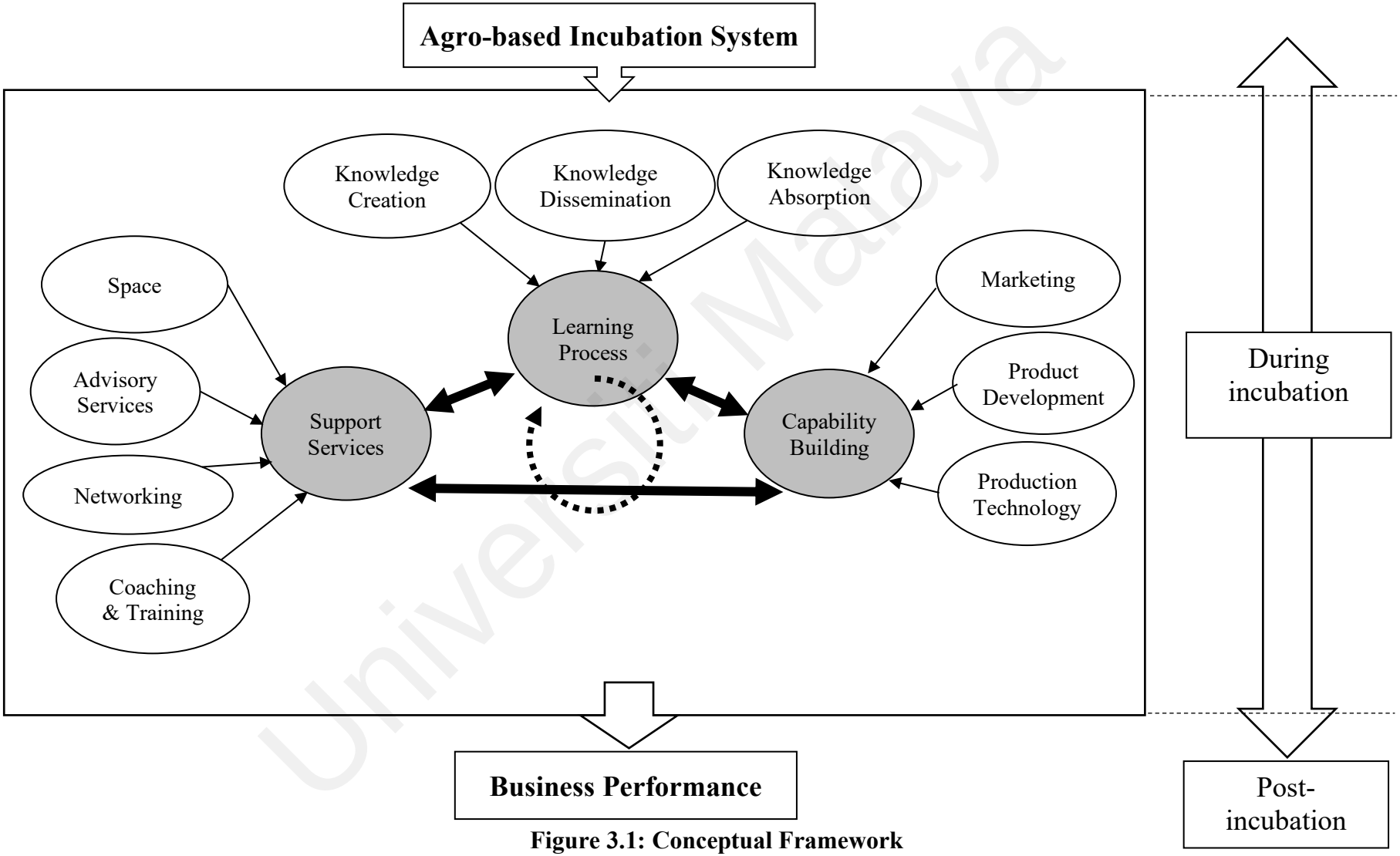

Figure 3.1: Conceptual Framework

This study developed two analytical frameworks to assess two important aspects of the incubation system. First are the incubation support services and its relevancy to incubatees. The second is the learning and capability of the incubatees and how these learning and capabilities interact to contribute to the incubatees performance.

Figure 3.2 shows the support system in terms of services provided by the incubator to the respective participants or incubatees. In details, there were several services provided by the incubator to incubatees namely advisory, spaces, networking, and internal coaching and training. Each of the services provided to incubatees may be relevant or irrelevant to a certain type of agro-based businesses. Therefore, this study intensely examines the relevancy of the services provided to each respective incubatees by different incubator stations. At the same time, as such study needs to undertake to ensure the appropriate services are provided by different incubator stations based on different business nature. This is because some of the existing services provided by incubator stations may be irrelevant to other incubator stations due to their different business environment. In fact, some of the other new services needed for certain agro-based incubator station in order to face stiff competition in the market after the graduation period from the programme.

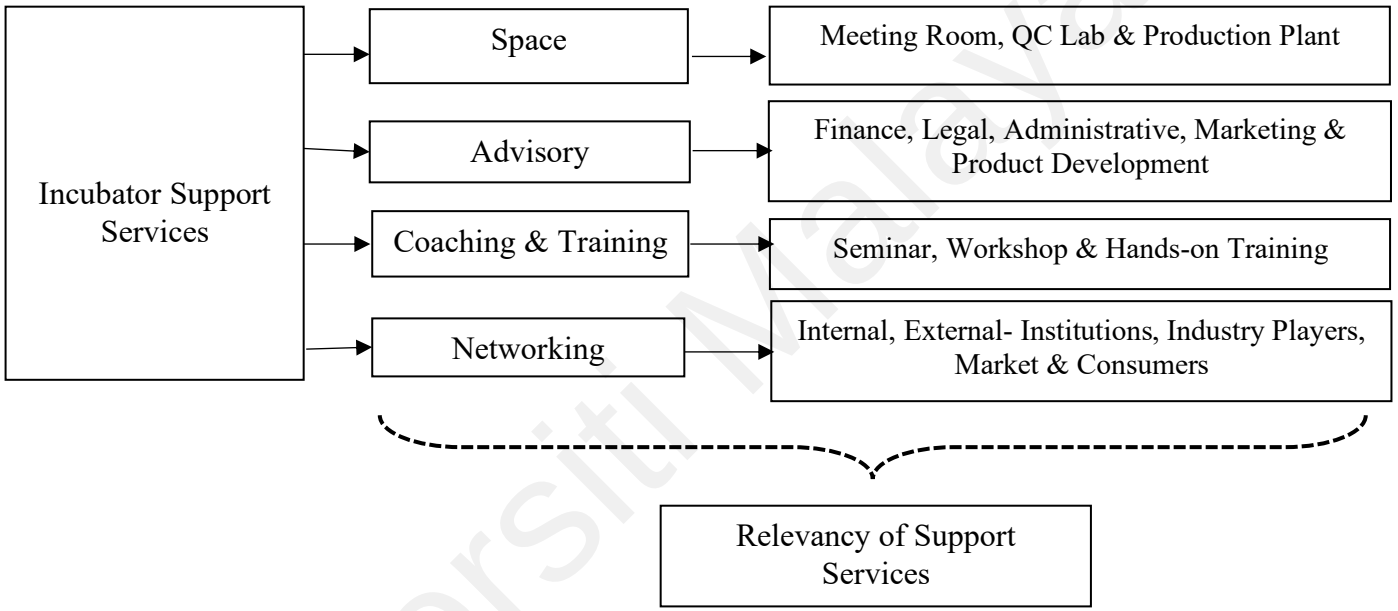

Figure 3.2: Incubator Support Services and Relevance

Despite the services facilities, the second analytical framework shown as Figure 3.3 examines the organisational learning and capabilities building of the incubatees during incubation and post-incubation period. The capabilities are generated via three phases of learning processes, namely knowledge creation, knowledge dissemination, and knowledge absorption. In details, this study examines deeply the knowledge creation sources internally and externally among both foods based and cosmetic based incubatees. The internal knowledge sources comprise from both employer and employee of that particular incubatee organisation. Whereas, external knowledge sources are from various parties such as suppliers, customer, competitors, universities and research institutions. The knowledge creation between both internal and external parties are serving the different purpose of knowledge usage in incubatees business operation. Apart from that, the knowledge dissemination among incubatees occurs via numerous channels such as integration, brainstorming, hands-on training, interaction either (formal or informal) and meeting. Meanwhile, the knowledge absorption happens based on respective incubatees absorptive capacity via their academic qualification and previous working experiences.

Above all, the entire three phases of learning proses are vital for incubatees in assisting them in developing three main capabilities such as marketing, product development, and production technology enhancement. Furthermore, this study examines the potential challenges faced by incubatees to embrace marketing capability, product development and technology capabilities for better business performance, especially during the post-incubation period.

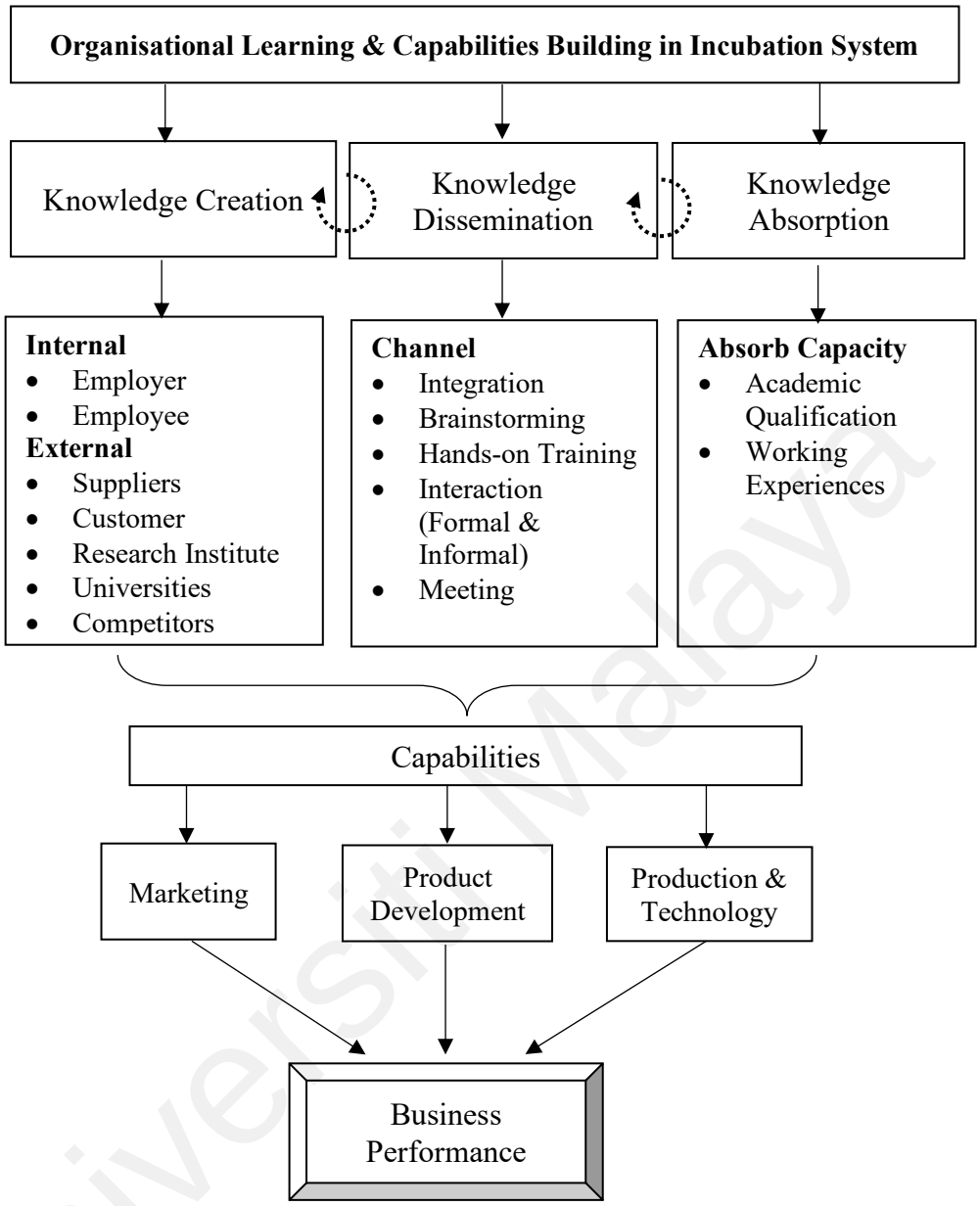

Figure 3.3: Organisational Learning and Capabilities Building in Incubation System

3.4 Identification and Selection of Cases

Currently, there are five agro-based incubators operated under MARDI umbrella. Each of the incubators had different business nature and operated in different states in Malaysia – rice-based products in Kedah, essential oil and herbs based cosmetic products in

Malacca, bakery products in Terengganu, seafood-based products in Sabah and paddy processing in Sarawak.

Figure 3.4 exhibits the MARDI incubators profile. There were four graduated incubatees from a total of eleven incubatees in Kedah's incubator station, and three out of five from Malacca's incubator station. For this study, the two better performing incubator stations notably (i.e., Kedah and Malacca) were selected. In the case of Kedah incubator station, all of eleven incubatees have approached via telephone call and email, but only two incubatees are reachable and agreed to participate in this study as a respondent. In fact, the incubator station manager is unable to approach other nine incubatees either via email, or telephone. Under those circumstances, there were only two graduated incubatees have been selected from Kedah incubator station. The same constraint not only occurred in Kedah incubator station but also in Malacca. In Malacca incubator station, there were only two incubatees comprise both graduated and non-graduated incubatees able to be approached via telephone from a total of five incubatees. The other three incubators stations in Terengganu, Sabah, and Sarawak were excluded in this study, as these stations do not produce any graduated incubatees mainly from Terengganu state. Incubators from both states namely Sabah and Sarawak also have been excluded in the study since these incubator stations just established in the year 2016 and 2017 respectively.

For Kristensen and Ravn (2015), the selected interviewees could affect the knowledge that a researcher produces through a research study. Hence, the selection of incubatees as cases study in this study had been done thoroughly after obtained advice and insights from the subject matter experts and policymakers which including the management of MARDI. Furthermore, the selected respondents that comprise both graduated and non-

graduated incubatees can yield some useful insights for the study based on their personal experiences and viewpoints. As a matter of privacy, this study is unable to provide the four incubatees organisation name and other contact details as MARDI strictly abided to its client privacy disclosure policy.

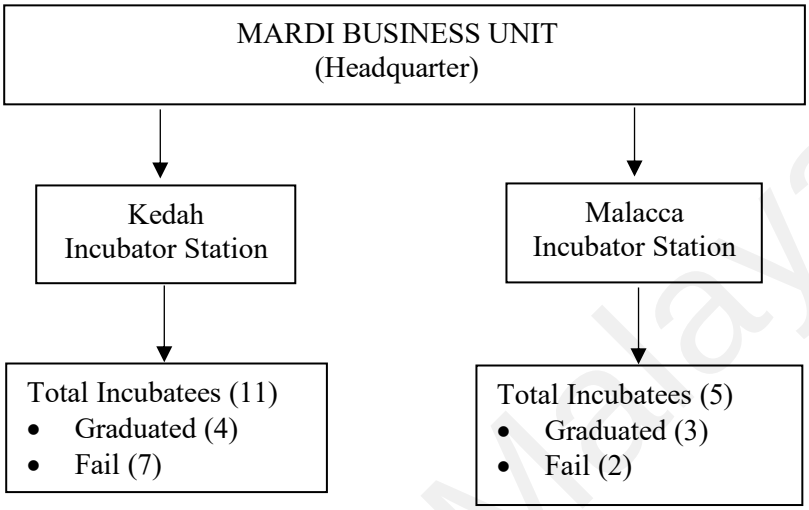

Figure 3.4: MARDI Incubators Profile

3.5 Data Collection Instruments and Process

In-depth interview carried out through a series of questions and answers approach to discover and obtain precious insights in term of participant personal experiences (Grossoehme, 2014). With the reference of past incubation studies, organisational learning and firm capability development theory, the interview questions were designed into few sub-categories of measurements namely:

(a) Background of incubatee

(b) Incubator's facilities

(c) Marketing

(d) Networking

(e) Process and production organisation

(f) Product life cycle and development

(g) Equipment and technology capability

(h) The learning process in an organisation

(i) Business sustainability

(j) Challenges during and after the incubation period

The total questions were about forty that comprise semi-structured and open-ended (See APPENDIX 1). Both qualitative and quantitative indicators have been used in the interview questions to elicit the agro-based industry performance at two phases namely during incubation and post-incubation. Quantitative data is precious in providing the "know-what" of the agro-based industry capability enhancement activities such as marketing expenditure, product market share, the impact of innovation (material consumption, utilisation of fixed capital and production machinery upgrading cost). Whereas, qualitative data brief the "know why" and "know-how" of the agro-based industry capability enhancement activities.

In total, six in-person interviews have been conducted from October 2017 until April 2018. The time for each interview is approximately forty-five minutes. An audio recorder was used during the interview session to record the entire conversation. The benefits of using a recording device are to provide accurate records of data gathered whereby the recorded files could be uploaded for coding and analysis purpose. The interviews were carried out in Malay language and were then translated into English before being analysed. After the interview session, the researcher transcribes the recorded interview conversation into transcript form. This enables the researcher to conduct coding on the transcript based on the research questions. At the same time, the researcher has taken some hand-notes that denoted certain key issues of the research. The impact of researcher

note-taking during an interview session, which may yield positive perception toward the researcher by the participant, has been highlighted by Christie, Bemister, & Dobson (2015).

Documentation is vital for case studies and used to support and enhance data from other sources (Yin, 2014). Hatch (2002) asserts that documents "*are objects that participants use in the everyday activity of the context under examination (p.117)*", and can be "*powerful indicators of the value systems operating within institutions (p. 117)*". For these reasons, the documentation may be necessary to develop a complete understanding of the entire case scenario especially the physical and social environment of the study (LeCompte & Schensul, 1999). In this case, MARDI annual reports from various years and Malaysian five-year development plans from 2006 until 2015 were used to understand the development and policy background of the incubator-incubatee programme in MARDI and Malaysia as general.

3.6 Data Analysis and Validation

Interview data were analysed inductively. The narrative data were collected and transcribed into MS Word platform. The narrative data included transcriptions of all interviews and field notes, questions from both incubator managers and incubatee owners. After then, the researcher coded the narrative data based on their connections to the research questions that cover several key elements of the study namely support services, organisational learning, capability development and business performance. The coded data were then sorted through multiple times as the researcher developed the findings presented in chapter five. The findings were then used to develop a credible answer to the research questions and explanations on the inclusion of the four core components of the

programme. Hays (2004) states that the researcher must be aware of the research questions at all times during the desegregation of data. This will do two things: "*ensure that the data will answer the questions, and keep the researcher from being side tracked by other "interesting and exciting data" (p. 232)*".

Besides that, the collected data via in-depth interviews approach is validated via a data triangulation approach (Peredaryenko & Krauss, 2013). Triangulation allows a researcher to investigate the research problem from a variety of angles and perspectives. This approach can help to ensure that data gathered in a project are credible (i.e., aiding the rigorous design and implementation of the project) but is also very useful in extending the scope of data gathering and analysis, particularly in projects that are exploratory or designed to be emergent. In these cases, the focus of the projects and therefore, the need for new data may evolve as the data collection and analysis progress. Gathering data using a triangulated approach provides a more fulsome picture of the phenomenon under study than what would be possible if data were gathered from only one source. At times, triangulation may highlight discrepancies or gaps in a dataset that requires further study.

Triangulation may involve the use of multiple methods, different sites, a variety of participant types, or a mix of other variables deemed relevant to the project. A researcher may also design a mixed-methods study, where triangulation occurs across both qualitative (e.g., interviews) and quantitative (e.g., secondary data) elements in the research design (Yin, 2014). In the following example as in Table 3.1, the researcher would explore the various settings, people and activities in which incubatees engage to explore the implication of technology on the product development process. Here, triangulation occurs at multiple levels- i.e., of the methods, sites, and participant groups.

Table 3.1: Levels of Triangulation

Modes of Triangulation	Methods	Sites	Sources	Participants
Common modes [suggested by Yin (2014)]	Interviews	Incubator Station	Transcript & Annual Report	Incubator Managers
Modes performed by the author	Interviews	Incubatees Premise	Transcript & Annual Financial Statement	Business Owners

Source: Adopted from Yin (2014)

Therefore, the review of company financial statements such as balance sheets, profit, and loss statement may use in this study to support and justify the reasoning in term of business strategies devised by the business incubatee owners (O'Leary, 2014; Robson & McCartan, 2016). This approach validates the statements given by the participants throughout the interview session. Therefore, applying both data collection methods such as primary and secondary are vital to mitigate the limitation of each as emphasised by (Yin, 2014).

At the same time, expert opinions had taken in the research in order to ensure the extensive literature review and data reliability and validity. In other words, the researcher has conducted interview session based on expert opinion to validate the content of the incubation program and to obtain precious insights from the incubator association (Varpio et al., 2017). The researcher conducted the interview separately with the incubator association experts to investigate the types of services required by the incubatees over different phases of development, assess the current capabilities of graduate incubatees and their challenges. Since there was no prior reason to conduct sampling technique, therefore no sampling techniques were applied to select experts. The experts comprise from several incubator development organisation in Malaysia such as Technology Park

Malaysia (TPM) and Malaysia Technology Development Corporation (MTDC). The experts were chosen based on the researcher's personal contact and from the referral obtained from the initial expert. Generally, the experts agreed on marketing, product development and continuous learning are the essential tools for incubatees survivability after graduating from the incubator- incubatee programme. Most of the successful incubatees had prior experience and relevant knowledge of their businesses unlike the failure incubatees that newly began to establish their career in the business.

3.7 Credibility and Generalisation

In general, research credibility is achieved by assessing the data interpretation and methodological triangulation (Charmaz, 2005). Methodological triangulation was accomplished through the use of multiple methods for the collection of data. This research involved the collection of data through observations, interviews, and documentation. Member checking requires the researcher to involve participants in the analysis and reporting process. The researcher asked one senior personnel from MARDI Business Incubation Unit and two incubatees to read through findings. The selection of senior personnel and incubatees determined based on their ability to provide constructive feedback.

Stake (1995) suggests that generalisation is not the purpose of the case study at all. He prefers the term "particularisation." He favours this term because the purpose of the case study is not to compare multiple cases, but to become intimately aware of the inner workings of a particular case. He suggests that "*there is an emphasis on uniqueness, and that implies knowledge of others that the case is different from, but the first emphasis is on understanding the case itself (p.8)*". In addition, Stake (2005) proposes that if any

generalisation is appropriate for qualitative research, it is "naturalistic generalisation." Such generalisations are formed by the readers, as the case is unveiled for them. Hence, the purpose of this research is not to define findings that may be transferable to other agro-based incubator stations, but rather to deeply describe the uniqueness of each agro-based incubator stations operation.

3.8 Summary

This chapter has presented the conceptual framework and analytical framework of the study mainly on the relevancy of services provided to incubatees and capabilities building during incubation and post-incubation period to ensure the business survivability. Moreover, this chapter has provided an overview of the study purpose and its rationale for approaching this research as a descriptive case study. The research design was then laid out, including the methods for data collection and data analysis. In this section, the questionnaire development process is elaborated intensely including the selection of variables of the study based on past studies review. Furthermore, the insights obtained from several series of interview sessions were transcribed and validated internally and externally to minimise biases in the study final output. Based on the analytical framework developed in this chapter, the next chapter provides descriptive evidence of the study.

CHAPTER 4: AN OVERVIEW OF INCUBATION SYSTEM IN MARDI

4.1 Introduction

MARDI was established on 28 October 1969 with its primary objective of generating and promoting new, fair and efficient technologies for the advancement of the food, agriculture and agro-based industries. Importantly, this institution is managed and guided in accordance with the policies and regulations decided by MARDI's Governing Board with the consent of the Minister of Agriculture and Agro-based Industry. With this intention, the MARDI Science Council ensures that MARDI's technical programme reaches maximum quality and effectiveness.

In reality, MARDI's leadership vision has evolved from the plantation system establishment to technological commercialisation. The leadership evolution has successfully yielded an impressive management quality and excellence culture to achieve both national and international recognition. In details, international recognition is achieved through collaboration with research organisations and universities in the United States, Canada, Japan, Australia, Taiwan, China, ASEAN countries and the European Union (EU) countries.

Apart from that, several other initiatives had contributed to MARDI development including the amendments to the MARDI Act in 1990. As such amendments allowed MARDI's involvement in commercialisation activities. Consequently, MARDI Tech Corporation Sdn. Bhd. was established in 1992 to allow more space towards commercialisation oriented activities besides promoting MARDI activities both at Malaysia and abroad. At the same time, MARDI has strengthened the technology delivery

system as part of its holistic approach towards innovation. With this intention, MARDI implemented the technology test-bed and incubator programme in 2005 as a component of the entrepreneur development programme.

On the other hand, MARDI is mandated to research several key areas namely science, technical, economic and social. In detail, MARDI serves as a centre for gathering and disseminating information and advice on scientific, technical and economic matters relating to the food and agriculture industry. This function is carried out through a variety of methods including annual reports publication, organise exhibitions, conferences, lectures, and seminars. For example, MARDI provides specialist services such as consulting services, analysis laboratories and various training to develop food and agro-based industries. Together with specialist services, MARDI is also providing R&D assistance in the field of pure science, applied science, technical and economics concerning the agriculture industry. It is important to realise that MARDI had established and maintained trustworthy relationships with public and private organisations, especially in scientific, technical, economic and social research for the betterment of food and agro-based industry as a whole.

4.2 MARDI Incubation program

MARDI has officially started its incubator technology programme on 28 February 2009 as one of the strategies to increase the effectiveness of MARDI technology transfer to local entrepreneurs who are keen to venture into agriculture sector. MARDI Incubator Technology is defined as a new technology pioneer plant equipped with the latest commercial machines and equipment. MARDI Technology Incubator is established aimed at producing successful graduates from a viable or competitive business aspect

financially, with a strong market and capable technical capabilities to grow. MARDI Incubator provides SME entrepreneurs with opportunities to learn technical skills, hands-on machines, and equipment for pre-commercial processing. Entrepreneurs or incubators are also exposed to relevant standards and certification in the agro-based industry.

There are five MARDI incubator stations in Kedah, Malacca, Terengganu, Sabah, and Sarawak respectively. The five incubator stations are involved in different agro-based activities. For example, incubator stations in Kedah specialise in manufacturing rice-based chips, incubator stations in Malacca specialising in the manufacture of herbs based cosmetic products, incubator stations in Terengganu specialises in the manufacture of vitato-based potato products, Sarawak incubator stations specialise in the processing of modern rice seeds and incubator stations in Sabah specialise in the production of seafood-based products. In general, every participant who is interested in participating in the MARDI incubator programme needs three months of the pre-incubation program. Subsequently, pre-incubation programme participants may apply to participate in the MARDI incubator programme by providing business registration documents and a comprehensive business plan that relate to MARDI incubator programme. The shortlisted participant is given an offer letter by MARDI's Business Unit upon the approval of MARDI's selection committee members. In addition, incubatee need to pay a sum of RM3000 as a security deposit and a monthly surcharge of RM300 during the duration of the programme.

The objective of MARDI Technology Incubator is to accelerate the process of commercialisation of selected MARDI technology (precursor), develop technology-based innovative and competitive SME companies and entrepreneurs. It supports and accelerates the development of the agricultural industry and provides opportunities for

MARDI researchers to engage in the field of development and commercialisation. This includes the development of a spin-off network that contributes to the continuous innovation process of MARDI technology and the formation of smart partnerships between entrepreneurs and technologists. In general, MARDI Technology Incubator offers four services as follows:

- *Technical service*: A practical guide to the handling and quality assurance of end-to-end products as well as R&D research for product diversification purposes.
- *Physical infrastructure*: pioneer factories, and office facilities: Includes shared office space for administrative services, and access to specific facilities such as laboratories and testing facilities. Premises also equipped with basic telecommunications and ICT facilities for incubation.
- *Legal and intellectual property management services*: Assist in managing technology licensing rights to entrepreneurs as well as assisting in corporate affairs. The interests of the intellectual property rights of both parties are protected.
- *Business development and product marketing services*: Incubators need to develop an incentive business plan concerning the product being produced and market forecasts for future product generation. The industry network is established through a business forum or smart partnership with finance for strengthening incubator networks including international business opportunities.

Based on Table 4.1, there are two MARDI's incubator stations established since 2005 and 2006 respectively in Kedah and Malacca states. The business nature of each incubator stations in different states relies on the natural resources comparative advantage. These incubator stations located in different states too involved in R&D specifically on the

respective natural resources and related products. Besides that, the incubation duration is set between 2-3 years in both incubator station before it was revised in 2017 to six months as an initiative to produce more agro-based entrepreneur via MARDI incubator-incubatee programme. The incubation fee is charged RM300 on a monthly basis and together with a security deposit which amounts RM3000. The security deposit is refundable once the respective incubatee has completed the incubation program.

Apart from that, most of the incubator station managers are well experienced in managing the respective incubator station even though some of the incubator managers' academic qualification is only up to secondary level education. Important to realise that the vast experiences of incubator station managers in the particular fields have yielded a couple of graduate incubatees especially in Kedah and Malacca incubator stations.

Table 4.1: MARDI Incubators Profile

	Incubator Stations	
Location	Alor Setar, Kedah	Linggi, Melacca
Establishment (Year)	2005	2006
Business Nature	Rice-based snacks	Essential oil-based products
Incubation Period	2 years	2 years
Incubation Fee (RM/month)	300	300
Security Deposit (RM)	3000	3000
Incubator Manager Experience (Year)	4	9
Incubator Manager Education Level	Diploma in Food Technology	Secondary
No. of Graduated Incubatees	4	3

Source: Author compilation

4.2.1 Facilities and Services

In general, most of the incubators are providing almost similar facilities to incubatee as showcased on Table 4.2 in order to facilitate the production process flow smoothly without any disruption. However, incubator does not provide some of the facility such as production inputs as this task should be carried out by the respective incubatee based on their business needs. Of course, the incubator would assist the respective incubatee by linking them to other local suppliers if they face any problem mainly in obtaining the inputs for production. Nevertheless, there are no additional charges imposed to incubatee if incubator assists them in term of establishing a connection with inputs supplier. At the same time, most of the incubator stations do provide very limited storage space for incubatee to store their finished goods. Consequently, incubatee is limiting their production output due to space constraint and sometimes they do rent additional storage space from outside incubator station. Moreover, the incubator station manager said that they are already submitted the proposal of extending the existing storage space to MARDI head office and still waiting for the response.

On the other hand, the machinery in the incubator stations is outdated in term of latest technology capability as these machineries were bought in 2006. Thus, as such types of machinery may limiting the production output of the incubatee as a whole. Besides that, some facilities are not fully utilised by incubatees such as telephone, facsimile and computer services. This due to incubatees do have their own communication gadgets and not rely on an incubator in providing as such services. Hence, the incubator should revise the relevancy in providing as such facilities than providing the exactly needed facilities to respective incubatees according to their nature of the business.

Table 4.2: Services and Facilities Profile

Types of Facilities	Alor Setar Kedah	Linggi, Melacca
Type of Machinery	√ (Direct Expanded Extruder)	√ (Soap processing & essential oil extraction)
Premises facilities (such as meeting rooms, storage, R&D laboratories)	√	√
Product Quality Control (QC)	√	√
Internet, phone & fax	√	√
Mechanical equipment	√	√
Production Inputs	X	X

Note: *√= Provided X= Not provided

4.2.2 Business Development Assistance

Table 4.3 shows other services offered by incubators based on respective business scope. The incubators as a whole, are just focusing on the essential services such as product creation and product formulation despite provides internal training to the respective incubatees based on their business scope. Nevertheless, most of the incubators are failed to realise that the measurement of success should not base solely during the incubation period but also after a post-incubation period as well. This because several essential advisory services namely financial advice, marketing assistance, skills training, networking, and product development are not provided to incubatees during the incubation period. In fact, these vital services determine the sustainability and survivability of incubatees during the post-incubation period.

Table 4.3: Business Development Assistances

Types of Assistance	Alor Setar, Kedah	Linggi, Malacca
Financial advisory services	X	X
Marketing	√	√
Technical & non-technical training	√	√
Networking	√	√
Use of MARDI trademark on the product	√	√
Skills development course	X	X
MARDI expert advisory services	√	√
New product development	X	√
Financial assistance	√	X
Legal services	√	√

Note: √= Provided X= Not provided

Both incubators from Kedah and Malacca states do provide some of the essentials services such as marketing assistance, technical and non-technical training, networking, application of MARDI trademark on product, MARDI expert advisory services and legal services. However, they failed to complement as such services with other additional required services namely financial advisory services, skill development courses, and partially other services such as new product development and financial assistance to accelerate incubatee business performance during incubation and post-incubation periods. Thus, it is wise for the respective incubator manager to revise the existing services relevancy and incorporate some other new relevant services or facilities according to the market and institutional needs so that it would benefit the entire entrepreneur community inclusively and holistically.

As shown above, the MARDI incubation program comprises in providing several key services namely space and production equipment, in-house training and other business-

related advisory services to achieve the incubator programme objectives. Each of the incubator stations is offering different types of services mainly in business development services based on the respective incubator stations business nature and business needs.

4.3 Summary

As a whole, MARDI's role has evolved gradually from developing agricultural technology to commercialising agricultural technology. In fact, MARDI has successfully established its pioneer role as a leading national agricultural research institution to promote national food and agro-based industry through scientific research and development plan. By the same token, MARDI incubator programme is a prominent agro-based star-up platform for local entrepreneurs to venture into the production of food-based products and as well as the cosmetic industry. Indeed, the facilities and expertise provided throughout the incubation period are matched or aligned with the needs required by entrepreneurs during the incubation stage. In the following chapter, the researcher will discuss the main findings of incubatees performance for each selected cases.

CHAPTER 5: FINDINGS AND DISCUSSION

5.1 Introduction

This chapter presents the main findings derived from the case studies. It is structured in two parts. The first part presents the main data, information and findings gathered through the interview sessions and field visits. It begins with brief profiles of all the four case studies. This is followed by an analysis on each cases studies that are organised in four elements – support service, organisational learning, capability development, and challenges. The status of the business performance at the post-incubation stage is also highlighted in this first part.

The second part of this chapter begins with a discussion on the relevancy of the services rendered by the MARDI incubation system. It examines the effectiveness of the incubation system in fostering organisation learning and capability building among the incubatees. Given the heterogeneity of the cases, the sections further provide an in-depth analysis of the similarities and differences in the process of learning and capability building from the four individual incubatees. Also, it highlights the possible challenges faced by incubatees in developing several capabilities during and post-incubation period, namely marketing, product development, and production technology.

5.2 Profiles of Case Studies

Table 5.1 shows the background of the respective incubatee owners and managers and as well as the glimpse of their business nature. In general, this study examined three successful graduated business incubatees and a failure incubatee from the overall 16 cases under the MARDI incubation program. Indeed, MARDI incubation program only has five

business incubatees graduated successfully and still survive in the market after the incubation period, whereas eleventh business incubatees unable to graduate during the incubation period or survive in the market after the incubation period. Most of the incubatees manage to complete the incubation period within two years except Incubatee 4. This due to the new rules and regulation was implemented whereby the incubation duration has been revised from 2 years to 1 year. As a result, Incubatee 4 could perform well neither during incubation nor after incubation periods.

Table 5.1: Profiles of Incubatees Business

Perspectives	Incubatee 1	Incubatee 2	Incubatee 3	Incubatee 4
Nature of business	Food	Food	Cosmetic	Cosmetic
Incubation period	2 year	2 year	2 year	1 year
Owner's level of education	Bachelor Degree in Chemical	Bachelor Degree in Biology	Ph.D. in Cosmetology	Bachelor Degree in Finance
Owner's prior business experience (years)	35	16	18	0
The main source of finance	Self-funding	Self-funding	Self-funding	Grants (Young Agropreneur)
Scale of business	Small (with about 16 workers)	Small (with about 8 workers)	Small (with about 10 workers)	Small (with about 2 workers)
Main source of production	local supplier	local supplier	local supplier	local supplier
Location of business	Alor Setar, Kedah	Alor Setar, Kedah	Kuala Linggi, Melacca	Kuala Linggi, Melacca
Status of completion	Graduated	Graduated	Graduated	Non-Graduated

The prior business experience had indicated significant result for Incubatee 1, Incubatee 2 and Incubatee 3 in term of sustaining the businesses successfully both during and after

the incubation period. Unlike Incubatee 4 owner who had failed to complete the incubation program within the designated period and sustains the businesses succeed in the market due to lack of exposure and experience in the particular industry. In fact, most of the succeed incubatees owner and manager namely Incubatee 1, Incubatee 2 and Incubatee 3 had more than five-year experience in their respective business fields unlike Incubatee 4 had no adequate business experience. Such a wealth of experiences had successful yield result in their business performance. Importantly, most of the successful-graduated incubatees have invested their funding in their businesses regardless of obtaining any bank loans or research grants unlike Incubatee 4 who entirely obtained research grants as a start-up fund.

The choice of the location by respective business incubatees is determined by the resources advantage factor (Penrose, 1959). For instance, the food-based business incubatees was established in Kedah state due to its comparative advantage in paddy crops whereby rice is used as main ingredients in both Incubatee 1 and Incubatee 2 production operation. Meanwhile, the cosmetic based business incubatees namely Incubatee 3 and Incubatee 4 was established in Malacca as the main ingredients for essential oil product is widely available in this state.

5.3 Case Studies

The following subsections present the main activities of the four incubatees from three perspectives, namely (a) incubator support services, (b) organisational learning, and (c) capabilities development in terms of marketing, product development, and production technology development. The third subsection on capabilities development also provides the examination on the evolution of incubatees at two stages (i.e., during incubation and

post-incubation) among the incubatees. Each sub-sections ends with the specific challenges of the incubatees.

5.3.1 Incubatee 1 in Snack-based Industry

Even though Incubatee 1 joint the MARDI incubator-incubatee programme in 2016, it had established a substantial business background since 1990. Incubatee 1 business is mainly focuses on spices production that accounted for about 15% of the total market share in Malaysia. The participation of Incubatee 1 in the MARDI incubator-incubatee programme is mainly driven by its parent company business decision to diversify their product segments from spices production to snacks oriented foods.

5.3.1.1 Incubator Support Services

Through the MARDI incubator-incubatee programme, Incubatee 1 received supports in terms of space facility and telecommunication services. The space facility comprises both production plant and office space. The monthly rental cost at approximately RM300 is relatively cheaper compared to the market rate at approximately RM2000-3000 monthly. There is a sufficient space provided for the setting up of production plant. This allows the operation of routine production tasks for the entire production process that ranges from raw material processing activities to finished goods productions. Importantly, the incubator is equipped with a complete set of facilities as shown in Figure 5.1 such as production machinery (*direct expanded extruder, forming and cooking extruder*), quality control (QC) facilities (*lab, moisture analyser and Ph meter reading equipment*) and storage space to ensure the smoothness and effectiveness of rice oriented snacks production.

In reality, Incubatee 1 is not relying on external technical service provider and vendors, since MARDI incubator provides them comprehensive technical guidance mainly in undertaking some minor maintenance task on production machinery as well as other equipment in QC lab. For this reason, Incubatee 1 has assigned two of their personnel to look after the production machinery during operation period as well as its maintenance. Indeed, as such comprehensive technical guidance is helpful for Incubatee 1 in mitigating unnecessary delay in their production operation solely due to machinery factor. Of course, the prior experience of Incubatee 1 employees have been instrumental in acquiring the technical knowledge based on the technical guidance extended by MARDI incubator.

Figure 5.1: Incubatee 1 - Production Facilities for Food-Based Product

5.3.1.2 Organisational Learning

Incubatee 1 uses both internal and external sources of knowledge in creating business ideas. Internally, both employer and employees contribute toward knowledge creation via several mediums such as brainstorming sessions, informal discussions, and formal meeting sessions. For instance, during meeting session, both employer and employees

can brainstorm a couple of insights such as product quality enhancement plans and solutions to mitigate key challenges that related to the production operation notably operation cost and market competition. In details, the employer knowledge is based on their past field experiences in the food industry particularly in terms of creating an attractive marketing strategy and engaging in product diversification. While the employee's knowledge creation is mainly based on their previous working experiences in the food industry that contributes significantly toward new product formulation and creating attractive packaging design. At the same time, Incubatee 1 had established a substantial collaboration with MARDI in terms of new products R&D and as well as suppliers in obtaining new products information trend based on the demand side. Importantly, as such external collaboration able to lead Incubatee 1 production trend based on the current market needs. Thus, Incubatee 1 has realised that the firm performance is drive by continuous learning in the organisation via both internally and externally to ensure business performance successfully in the long-term. The Incubatee 1 general manager stressed on the importance of both internal and external learning:

> *With an experienced workforce and extensive external partnership, such combination enables us to produce products that are potentially marketable in both domestic and foreign markets. (Personal Communication, 19 October 2017)*

At the same time, knowledge codification also takes place in Incubatee 1 organisation as a part of the organisational learning process whereby the knowledge is well documented or recorded for future reference and usage. In the case of Incubatee 1, codified knowledge comprise in terms of documentation such as production manual and other safety guidelines. Consequently, Incubatee 1 prefer to set up a database as a way

forward for knowledge codification in remaining and sustaining key information about its organisation operation. For this reason, Incubatee 1 responded that:

> *Knowledge codification is mainly emphasised in our organisation since; we are obliged to ISO9001 certification rules and regulations. Under ISO9001, our organisation should mainly ensure the quality management aspect by documenting systematically each and every procedure involved in the business operation since it is a part of a regulatory requirement. (Personal Communication, 19 October 2017)*

Interestingly, both knowledge creation and knowledge codification have led to knowledge dissemination in Incubatee 1 organisation. In details, whenever there is a meeting session in Incubatee 1 organisation for knowledge creation purpose, then the new insights are disseminated to the respective employees via brainstorming medium. In like manner, the knowledge dissemination takes place in Incubatee 1 organisation thru knowledge codification medium whereby employees can attain the relevant knowledge in both technical and non-technical matters by reading the related manual or handbooks. Hence, the knowledge dissemination occurs in Incubatee 1 organisation with the integration of both knowledge creation and knowledge codification activities.

In terms of knowledge absorption, it closely related to several essential absorptive capacities namely academic qualification, working experiences, and common language. In general, knowledge absorption occurred at two different types of knowledge namely codified knowledge and tacit knowledge. In the case of Incubatee 1, academic qualification and common language like the Malay language are remain necessary for

both employer and employees to absorb the knowledge which is codified as SOP and guideline manual. While in terms of tacit knowledge, both employer and employee are required to have sufficient working experiences and capability to absorb it. This due to tacit knowledge is closely related to someone's personal experiences, and it is uncodified. Therefore, the best medium to enhance knowledge absorptive capability among employer and employees is via a learning-by-doing approach.

One important finding from the field visit and interview with Incubatee 1 is that MARDI incubator programme does not contribute to developing and enhancing knowledge codification and knowledge absorption. Truly, Incubatee 1 does not seek any guidance from MARDI incubator in terms of knowledge codification since it involves its organisation privacy matters such as standard operation procedures (SOP) for product formulation and other financial related matters. Likewise, for knowledge absorption, Incubatee 1 utilised its strength in terms of skilful human capital to catch-up with the latest product information and sophisticated technology insights from the market in creating the better business prospect for long-term.

5.3.1.3 Capabilities Development

(a) Marketing Capability

MARDI has rendered limited marketing support service to Incubatee 1 during the two years incubation period. MARDI incubator has facilitated Incubatee 1 to promote its products in agro-based expo or exhibition at both district and national level. Incubatee 1 has to pay a minimum fee of RM100.00 for the booth and space utilisation during the exhibitions. Nevertheless, due to the financial limitation, MARDI is unable to provide a

full range of marketing support services in providing marketing platforms, conducting a market survey and advising on marketing strategy for Incubatee 1 to leverage its marketing capability during the incubation period. In the following extract, MARDI's food-based incubator station manager explains the limitation in terms of marketing service to Incubatee 1.

> *Our support capacity is limited in providing space to incubatee at local agro-based exhibitions unlike provides marketing support service. Indeed, we are unable to provide an extensive support service for marketing activity due to limited budget allocation for the incubation program, lacking internal marketing personnel and so forth. Hence, we leave to respective incubatee's owner to undertake its marketing strategy based on their product nature and advantage. (Personal Communication, 16 October 2017)*

In other words, Incubatee 1 has to substantiate its marketing capability independently despite ensuring the business performance, especially at the post-incubation period. It is important to note that at post-incubation period, information and capacity building are key elements of market intelligence that determine the sustainability of incubatee. These include marketing strategy selection, marketing platforms selection, undertaking a market survey, product distribution channel are marketing cost is not provided by MARDI incubator. For this reason, Incubatee 1 has worked independently to conduct a market survey to obtain feedback from consumers on its rice-based snack products before it is launched widely. By adopting the learning-by-doing approach, Incubatee 1 managed to improve the snack products ingredients and packaging design based on a selected group of consumers during the market survey sessions. Meanwhile, the identification of the consumer target group is vital before undertaking a market survey for the targeted

products. For Incubatee 1, their potential customers are youngster and kids as snacks are pretty much addicted by these age category group. The consumer tends to provide some suggestions and critics during the market survey session for the product betterment. Thus, Incubatee 1 openly take all the necessary comments and critics from their sample pool of consumers to ensure the product requirement meets consumer expectation and as par with other competitor snack products. This open innovation mindset has successfully increased the quality of Incubatee 1 products.

Once the snacks product is launched successfully during the incubation period, Incubatee 1 engaged in several mediums to market their snack products via online and other mass media. The coverage and access to new product information are effective via online marketing mainly on the social media platform as can be seen in Figure 5.2. This is because most of the youngsters nowadays are widely engaging with as such applications in their routine. Even though the monthly marketing cost amounts from RM 15000 to RM 20000 but the higher proportion of the marketing cost is spent to conventional mass media channels such as an advertisement in television and radio, newspapers and so forth. Surprisingly, the advertisement cost for marketing via online channels are relatively cheaper than conventional mass media channels. This due to an open-source of information sharing platform provided by most of the social media at a minimal cost.

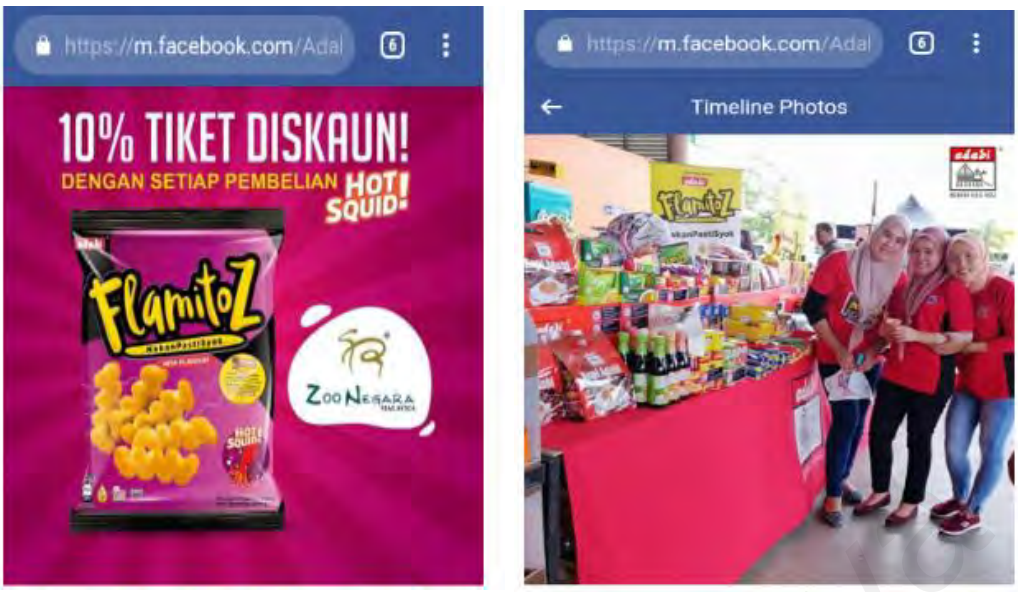

Figure 5.2: Incubatee 1 - New Product Promotion via Facebook

Despite launching price promotion and attractive discounts to attract potential customers in the market, Incubatee 1 needs to ensure its rice-based snack products price remain lower than their competitors, especially during the post-incubation period. During this period, business sustainability remains a prime objective for Incubatee 1 since they are an infant player in the snacks industry compared to other competitors. At the same time, Incubatee 1 ensures their financial capability is at the right position to carry out any large marketing activities if required during special occasions such as festive season, local products expo and so forth. In fact, as such occasional is considered as a golden opportunity for local entrepreneurs to promote their respective products to a wide range of customers despite ensuring the product's visibility.

Apart from self-marketing approach via in social media and other mass media, Incubatee 1 relies on the retailer in marketing their snacks products at niche market mainly in a rural area. Since there is a lack of access to electricity and internet facility mainly in rural areas, the retailer plays a key role in marketing Incubatee 1 products in the rural

area. Importantly, most of the snacks producers in the market are relying on the retailer in ensuring their respective products reach to the niche market. In fact, the reason Incubatee 1 is still relying on the retailer is that lack of access to a rural area which involved additional cost mainly on transportation. For instance, Incubatee 1 faced some difficulty in marketing their snacks products in the rural area due to improper road system. Hence, the distribution channel, which comprises the combination of producer-retailer-consumer is considered as one of the best-fit distribution channel especially to promote homogenous products. Although this may be true, it is noteworthy that retailer hesitates and reluctant to supply or promote any products if the particular products do not certify by any certification such as HALAL, GMP, ISO and so forth.

In details, HALAL certification indicates the food and drinks products are prepared by Islamic law. The HALAL certification in business operation is vital to convincing Muslim customers that all foods (particularly processed foods), as well as non-food items like cosmetics and pharmaceuticals, are processed and prepared in accordance to *Shariah Compliance.* In Malaysia, the Islamic Development Department of Malaysia issues the HALAL certificate to business entities.

Apart from HALAL certificate, Good Manufacturing Practice (GMP) certification is ensuring that products are consistently produced and controlled according to quality standards. GMP covers all aspects of production from the starting materials, premises, and equipment to the training and personal hygiene of staff.

Whereas, International Organisation for Standardisation known as ISO is a certificate that is covering everything from manufactured products in order to ensure the creation of

products and services that are safe, reliable and good quality. In brief, ISO standards help businesses increase productivity while minimising errors and waste.

Besides that, Hazard Analysis and Critical Control Points (HACCP) is a systematic preventive certification for food safety from biological, chemical, and physical hazards in production processes. HACCP attempts to avoid hazards rather than attempting to inspect finished products.

Finally, Food Safety is the Industry's Responsibility (MESTI) certification comprises the maintenance of food hygiene and process control which includes food safety assurance and food traceability. This certificate is issued by the Malaysian Health Ministry to food manufacturers in Malaysia.

Above all, Incubatee 1 products complied with several certifications namely HACCP, GMP, MESTI, and ISO. Surprisingly, Incubatee 1 has applied for the respective certificates by own initiative without any facilitation or guidance from MARDI incubator. According to Incubatee 1 general manager,

> *The MARDI incubator does not facilitate us in terms of certain mandatory certification application such as HALAL, HACCP, GMP, MESTI and so forth. Indeed the emphasis on as such certification seems to be an important criterion for any new product to gain popularity and confidence among consumer in the market especially in terms of product safety and environmentally friendly. Therefore, we hope that MARDI incubator could extend their existing service to the other services needed by incubatees in reality for their respective business*

performance after the incubation period. (Personal Communication, 16 October 2017)

(b) Product Development Capability

Product development capability is another crucial capability for Incubatee 1 to ensure their business sustainability in the long term. For instance, product development in this study is divided into several dimensions such as product branding, product diversification, product upgrading and product patenting in the case of Incubatee 1, the rice-based snack product brand known as 'Flamitos.' Once the product branding has been established, Incubatee 1 managed to obtain a copyright for its product brand in order to avoid any duplication or imitation by other snack products producer in the market. However, MARDI does not facilitate Incubatee 1 at all in obtaining the copyright for its product brand. Conversely, Incubatee 1 has deployed external consultant service to obtain the copyright approval for its product.

The food-based incubator station manager, when describing the patent and copyright services, said:

MARDI does not provide any advisory service to incubatee pertaining to product patenting and product copyright during the incubation period. This is because, during the incubation period, our greater emphasis is on product development based on MARDI technology transfer initiative. Nevertheless, incubatees are allowed to print MARDI's trademark on their respective product packaging during incubation period only. As such initiative is granted by MARDI to boost

consumer confidence and reliability toward incubatee's newly established products in the market. (Personal Communication, 16 October 2017)

At the same time, Incubatee 1 undertakes product upgrading task based on its current product demand in the market. For instance, the product upgrading and improvement process concentrated mostly on the product ingredients, product weight, product packaging and so forth. Product upgrade plays an essential role in ensuring Incubatee 1 competitiveness with other snacks producer in the market. Whereas, in term of product diversification, Incubatee 1 has established its long-term business goal whereby working on pets food production during the post-incubation period. Indeed, Incubatee 1 do observe some potential in producing pets food in Malaysia since currently there is none of local pet food producer.

Even though Incubatee 1 parent company is a leading spices producer in Malaysia but it is essential for them to re-think product diversification strategy since the market share for the spices products is almost saturated in the domestic market due to stiff competition from imported spices products. Surprisingly, the market for the pet-foods product is growing in Malaysia, but unfortunately, there is no local based company at all in meeting the demand. In fact, most of the local hypermarket and sundry shop are selling imported pet-food products whereby the price is relatively higher. For this reason, Incubatee 1 had decided to venture different product types such as pet foods based on their capabilities in terms of strong financial capacity, sufficient workforce, adequate R&D facility and so forth.

However, MARDI incubator has failed in extending its service scope to incubatee in terms of product upgrades and product diversification. Indeed, the incubator manager had clarified precisely about the limitation of the services for both product upgrades and product diversification.

> *We are unable to offer extensive support services for incubatee as per requested for product enhancement and product diversification within a year of the incubation period. In fact, both product enhancement and product diversification tasks required an extensive R&D process that is not viable to proceed within one year. Therefore, we expect incubatee to focus on the core product and establish it successfully in the market during the incubation period. (Personal Communication, 16 October 2017)*

The interview findings indicate that incubatee should consider about product upgrades and product diversification during the post-incubation period. Of course, incubatee has to plan and implement the relevant tasks independently for product upgrades and product diversification. Therefore, Incubatee 1 needs to ensure the business profit and sustainability in the long-term rather than depending solely on homogenous item production such as rice-based snacks.

(c) Production Technology Capability

Apart from product development, Incubatee 1 has equally focused on production technology capability to ensure its product cycle sustainability in order to meet the market demand. Incubatee 1 had utilised maximally the production amenities and the technical knowledge mainly in terms of production machinery operation and its maintenance as

provided by incubator during the incubation period. In fact, the production capacity was exceeded then the available production facilities in the incubator station. This due to their existing production technique that is solely volume-oriented. However, Incubatee 1 managed to overcome this constraint by expanding the production machinery scale from small to the medium during the post-incubation period. In other words, Incubatee 1 has leased the production machinery to produce its snack-based products in the market. Interestingly, Incubatee 1 is preferred to lease the production machinery due to the evolution of production equipment technology from time to time. For example, Incubatee 1 is preferred to lease the production machinery as technology is evolving over time and therefore it is wise and benefit them to upgrade the production technology capability by applying the leasing approach.

On the other hand, Incubatee 1 has leased the production machinery from an external party based on their customised function requirement. In details, Incubatee 1 instructed the production machinery producer to develop a customised production machine based on its product nature. Of course, the customised production machine can fulfil several layers of the production process from incoming material processing until finished good packaging tasks. Moreover, the customised production machinery is highly labour-saving oriented and therefore advanced skill workers needed to manoeuvre it. This because, Incubatee 1 business operation is highly based upon their efforts, experience, and skills rather than operate as a common production function. By investing in the customised production machinery, Incubatee 1 can secure its profit by reducing its fixed cost mainly low skilled labour.

According to Incubatee 1 general manager:

> *We prefer to lease our production machinery from external counterparts as this would be the safest approach since the latest technology is booming rapidly. Therefore we are keen toward leasing concept in term acquiring our organisation production equipment or machinery. (Personal Communication, 19 October 2017)*

At the same time, the entire leased machinery maintenance cost amounts from RM 30,000 to RM 50,000 every month. The machinery maintenance is schedule-based rather than on-call based. In details, fixed-scheduled monthly maintenance is required for the production machinery in Incubatee 1 premise to ensure its performance at optimum level and minimise the defect on the machinery. In fact, as such timely scheduled maintenance mechanism is far better in preventing any major breakdown issue during production, unlike the non-timely scheduled maintenance approach.

Besides that, Incubatee 1 outsourced their production to other firms, especially whenever there is a massive demand for snacks-based products. A significant rise in the products demands occurs during certain events or festive seasons. It is vital for Incubatee 1 to well prepared in facing any demand uncertainty in the market. Ultimately, Incubatee 1 managed to convert as such demand uncertainty to benefit by out-sourcing the additional products order to the third party thus, as such proactive action is vital for Incubatee 1 to ensure the availability and accessibility of its snack-based products in the market despite prioritising the customer preference.

5.3.1.4 Challenges

Although Incubatee 1 successfully graduated from the incubator programme, they still face constraint mainly in terms of product pricing. This due to stiff competition from other well-known local snack brand producers such as MAMEE and Twisties. Those top brand snacks producers can offer a lower price for their snacks products in the market which indirectly affecting the profit margin of new snack producer such as Incubatee 1. As a result, Incubatee 1 has to accept a low-profit-margin at the initial stage in order to establish its products successfully in the market.

Above all, several key essential advisory services and training or courses are not provided by the incubator namely finance, marketing, and other relevant services. For instance, finance is a crucial pillar for organisation growth and sustainability. Information about financial oriented services such as appropriate accounting and financial management skill, information about business funds accessibility from various agencies that are essential for entrepreneurs to substantiate and accelerate their long-term business growth. Indeed, substantial financial stability is vital for new businesses in the market to undertake several activities especially marketing and product development. Even though Incubatee 1 has substantial financial support from its parent company, but their concern is still pretty much on other new incubatees in commencing marketing and product development activities to ensure their business performance during the post-incubation period.

Apart from that, networking and collaboration are limited internally during the incubation period. To put it differently, Incubatee 1 engaged internally with MARDI personnel about technical and non-technical matters. For instance, Incubatee 1 is allowed

to print the MARDI trademark on their rice-based snack packaging during the incubation period. This creates a positive perception among consumer whenever they decide to purchase newly launched products in the market. Although as such internal collaboration yield some benefits to Incubatee 1, but it is not sufficient to cover a wide range of customers either domestically or internationally without external collaboration establishment. Of course, external collaboration leads to a different dimension of business progress specifically in several key areas like marketing, advance product development, access to finance, human capital enhancement and so forth. Thus, limited networking access may affect Incubatee 1 business performance mainly during the post-incubation period.

On top of that, there is a lack of certain training and courses mainly on product development such as product packaging, product designing and product patenting besides routine hands-on training. In reality, the incubator can provide certain training and courses mainly on human development and product development aspects based on their past incubatees performance track record in terms product quality enhancement as equal with other counterparts in the market. Consequently, Incubatee 1 need to allocate a large amount of budget to undertake a market survey before launch their own rice-based snacks product in the market. Likewise, new incubatees may also face some financial difficulty if they are unable to allocate a certain portion of its budget for their business operation during the post-incubation period. As a result, the possibility for new incubatee to survive is extremely low due to insufficient resources allocation which would hinder the business operation during the post-incubation period.

5.3.2 Incubatee 2 in Healthcare Industry

Incubatee 2 had established its first business in 2002 which solely focusing on the food industry at a small scale. Mostly, producing healthcare-oriented products such as sliming herbs tea, digestion capsules and so forth were the primary business focus. Incubatee 2 had decided to join the MARDI incubator programme in 2008 to enrich the product quality and its standard at par with other healthcare products in the market. Sufficient background knowledge from the biological field and relevant experiences in the food based-industry were the key factors that lead Incubatee 2 owner to successfully establish the business at both the domestic market and foreign market. Incubatee 2 had initiated the business via a self-funding mechanism in 2002 without gaining any financial aids from financial institutions. The self-funded business prepared and motivated Incubatee 2 to strive harder to yield fruitful result from the business in the long term.

5.3.2.1 Incubator Support Services

Although the support services provided by incubator is quite similar to other incubatees previously, Incubatee 2 utilised the R&D lab facilities mainly on freshness and sensory checks, chemical tests and other necessary quality tests. Given that, setting up a lab that equipped with R&D facility is costly for any newly established start-up enterprise. Incubatee 2 had maximally utilised the rendered services during two years of incubation period especially the R&D amenity to enhance its product quality and invent other new products. Besides R&D facilities, other services such as meeting room and communication facilities are not served Incubatee 2 purpose. Hence, a potentially successful business owner such as Incubatee 2 is targeted in adapting the right and precise services from the incubator to achieve their long-term business goal. This is emphasised by the Incubatee 2 owner:

Even though I have established this business since 2002, but the main reason for my involvement in MARDI incubator programme is merely to focus on product quality enhancement via an extensive R&D activity. This is because MARDI is a leading agricultural research institution in Malaysia despite its involvement in several frontier research activity in facilitating national agriculture development. (Personal Communication, 19 March 2018)

5.3.2.2 Organisational Learning

Owner driven knowledge is the main internal knowledge sources for Incubatee 2 whereby the owner solely devise the organisation direction in deciding the type of the product. Incubatee 2 successfully executed most of the business ideas from self-discovery approach. For instance, Incubatee 2 would actively participate in most of the international expos and exhibitions to discover the interest and needs of the customer from foreign markets.

On the other hand, employee-driven knowledge is a less pressing issue in Incubatee 2 business operation context. For example, Incubatee 2 owner claimed that:

We always want to create both way learning medium in order to benefit both parties namely organisation and employee as a whole. However, the learning habit among the employees in the organisation is at unsatisfactory level which might regress the firm performance. As such problem occurs among local workers which demotivate other productive workers in the organisation. As a result, two-way learning interaction is an inappropriate mechanism in the small firm and

therefore, I should decide and instruct the employee based on my interest in the benefit of the organisation as a whole. (Personal Communication, 19 March 2018)

In terms of external knowledge acquisition, Incubatee 2 had successfully established its external learning collaboration with the foreign business council. Such futuristic strategy had yielded several benefits for Incubatee 2 owner mainly obtaining an opportunity to expand its products to other foreign markets namely North Africa and China. Apart from the business council, Incubatee 2 also had established substantial collaboration externally with MARDI during post-incubation mainly on R&D aspect. This is because Incubatee 2 is still relying on MARDI's R&D amenities to pursue both product specification improvement and product development plans simultaneously due to the minimal charges imposed for its usage. By having access to R&D facilities at minimal cost, Incubatee 2 manages to market its products in both domestic and foreign markets at a reasonable price compared to its competitors. Thus, the external learning approach is vital for Incubatee 2 owner in sustaining their business operation during the post-incubation period via continuously product improvement and new product invention mechanisms.

The knowledge dissemination takes place during incubation and post-incubation in Incubatee 2 business operation. Incubatee 2 had obtained hands-on training during the incubation period from MARDI incubator personnel in terms of product R&D and machinery operation tasks. Incubatee 2 owner has believed that hands-on training is the best approach if the employee pool in the organisation is unfitted academically. Incubatee 2 claimed that the knowledge of a certain employee is non-transferable internally if they left the organisation without any prior notification. Such unfavourable circumstance led to inefficient in term of resource utilisation. This is because Incubatee 2 owner had

overspent at the initial stage for their employee's skills development with the expectation that the trained employees will eventually contribute to the company development technically and administratively. Unfortunately, Incubatee 2 owner does not obtain an expected fruitful return from the human capital investment. The main reason leads to as such a situation is due to lack of ownership attitude among employees toward the organisation and its development.

The knowledge absorptive capacity in Incubatee 2 is relatively low even though it has graduated successfully from the incubation program. This is because Incubatee 2 owner is a foreigner and not using the common language, i.e., Malay language as a medium of instruction in the business operation, unlike his employees are well versed in the Malay language. Therefore, the knowledge absorptive capacity among Incubatee 2 employees relatively low especially in digesting information and instruction from the English language. Nevertheless, the Incubatee 2 owner has shared his experience on how he managed to graduate successfully from MARDI incubation program even though the absorptive capability of Malay language is less buoyant:

> *Basically, my previous academic degree and previous business experiences in food-oriented business were strengthened my both theoretical and practical knowledge. Moreover, I managed to absorb the knowledge and skill provided during hands-on training based on my past experiences. In fact, before joining MARDI's incubator programme, I have engaged in the food-based business since 2002. As a result, I do have practical experiences which I went through in the market as a business owner. By utilising those experiences, I managed to graduate from this programme successfully on time. (Personal Communication, 19 March 2018)*

5.3.2.3 Capabilities Development

(a) Marketing Capability

Similar to Incubatee 1, the modern advertisement strategies via online advertisement tools as shown in Figure 5.3 like company webpage, social media, and other mass media remained as the leading marketing platform for Incubatee 2. It is vital to synchronise the business marketing strategy based on current trend especially in the digital era. Furthermore, online marketing strategy is the best platform compared to traditional mass media such as magazine and newspaper in promoting products to the targeted customer group (middle age and senior age) at a minimal cost.

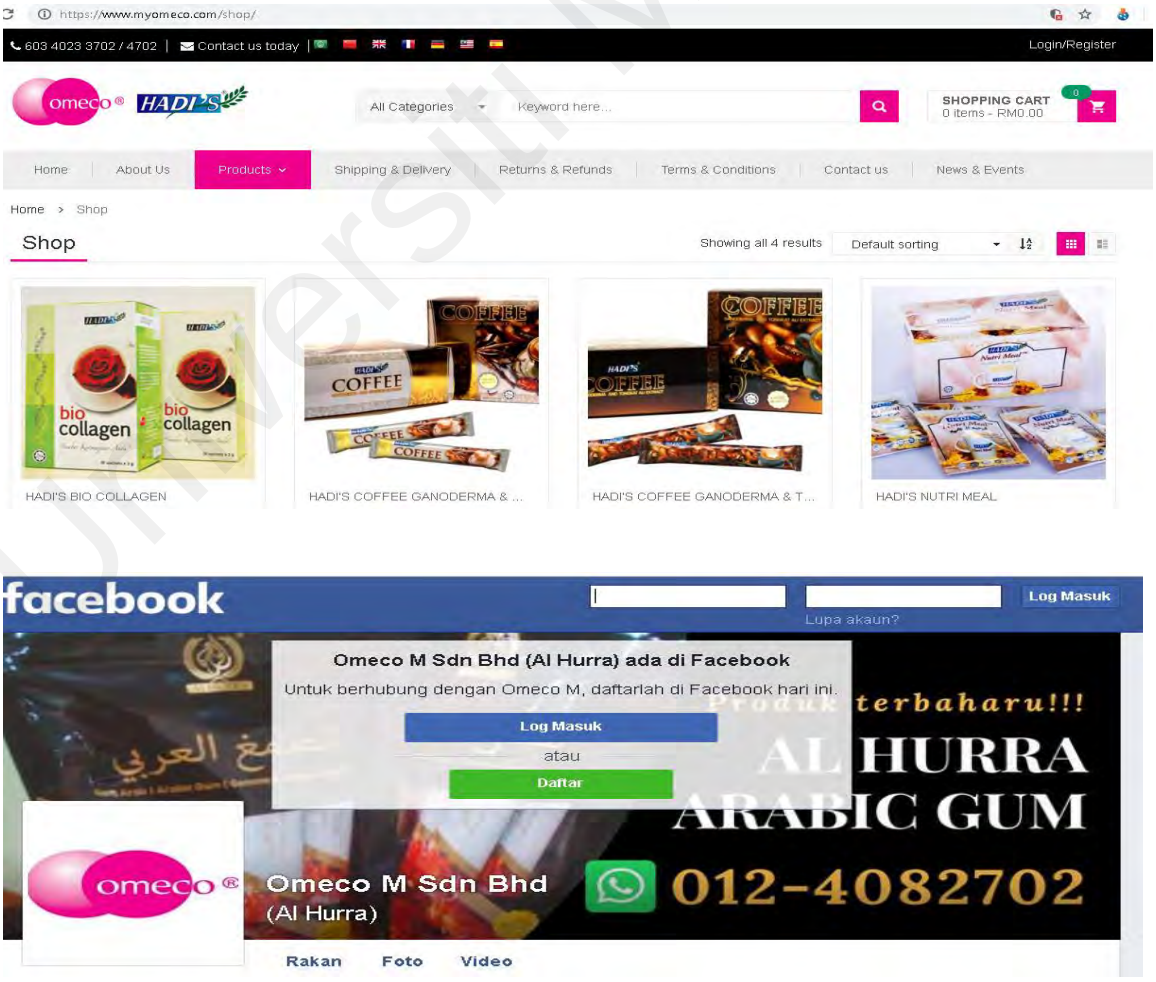

Figure 5.3: Incubatee 2 - New Product Promotion via Facebook and Webpage

Incubatee 2 owner justified the drawbacks of traditional mass media platforms as:

> *The traditional mass media is quite costly than the newer forms of advertising platform. In details, we may need to purchase numerous spots that requiring us a commitment of thousands of dollar before the results are gauged. At the same time, the product information reachability rate to the targeted customer group is limited in traditional advertising platform unlike other online marketing platforms such as Facebook, Twitter, Amazon, Lazada and so forth. Furthermore, we do have almost unlimited opportunities to interact with our potential customer if they click on our advertisement link. (Personal Communication, 19 March 2018)*

As the interview findings indicate, modern technology allows marketers to more precisely target potential customers based on the number of personal information websites collect about visitors. In the same vein, small businesses like Incubatee 2 can determine in advance not only what type of person visits a particular website, but how often, what they view and other relevant information. Thus, Incubatee 2 owner could align and customise its business marketing strategy specifically to meet their respective customer needs. On top of that, several vital capabilities in terms of finance and ICT are needed to strengthen the marketing capability since MARDI is not rendering as such assistances. In particular, Incubatee 2 is required RM15000 monthly to facilitate the marketing activities both at the domestic market and foreign market. Also, a more substantial proportion from RM15000 goes for product design since design play a crucial role in the marketing activity whereby it can significantly affect consumer-purchasing behaviour toward the product. At the same time, ICT capability is also another critical requirement for business owners like Incubatee 2 in equipping themselves with current market updates mainly in terms latest marketing strategy information. Of course, in order to subscribe to a specific

marketing platform namely Shoppe and Amazon, Incubatee 2 is still subjected to certain fee payment whenever Incubatee 2 promote their products. Above all, the RM 15000 monthly marketing budget plays a significant role in Incubatee 2 to subscribe to the online platforms and undertake another maintenance task for ICT appliance.

In the following extract, food-based incubator station manager explains the unavailability of financial and ICT oriented support services to incubatee.

> *We realise that both financial and ICT capabilities are equally important to leverage marketing activity. However, we are unable to offer as such required services due to certain limitation. In details, MARDI does not allocate any fund to assist incubatee personally rather than for the entire incubation program. Nevertheless, we do facilitate our incubator programme participant to obtain financial aid from several government institutions that are providing microscale assistance for the young entrepreneur. Apart from financial support service, we do not have ICT taskforce in the incubator station unlike in MARDI headquarter. Moreover, every incubatee has their own customised online marketing strategy specifically for their products. Hence, it is not possible for us to provide customised ICT support service to the incubator programme participants as a whole. (Personal Communication, 15 March 2018)*

The excerpt above is an indication that MARDI incubator does not render certain support services such as financial aid and ICT as per expected by incubatees as a whole. It is noteworthy for incubatee to strengthen their financial position before engaging in the incubator programme as their ultimate goal should be on their respective business

performance especially during post-incubation period rather than during the incubation period.

Apart from financial and ICT capabilities, a competitor's marketing strategy is another crucial issue considered by Incubatee 2 before strategising their marketing approach. In this case, Incubatee 2 marked the product price slightly lower than its counterpart. Nevertheless, Incubatee 2 is capable of providing the improvise quality-based healthcare products with reasonable price to their respective customers. Furthermore, Incubatee 2 is believed in establishing trust between producer and customer to sustain long-term business relationship rather than solely concerning business profit. As a result, competition merely in terms of pricing is meaningless if it does not signify on the product quality enhancement.

In terms of the product distribution channel, Incubatee 2 is adapting a two-way distribution link from producer to customer. Since most of the healthcare products are marketable via numerous online platforms, thus only both producer and customer linkage has been established. Moreover, the direct-selling approach is the preferable approach for Incubatee 2 due to its product nature. In other words, Incubatee 2 as a producer of healthcare product should liaise with the customer directly in getting their feedback and complaint toward the products. Indeed, customers feedback is vital for healthcare product producer like Incubatee 2 to monitor the product features in terms of safety continuously, standard and so forth. Importantly, the customer prefers to purchase healthcare products whenever it involves two-way interaction between producer and customer unlike involving wholesaler or agents. This because the customer would expect the producer to be prepared in responding to any query and complaint promptly about the respective product.

Besides that, the market survey remains a crucial factor, especially at the pre-incubation and incubation stages. This because Incubatee 2 need to survey the potential for its upcoming product at the market level. Likewise, Incubatee 2 had undertaken a market survey for its healthcare products before launched it in the market. Indeed, the market survey could provide some valuable insights to the producer in adding several additional features for the product betterment compared to other competitor product in the market. At the same time, market survey assists Incubatee 2 in identifying information variation in different market segments. For instance, some of the foreign markets imposed several mandatory rules in terms of product labelling, packaging and so forth. Therefore, certain certification requirement such as *Good Manufacturing Practices* (GMP) and *Hazard Analysis and Critical Control Points* (HACCP) is mandatory and must be complied by Incubatee 2 whenever export its products to foreign markets. By doing so, Incubatee 2 manage to produced healthcare product at par with other international healthcare product brands and manage to penetrate 80% foreign markets as its product market share.

(b) Product Development Capability

In terms of product branding, Incubatee 2 had successfully established its healthcare product name known as "*Omeco*." This brand name partially represents Incubatee 2 owner's name. In the first place, new product branding is essential to attract customer attention and build a substantial recognition toward the products. By having a well-known product brand, it may enhance the organisation credibility among customer despite boost the product's sales. Moreover, the product brand successfully yields good reputation for Incubatee 2 due to several critical improvements on the product namely product quality, product price, and product taste.

At the same time, Incubatee 2 pay equal attention to their product upgrading matters. This due to any failure in terms of product quality enhancement, new product invention, and product formulation improvement would regress the firm growth and development. Also, Incubatee 2 has decided to lead the healthcare product market share by adding value to the existing products as well as upgrading its key ingredient. As a result, Incubatee 2 has managed to boost its healthcare products demand tremendously despite stand out amid a sea of stiff competition in the market.

The Incubatee 2 owner reported the factor that drives him toward product upgrade matter continuously:

> *I am personally reflected with the fate of Nokia mobile company whereby this firm loses its market share to other mobile producers due to lack of product upgrading features on its product. Hence, the lesson I learned from Nokia business story is that we should not ever live comfort with our present achievement rather than think ahead as – what is our next plan to sustain the business growth in long-term? (Personal Communication, 19 March 2018)*

Not only Incubatee 2 owner has emphasised on the importance of product upgrading matters, but also incubator station manager had stressed on a similar matter.

> *As an incubator station manager, my greater emphasis to the incubatee is mainly on product upgrade related matters during the incubation period. I have advised most the incubatees personally to utilise the R& D services in our premise for product upgrading or product diversification purposes because it is costly for*

incubatees to own sophisticated R&D lab as in MARDI incubator station especially during the post-incubation period. (Personal Communication, 15 March 2018)

As both interviews findings indicate, continuos momentum of product upgrading in terms of product quality, product ingredients and product packaging are equally important to the firm in sustaining its reputation, revenue, and customer. For this reason, Incubatee 2 had successfully sustained in the market since 2002 despite its continuous product improvement initiatives.

On top of that, Incubatee 2 owner obtained some useful insights and knowledge for product development. This has been done via a network connection with the foreign business council in order to identify the food demand, especially for the healthiest lifestyle. Incubatee 2 owner had discovered that the demand for healthcare food products is quite impressive in the Middle East, North Africa, and China markets. Eventually, this leads Incubatee 2 to excessively diversify their products from rice-based biscuits to tropical fruits seeds. Of course, Incubatee 2 belief that product diversification is an essential strategy to provide a set of product choices for consumers to purchase it. For that reason, Incubatee 2 has vibrantly planned to materialise its product diversification strategy in the African continent mainly on tropical based juice product. Importantly, Incubatee 2 engaged in foreign business council by carrying out some basic research mainly to understand the demand for the tropical based product in African continent market. Then, Incubatee 2 owner found there is extremely lack of companies in African countries that engaging in tropical fruit-based products production. Moreover, Incubatee 2 managed to get a local African contact whereby both of them were agreed to establish

a partnership in North African countries. As a result, Incubatee 2 managed to seize the opportunity brilliantly from the foreign business council meeting.

In the following extract, Incubatee 2 owner explains the importance of networking to accelerate business performance in the long-term.

> *We would highly appreciate if MARDI could extend its existing support service mainly the networking support service. Indeed, networking support service is essential in establishing and strengthening the business relationship with government agencies, institutions, and other relevant organisation. Presently, we have managed to establish our own business network namely business council, research institution and other producers in a similar industry after the incubation period. Importantly, we are managed to equip ourselves to meet the current business climate by developing a successful product development plan. (Personal Communication, 19 March 2018)*

Whereas MARDI incubator station manager justified the absence of networking support service to incubatee as:

> *In reality, it is tough for us to customise an appropriate business networking model for our respective incubatees. This due to the differences in terms of incubatee's business operation. In details, each of the incubatees is expecting us to provide a customised business networking support service which is beyond our capacity. Hence, we decided not to extend as such support service to incubatee rather than encourage them to establish their own business-networking model based on their business nature. (Personal Communication, 15 March 2018)*

These two interviews show that, although MARDI incubator does not provide networking support service, Incubatee 2 has successfully established its business network and gained several benefits in terms new market penetration, enhance product brand image globally, increase in products sales and as well as an increase in company revenue. Nevertheless, MARDI incubator cannot expect the same outcome similar to Incubatee 2, especially among newly established business owner, especially without any prior business experiences. Thus, MARDI incubator needs to provide a basic networking platform mainly for inexperience incubatees so that they stay connected with the latest updates that occurred in the market.

Nonetheless, Incubatee 2 is less impressive toward product patenting due to its complex application process and costly subscription fees. For instance, Incubatee 2 claimed that they have to wait almost six to twelve months to solve the patent application process. Furthermore, Incubatee 2 believes in tremendous changes in the market and technology advancement could overtake its invention by the time a patent is granted. Therefore, Incubatee 2 prefer to utilise the precious time productively to expand the production output and increase its organisation revenue rather than focusing unnecessarily on patenting issue.

(c) Production Technology Capability

Next, in terms of production technology acquisition and management, Incubatee 2 had initiated its production scale at a small level during the incubation period. During the incubation period, most of the machinery technology is semi-automated and user-friendly oriented. In other words, the learning process to operate the respective machinery in the incubator premise is not that difficult. However, the production output that generated

from the machinery is relatively in a small volume and therefore, the incubator had decided not to expand the existing machinery capacity since as such production facilities capacity is sufficient to any new agro-based start-ups. Although this may be true, Incubatee 2 had decided to expand its production machinery capacity after the incubation period. Importantly, Incubatee 2 managed to establish its healthcare products in both domestic and foreign markets. Under those circumstances, Incubatee 2 has to expand the existing small-scale production capacity to medium-scale production capacity despite ensuring its business performance during the post-incubation period.

In the following extract, Incubatee 2 owner explain the production technology acquisition experience during the incubation period.

> *I appreciate the guidance mainly production machinery operation oriented hands-on training provided by MARDI incubator manager during the incubation period which is helpful especially when we have expanded our production machinery scale from small to medium one. Even though our new production machinery are sophisticated than in the MARDI incubator station, but the overall standard operating procedure (SOP) for production machinery is similar to each other. (Personal Communication, 19 March 2018)*

As the interview findings indicate the importance of learning for incubatee mainly in the technical area which would facilitate them in acquiring key knowledge and skills related to production technology matter. Moreover, incubatee needs to strengthen the fundamental technical oriented hands-on training during incubation period rather than blindly investing in advanced technical production technology machinery during the post-incubation period.

Most of the production equipment has been purchased by Incubatee 2 itself without relying on external source funding assistance. The investment carried out by Incubatee 2 has motivated the owner to strive harder to develop and expand its existing healthcare products business globally. Moreover, most of the production equipment was imported from China and customised according to Incubatee 2 business operation. Of course, the production equipment price is reasonable compared to western technology. Noteworthy, the monthly maintenance cost for the production equipment is approximately RM 5,000. In fact, the local technician can perform the equipment maintenance without relying on the producer technical team from China. Since most of the production equipment in the Malaysian market is from China, and therefore, most of the local technicians are well versed in terms of Chinese based technology equipment. Furthermore, the spare parts for the Chinese based production machinery are widely available in the domestic market. Hence, Incubatee 2 could minimise the production breakdown time significantly due to the readily available technical team and spare-parts domestically.

Notwithstanding, Incubatee 2 insist on has its back-up plan during the emergency period by out-sourcing the production task to another firm from similar industry as such measure is usually taken whenever there is a serious machinery breakdown problem. Outsourcing is an alternative method for Incubatee 2 in ensuring its production continuity to meet the market demand timely.

5.3.2.4 Challenges

Several key issues were identified as an obstacle for Incubatee 2 in accelerating their business performance and development. Of course, the mismatch in terms of services rendered to Incubatee 2 remains a significant problem. Even though incubator provides

various services such as office space, ICT facility, R&D facility, and storage space but there are lacking several other key services mainly on advisory services, networking opportunity, and external seminar or workshop. For instance, advisory services in terms of marketing, product development, and production technology development remain a crucial issue for Incubatee 2 to further accelerate its business performance, especially during the post-incubation period. Likewise, other services namely networking and seminar or workshop supposedly should provide to Incubatee 2 during incubation period since these crucial services not only would lead to business sustainability but also spur the commercialisation during post-incubation.

On the other hand, competent domestic workforce availability is another critical challenge faced by Incubatee 2. This because most of the local workers involved in Incubatee 2 business operation are not passionate and dedicated toward their job despite poor attendance to working place. Therefore, Incubatee 2 had decided to hire a foreign workforce in mitigating local workforce problems. In fact, foreign workers are much more responsive for the given task provided owner takes their welfare and working condition into consideration. Of course, foreign workers must be dedicated toward their respective job since they had signed an agreement with their respective superior that might bond them for three years to 5 years. As a result, Incubatee 2 could divert its focus from labour shortage issue to another issue that would significantly accelerate the business performance.

5.3.3 Incubatee 3 in Cosmetic Business

Incubatee 3 owner had initiated the cosmetic oriented business since 2000 before engaged with MARDI incubator programme in 2008 at Kuala Linggi incubator station.

In fact, the owner was a teacher in a primary school before establishing the cosmetic business. Incubatee 3 had discovered the potential of cosmetic oriented business while in the teaching profession by attending the various seminar and short courses about the cosmetic field. The owner planned to set-up this business in the year 2000 as a retirement option due to her interest and passion toward cosmetic oriented business.

Incubatee 3 owner had initiated the business as a full-time profession at small scale after her retirement period. Moreover, the cosmetic based business is self-funded without seeking any external financial assistance. The main motive that sparks Incubatee 3 interest to venture into this particular business is due to human being nature which devoting themselves to beauty-care products that available in the market. Given that, most of the production inputs mainly herbs oriented inputs are domestically available, and therefore, Incubatee 3 owner had fully committed in the cosmetic based business operation after her retirement. Even though Incubatee 3 has successfully graduated from MARDI incubator programme in 2010, but it is noteworthy to examine its success journey based on the provided services by MARDI incubator that lead to several capabilities building in terms marketing, product development, and production technology development.

5.3.3.1 Incubator Support Services

Incubatee 3 had access to basic support services such as entire production plant, meeting room, telecommunication amenity, R&D lab, and hands-on-training. Noteworthy, the production facility services offered by incubator (Figure 5.4) such as machinery (*essential oil extraction machine, essential oil processing machine and essential oil storage buffer tank*), quality control lab facilities (*soup mould, weighing equipment, mixer, viscometer and heating and cooling equipment*) and storage space are comprehensively serving

Incubatee 3 purpose in producing herbs based essential oil product. Also, the production machinery capacity is sufficient for Incubatee 3 to produce essential oil at small scale despite utilising both storage facility and quality control lab to undertake R&D activity. Moreover, incubator does provide some of the herbs input to Incubatee 3 which is mainly required in essential oil production. Importantly, all these services were provided by incubator at the below-market rate which is approximately RM 300 per month. Nevertheless, all these essential support services are sufficient for Incubatee 3 to operate the routine production operation, especially during the incubation period. In contrast, there are still lack several other crucial services namely advisory services, seminars or workshops, and networking platforms to ensure Incubatee 3 business performance during the post-incubation period.

Figure 5.4: Incubatee 3 - Production Facilities (Cosmetic Based Incubator Station)

5.3.3.2 Organisational Learning

The organisational learning existence in Incubatee 3 firm can be seen at several dimensions namely internal and external knowledge creation, knowledge dissemination, knowledge codification, and knowledge absorption. Internal knowledge creation occurred via a knowledge combination of both employer and employee. The employer has the knowledge creation capability via observation and active participation in obtaining the latest cosmetic based products updates and consumer feedback in the market. By doing this, Incubatee 3 owner able to synthesise all these first-hand information that gained directly from the market participation before re-invent or create any new cosmetic products as such a strategy can minimise demand uncertainty for any new herbs based cosmetic products in the market. At the same time, internal knowledge flow occurs in Incubatee 3 firm through its employee's previous working experiences in the cosmetic based industry. There were several employees in Incubatee 3 firm which has substantial working experiences from other cosmetic based multinational companies (MNC). Thus, Incubatee 3 manage to capitalise as such talented employee in inventing some advance cosmetic based products in the market which is equivalent with other cosmetic product producers such as AVON, LOREAL PARIS, NIVEA and so forth. Of course, it is undeniable that the wealth of experience workforce in Incubatee 3 business operation has led to its business performance successfully since 2008.

Apart from internal learning medium, Incubatee 3 had substantially established collaboration with several external parties such as research institution (i.e., MARDI), other cosmetic producers, raw material supplier, and agro-based university (UPM) to drive external knowledge flow in their organisation. Noteworthy, as such external collaboration could enhance the cosmetic products such as essential oil, soap and facial

whitening cream in terms formulation, quality and promised result upon its usage. For instance, the external collaboration mainly with a research institution and agro-based university (UPM) had contributed to new knowledge creation which is scientifically proven. Furthermore, as such external collaboration may provide a substantial platform for Incubatee 3 to play a pioneering role in producing its newly invented cosmetic products. Likewise, the insights gained from other cosmetic producers and raw material suppliers are leverageable by Incubatee 3 mainly as a part of its learning process in producing the latest trend of cosmetic based products at a competitive price.

In the following extract, Incubatee 3 explains the external learning process via substantial collaboration to soar-up business performance.

> *Organisational learning is the main priority in our business operation whereby it has substantiated with external collaboration. In fact, we have already established a substantial external collaboration before joining MARDI incubator programme in 2008. Because of external collaboration, we are aware of the latest cosmetic products trend and its demand trend in the market. By doing so, we could align our production plan in producing the latest trend of cosmetic products to serve current demand in the market. (Personal Communication, 6 December 2017)*

This shows that both internal knowledge and external knowledge flows have spurred open innovation in the case of Incubatee 3. Indeed, open innovation has benefited Incubatee 3 in terms of new product development that expand its cosmetic products market share and as well as boost the firm revenue. Thus, it is undeniable that open innovation offers ample opportunity to minimise research cost despite bringing innovation to market promptly especially in a more integrated world.

Besides that, it is important to realise that knowledge creation is incomplete without knowledge dissemination. In the case of Incubatee 3, knowledge dissemination occurred via hands-on training and meeting session. The respective production supervisor in-charged fully in training a new employee and disseminate the necessary knowledge regarding the cosmetic production operation. Both formal and informal approach is undertaken in knowledge dissemination to their respective personnel in production department based on their absorptive capacity. In other words, formal knowledge dissemination such as providing the production operation manual and other relevant material is applicable for the high-skilled employee group. Whereas, informal knowledge dissemination is targeted for an employee with low absorptive capacity due to their poor academic background and lack of relevant fieldwork experiences. Indeed informal knowledge dissemination occurred via *mentor and mentee* approach whereby hands-on training is provided to unskilled employees during the production operation period. Above all, the entire knowledge dissemination process mainly occurs in a common language which is known as the Malay language. This due to the majority of employees involved in the production operation is from Malay ethnicity background. Thus, applying the Malay language could minimise the transaction cost for Incubatee 3 owner in training the unskilled workers to be well versed in the English language due to their academic background.

Incubatee 3 owner shared knowledge dissemination experiences during the incubation phase and post-incubation phase.

> *During the incubation period, we are well- exposed intensely on product formulation and production machinery operation tasks. The knowledge dissemination process occurred mainly via hands-on training whereby the*

training was conducted in the Malay language. Likewise, we have taken a similar approach to ensure knowledge dissemination process in our firm during the post-incubation period. Of course, we have customised the knowledge dissemination process according to our firm operation norm. (Personal Communication, 6 December 2017)

The excerpt above is an indication that knowledge dissemination plays a crucial role in organisational learning aspect. This because both knowledge creation or knowledge codification and knowledge absorption are meaningless if it does not disseminate equally in for the organisation benefit as a whole. In this case, both incubator and Incubatee 3 have undertaken the knowledge dissemination task more effectively to ensure its business performance development.

5.3.3.3 Capabilities Development

(a) Marketing Capability

Marketing capability is an essential issue in ensuring the cosmetic products produced by Incubatee 3 is widely reachable to the consumer regardless of any boundary. Likewise, the selection of an appropriate advertisement strategy is equally important to boost the demand especially for herbs based cosmetic products. Since Incubatee 3 products focus group is mainly women, and therefore, most of the cosmetic product updates were advertised in feminine related magazines besides common social media platforms as shown in Figure 5.5. In terms of advertisement cost, Incubatee 3 spendings about RM 5,000 monthly to promote their products via numerous platforms such as social media, mass media and feminine oriented magazines. Noteworthy that Incubatee 3 spent

relatively low on marketing activities compared to food product incubatees since its focus solely relies on the domestic market.

Figure 5.5: Incubatee 3 - New Product Promotion via Facebook and Webpage

Interestingly, Incubatee 3 owner indicated the evolution in terms of marketing strategies during incubation and post-incubation period:

> *During incubation period in 2008, I used to spend approximately RM5000 per week on advertising my products in several conventional mass media medium namely radio, magazine and newspapers to ensure the products reachability and*

accessibility among customers in Peninsular Malaysia. Different from the latest social media technology like Facebook and WhatsApp whereby I can advertise my products at very minimum cost or even for free. In fact, the products information is reachable and assessable by customers not only in Malaysia but the entire world. Hence, our annual budget allocation nowadays is much more concentrated on R&D mainly in term of quality enhancement rather than for marketing. (Personal Communication, 6 December 2017)

Apart from that, considering competitor marketing strategy is another crucial matter for Incubatee 3 especially in setting price for their respective herbs-based essential oil products. Since most of the competition is occurring in terms of pricing reduction, similarly, Incubatee 3 has to set-up its products price slightly lower than its key competitor's price as such a strategy is vital for Incubatee 3 to gradually capture the domestic market share from the existing cosmetic product producers. Alternatively, Incubatee 3 had decided vibrantly to face stiff competition in the market by enhancing its product quality. By doing so, customer trust could be established toward Incubatee 3 herbs based cosmetic products regardless of price promotion approach.

In terms of product distribution channel, Incubatee 3 is preferred direct marketing distribution approach rather than market their herbs-based cosmetic products via third party approach. Indeed, Incubatee 3 is keen toward as such an approach in order to minimise the distribution cost. To put it differently, Incubatee 3 believed that consumer able to enjoy the most reasonable price in contrast with other cosmetic product brands if direct distribution marketing medium is implemented as a part in their marketing strategy. Direct selling approach is pretty much manageable by Incubatee 3 since their business scale is not as large than their other key competitors such as NIVEA, AVON, SILKY

GIRL and so forth. Importantly, Incubatee 3 is reachable by its customers whenever there are any issues about cosmetic products. The issues could be in terms of the complaint, suggestion, and query toward the cosmetic product as a whole. Incubatee 3 realise the importance of solving their customer's problem and address customers feedback promptly in order to establish a long-lasting business relationship.

On the other hand, Incubatee 3 had undertaken a market survey for its herbs based cosmetic products before officially launch the respective products in the market. In detail, Incubatee 3 had received positive and constructive feedback from the consumer in the market since it involves herbs-based cosmetic products. Apart from that, Incubatee 3 had personally engaged in the market by randomly asking the existing customer's feedback toward their herbs based essential oil products. By doing so, Incubatee 3 could able to access first-hand information directly from the users that help improvise the existing product or re-invent some other products.

Above all, Incubatee 3 products market share is 100% concentrate on the domestic market. Since Incubatee 3 products are newly launched in the market, and therefore, the accessibility of Incubatee 3 products at the international market is quite limited despite facing certification restriction such as GMP, HALAL and ISO 22000. Moreover, Incubatee 3 is not ready to adopt as such certification requirement due to its limited production scale that is solely focusing on the domestic market. In the same vein, the export cost is exceptionally high whereby it comprises export duty, export license, transportation cost, and other administration costs. Hence, it is not feasible for a newly established start-up business to venture foreign export market immediately without having any substantial experiences and knowledge on that particular market.

The incubator station manager is highlighting Incubatee 3 successful performance during the incubation period as:

> *I am really impressed with Incubatee 3 performance throughout the incubation program period. The Incubatee 3 owner is a visionary person to drive the business successfully after the incubation period. However, Incubatee 3 had decided not to expand its products market in abroad due to certain restriction mainly in terms of certification requirement. It means, Incubatee 3 must comply with certain certification rules and regulation if prefer to export its product in the overseas market. Nevertheless, we do not provide as such support service to incubatees at the moment, and therefore it may demotivate incubatees to apply independently for several essential certificates such as HALAL, GMP, ISO and so forth. (Personal Communication, 6 December 2017)*

As the above interview findings indicate, Incubatee 3 is felt comfortable with its existing position in the domestic market. However, relying on a single market does not prolong its business operation in the long-term due to stiff competition factor despite market uncertainty issues such as commodity price fluctuation and currency fluctuation.

(b) Product Development Capability

Incubatee 3 has introduced its product brand as "*PESONA*" (Figure 5.6) before joining MARDI incubator programme in 2008. In other words, Incubatee 3 had established its cosmetic product business and the brand name since 2000. Interestingly, Incubatee 3 had some experience as a promoter and distributor for several other top cosmetic products in the market namely AVON and COSWAY before initiated their own business in 2000. Of

course, the experiences gained as being promoter and distributor is helpful for Incubatee 3 in moulding the necessary capability and skills which motivated them to establish their own cosmetic based start-up business. Essentially, self-confidence and risk-taking habit are the key factors for Incubatee 3 owner to establish their own cosmetic product business despite well prepared to face any challenges once launched herbs-based cosmetic products in the market.

Figure 5.6: Incubatee 3 - Product Branding

Apart from that, product upgrades and product diversification are playing a crucial role in leading Incubatee 3 business growth. Indeed, Incubatee 3 realise the importance to undertake product upgrades and product diversification in their respective business as a long term business goal despite ensuring the business sustainability. In term of product upgrading, Incubatee 3 upgrades their cosmetic products based on the existing market trend and based on their raw material supplier recommendation. This due to the tendency of the cosmetic product cycle which is at a fast pace. Correspondingly, Incubatee 3 had diversified its existing cosmetic products production to healthcare food-based products such as slimming tea, anti-ageing capsule, and digestion fruit juice. As such product diversification decision is taken by Incubatee 3 after noticing a significant decline in their

market share for essential oil-based products. For this reason, Incubatee 3 needs to stay updated with the latest demand trend in the competitive market to meet their consumer demand toward new products.

In the following extract, Incubatee 3 owner explain why product diversification is vital in their business operation.

> *I feel the product diversification strategy is a good market penetration strategy apart allow us to enjoy economies of scale. In other words, we are gaining advantage from product diversification strategy since the same fixed cost has been utilised for more output. Thus, our operation cost declined gradually whereas the profit margins soured-up steadily. (Personal Communication, 6 December 2017)*

This signifies that Incubatee 3 is managed to produce outputs at the lower unit of its production costs despite makes the business more profitable. Furthermore, the lower unit production cost allows Incubatee 3 to offer a lower price to its customer for almost every cosmetic products. Hence, the lower production costs enable Incubatee 3 to sell its cosmetic products more competitively in larger markets.

(c) Production Technology Capability

Incubatee 3 is preferred to purchase the production machinery than lease since they have a regular demand for their respective herbs based essential oil products. Incubatee 3 is not keen on expanding its production machinery scale from a small level to medium

level due to the high capital cost constraint. Furthermore, the sales for Incubatee 3 cosmetic products is an uncertain and seasonal base, despite facing stiff competition from other cosmetic product producers. At the same time, Incubatee 3 does have more than two production machinery whereby the first machinery is assigned for skincare products such as soap and shampoo while the second production machinery is designated to produce facial whitening cream. Since Incubatee 3 had invested for two production machinery, and therefore, Incubatee 3 owner is hesitated to upgrade the existing production machinery scale from small scale to medium-scale in the short term.

In the following citation, Incubatee 3 owner has revealed its alternative plan to boosting the production output without expanding the existing small-scaled production machinery.

> *In reality, we are keen toward original equipment manufacturer (OEM) business approach in MARDI headquarter unlike operating the production in Malacca incubator station due to distance problem. To put it differently, we would like to get benefit from the specialised technology that MARDI incubator provides. Nevertheless, MARDI does not provide OEM oriented support service for graduated incubatee. Under those circumstances, we are unable to proceed with the production of a certain customised type of cosmetic products demand. (Personal Communication, 6 December 2017)*

In contrast with Incubatee 3 claims, the incubator station manager has responded firmly about OEM support service.

> *Currently, there is OEM based production practice in MARDI headquarters only for food-based products. In fact, MARDI does allow OEM based production*

practice given that incubatee should apply for it directly to MARDI headquarter. Once the request is approved by MARDI business unit, then the incubatee need to sign new contract undertaking later. The duration of OEM based production practice may vary according to incubatee needs. However, most of the incubatee is not keen toward as such formality rather than prefer one-off OEM based production practice. Of course, MARDI does not compromise with as such request from our former incubatees. (Personal Communication, 7 December 2017)

Based on both interviews result, the OEM oriented business practice is limited to food-based products production at MARDI headquarters in Selangor state. Unlike, the cosmetic based products production plant is located in Malacca only. Incubatee owner interviewed from the cosmetic industry claimed the distance barrier is escalating their operation cost since their product market largely concentrated in Selangor state. Apart from the production cost factor, Incubatee 3 is passion toward MARDI's R&D amenities to ensure the quality of its cosmetic products at a premium level like other competitors. Therefore, MARDI needs to consider Incubatee 3 claims about setting up an OEM facility at headquarters mainly to support the domestic cosmetic industry.

Besides that, Incubatee 3 had conducted cross reviews for the production machine performance and its maintenance cost with other cosmetic product producers before proceed to purchase it. In fact, the existing machinery maintenance cost is below than RM1000 due to its small production capacity. Upon the machinery purchase, Incubatee 3 had requested the respective machinery suppliers to provide an appropriate and systematic, hands-on training for Incubatee 3 technical team members to undertake the machinery troubleshooting tasks in the future. Noteworthy, before Incubatee 3 established their technical team previously, it relied solely on supplier's technical team and

surprisingly the problem troubleshooting tasks took almost 2 to 3 days. Under those circumstances, it would cause unnecessary delay in terms of output delivery to their respective customers besides affecting the sales revenue.

5.3.3.4 Challenges

Like in other incubator stations, the limited storage space is remaining as a vital issue for Incubatee 3 too. This due to single storage space is allocated for Incubatee 3 to store their raw materials and finished goods. In fact, Incubatee 3 has to bring the raw material for the production of its cosmetic items twice in a week which eventually lead to overhead cost increases. Since most of the cosmetic products, the raw material is highly sensible toward temperature, and therefore, an appropriate storage system is required in the incubator station.

Apart from limited storage space, lack of several crucial advisory services remains a major issue for Incubatee 3. Essentially, several key advisory services such as finance, marketing, legal and human resource management should have rendered to Incubatee 3 which would facilitate capability building for their business performance during the post-incubation period. Again, proper financial guidance should have exposed to incubatees regardless of their business experience since as such guidance would facilitate Incubatee 3 to undertake a business plan systematically. Furthermore, there is a lack of information for Incubatee 3 to seek further financial assistance for their business development during the post-incubation period. Hence, this limiting Incubatee 3 business growth in the long term mainly in terms of expanding its production scale.

On the other hand, lacking marketing advisory service during the incubation period is another challenge faced by Incubatee 3 to launch its product brand at nation-wide. Even though the existing rendered services mainly in terms product development and R&D are sufficient to nurture Incubatee 3 capability in developing an indigenous product, but all these efforts would be meaningless if Incubatee 3 is unexposed to the relevant marketing knowledge and skills to promote their products in the market. On top of that, advisory service in terms legal aspect is crucial for Incubatee 3 especially in applying for certain certification and license.

Unfortunately, there is still lacking information about types of legal services and its relevant agencies whereby Incubatee 3 need to liaise for the permit and license application purpose. Since Incubatee 3 had involved in producing cosmetic products, it must mandatorily obtain a safety certificate from the Malaysian Health Ministry to verify that Incubatee 3 products are safe and consumable. This entire process would take about six months due to health officers physical inspection at Incubatee 3 production premise. As a result, Incubatee 3 has to pause their business operation while waiting for the necessary license and certificate approval which eventually increase the business overhead cost. At the same time, the human resource management advisory service is correlated with a legal-based advisory service. In details, there is insufficient information provided to Incubatee 3 mainly the terms and condition of hiring a foreign worker in the production activity. Indeed Incubatee 3 is preferred in hiring former skilful workers from top cosmetic companies to utilise their experiences, skills, and knowledge which would significantly drive its business development and sustainability in the long term. Nevertheless, due to imperfect information on foreign worker recruitment, the chances to hire skilful foreign worker is less favouring Incubatee 3.

Besides that, the incubator station location is another concern for Incubatee 3 in terms of both raw material and finish goods mobility. In other words, most of the raw material suppliers and customers are located in Kuala Lumpur unlike Incubatee 3 stationed in Malacca incubator station whereby the distance variation is about 100 kilometre. However, there is no any incubator station assigned for cosmetic based-items production neither in Kuala Lumpur or at MARDI headquarter. Noteworthy, Incubatee 3 does encounter the raw material supply disruption during the festive season because heavy vehicle such as a truck is restricted to enter the highway with the load. Hence, Incubatee 3 is unable to proceed with their customer order on time which eventually decline its sales and revenue.

5.3.4 Incubatee 4 in Cosmetic Business

Incubatee 4 had joined the MARDI incubator programme in 2014 without any prior business experience and relevant academic background regarding the cosmetic industry. In fact, Incubatee 4 has obtained his bachelor degree in finance unlike other incubatee owners (1, 2 and 3) who are champion in obtaining the highest academic recognition in their respective business field. Noteworthy, Incubatee 4 joined the incubator programme after successfully obtained financial assistance in terms of the business grant to establish essential oil-based cosmetic products start-up business. Incubatee 4 is unable to graduate from the incubation program as the incubation program period had reshuffled from 2 years to 1 year. In essence, the Incubatee 4 involvement in MARDI incubator programme could be seen as a step-stone in experiencing the real business nature.

5.4.4.1 Incubator Support Services

The support services provided in terms of space, R&D lab, production machinery, and telecommunication service be partially assisted Incubatee 4 in operating their routine production activity. Furthermore, MARDI's expert does provide its expertise service to Incubatee 4 in exposing to a systematic product processing technique that is specifically related to essential oil production. At the same time, Incubatee 4 manages to obtain the key raw material for its essential oil production from the incubator station at a reasonable price. Even though Incubatee 4 appreciates the given opportunity to participate in MARDI's incubator programme, but there are still lacking in terms of several other crucial services namely networking, advisory services and so forth. In other words, the existing services provided by incubator is just sufficient in facilitating incubatee's production operation rather than exposing them to marketing activity and other relevant activities which lead to its better business performance during the post-incubation period.

5.4.4.2 Organisational Learning

In general, Incubatee 4 engages with internally and externally mainly for knowledge creation and obtain other business ideas. Importantly, the internal knowledge creation is solely from Incubatee 4 own idea rather than engaging both way (employer-employee) learning process in the organisation. This due to the small workforce pool that is engaging in Incubatee 4 production activity. In fact, most of the employee in Incubatee 4 organisation is employed on a short-term contract basis. For that reason, Incubatee 4 is preferred to steer the business operation by its own initiative rather than involving its personnel neither in the informal interaction session or formal meeting session. Although the employer knowledge is a key driver of its business performance and development, employee involvement in knowledge creation activity at the organisational level is

equally important due to their invaluable past experiences from the various organisation. In reality, Incubatee 4 has failed in maximising its employee tacit knowledge for the organisation development during the post-incubation period.

Different from internal knowledge acquisition approach, whereby Incubatee 4 has collaborated externally with MARDI and agricultural-based university (e.g., UPM) for its product development during post-incubation. Indeed, Incubatee 4 obtain invaluable insights via external knowledge flow to drive its business performance by diversifying essential oil-based cosmetic products. Furthermore, Incubatee 4 manages to enhance its existing product quality despite inventing in new types of essential oil-based cosmetic products with the guidance of agricultural university. Although, Incubatee 4 gained external knowledge from agricultural-based university (e.g., UPM) experts mainly for product development, however, Incubatee 4 failed to commercialise its products successfully in the market due to lack of engagement among other business owners and raw material suppliers. It is important to realise that, establishing collaboration solely with research institution like MARDI and agricultural-based university (e.g., UPM) is not a deciding factor to attain a sustainable business performance. This due to establishing a substantial collaboration with other parties especially suppliers, distributor and other cosmetic product producers is vital in ensuring product reachability to its potential customer.

While in terms of knowledge dissemination, Incubatee 4 has transferred the knowledge and other relevant skills via informal interaction to their respective employees, since Incubatee 4 engaged directly in the production activity together with other employees. Thus, the tacit knowledge dissemination occurs between employer and employees as a part of an organisational learning process. Notwithstanding, there is a lack of space for

knowledge codification in the Incubatee 4 production operation because of informal knowledge dissemination approach. In other words, Incubatee 4 owner is disseminating his personal experiences and thoughts to employees in the Malay language so that, they can absorb the instruction and response to it accordingly. Unlike the other three incubatees, Incubatee 4 does not has an employee with a reasonable academic qualification and relevant working experience specifically in the cosmetic industry.

In the following extract, incubator station manager explains the learning process takes place in Incubatee 4 business operation during the incubation period.

> *Based on my observation for six months, Incubatee 4 owner does not concern on organisational learning especially in terms of knowledge dissemination to its respective employees. In reality, most of the delays occurred in Incubatee 4 production activity due to incomplete knowledge transfer between employer and subordinates. In other words, Incubatee 4 employees are unable to perform the assigned production operation task due to vague instruction from their respective employer. I am personally felt that, as such knowledge dissemination approach is inappropriate in Incubatee 4 business operation since most of the employees are inexperience in the cosmetic industry. In fact, we have trained and disseminated the necessary knowledge in terms of technical and product formulation to both Incubatee 4 owner and its employees. However, they failed to imitate our guidance model for their business performance betterment. (Personal Communication, 7 December 2017)*

This obviously indicates that Incubatee 4 owner has failed to codify his invaluable knowledge and experiences as a formal guideline or SOP for production operation activity. Moreover, Incubatee 4 does not concern the information importance for business operation success. Thus, inadequate knowledge integration would lead to complex problems in business operation mainly in terms of technical aspect and product quality-related matter.

5.3.4.3 Capabilities Development

(a) Marketing Capability

Incubatee 4 has produced essential oil-based cosmetic products in terms of perfume, body lotion and so forth by solely aiming at women client from various age groups. In fact, most of the women tend to have a particular type of cosmetic products in a smaller size such as perfume and body lotion. For that reason, Incubatee 4 had diversified its products packaging size to the smaller size besides retaining the existing regular packaging size. As such product packaging diversification is undertaken based on the market survey result that conducted domestically. Essentially, the demand for essential oil-based cosmetic products mainly in small packaging size has increased significantly among Muslim women due to its idle weight despite certified as HALAL. In fact, the HALAL certification requirement is vital to prove any types of products that are mainly targeting Muslim customer is fulfil the terms and conditions as stated in the Islamic Law.

In the following extract, incubator station manager commented on how Incubatee 4 has failed to graduate from MARDI incubation program due to inappropriate marketing strategy.

One of the reasons for Incubatee 4 business demise is due to failure in undertaking market survey like other graduated incubatees. Importantly, the market survey would lead to a better perspective and understanding of cosmetic product market and the potential customer despite ensuring Incubatee 4 business performance. At the same time, failure in undertaking market survey has deteriorated Incubatee 4 business performance by not identifying the potential threats and as well as opportunities, especially for its essential oil-based products. Even though we have provided an opportunity for Incubatee 4 to market its essential oil-based cosmetic products in the MARDI annual expo, but we admit that nothing much Incubatee 4 can gain from as such limited marketing support service. (Personal Communication, 12 April 2018)

The quote above shows that Incubatee 4 does not adequately strategise its marketing capability especially in terms of an effective advertisement strategy rather than focusing on face-to-face approach. Of course, as such marketing approach is inappropriate for Incubatee 4 especially during digitalisation era to widen its essential oil products market either domestically or internationally due to limited market coverage scope.

On top of that, Incubatee 4 stressed the importance of strengthening financial capability since it has a complementary role in marketing activities. For instance, Incubatee 4 is spending less than RM 1000 monthly as a part of marketing cost. Conversely, Incubatee 4 tend to spend more than RM 1000 for transportation expenses whenever there is an appointment to meet or deliver the products to its customers. By doing so, Incubatee 4 tend to lose its competitiveness to other competitors in the cosmetic industry rather than channelling the marketing fund toward impactful advertisement strategies such as online

platform, social media, and mass media which could cover consumer extensively from various market segments.

Above all, Incubatee 4 is unable to undertake price promotion approach to boost the essential oil-based cosmetic products demand, unlike other producers due to its infant role in the cosmetic industry. At the same time, Incubatee 4 does not undertake any alternative approach to overcome the price-oriented competition, unlike other three successful incubatees that manage to ensure their business performance successfully in the market via product quality enhancement approach. Truly, the three graduated incubatees realised the competition based on product quality enhancement is equally important especially for new players in the respective industries rather than competing solely in terms of price reduction.

Whereas in terms of product distribution channel, Incubatee 4 is preferred direct selling approach rather than market their essential oil-based cosmetic products via retail stores. Indeed, Incubatee 4 is keen toward direct selling approach since it is a cost-effective way for a newly established business to bring its products to market despite its products market share is 100% rely on the domestic market. Therefore, the two-way interaction approach is an appropriate mechanism mainly to establish a strong bond between producer and customer. On top of that, Incubatee 4 also ensure its customer satisfaction by providing door-to-door services including products demonstration and door delivery. Nevertheless, the scope of Incubatee 4 products coverage is limited to a particular district which is close to the production plant. As such, limited market coverage occurs due to Incubatee 4 instability financially that impede its extensive range of marketing capability directly despite cause unnecessary delays in the product delivery system.

(b) Product Development Capability

Product branding is a preliminary requirement in product development activity. Likewise, Incubatee 4 successfully establish a brand identity for its products known as *X*. Noteworthy that, the exact brand name of Incubatee 4 is not subjected to disclosure in this study due to its less impressive performance during the incubation period. In reality, the entire branding process is costly since it involves several crucial tasks such as naming development, graphic design and brand identity integration. Likewise, the product brand patenting is less impressed Incubatee 4 as the patent application involves a lengthy process with unnecessary time consumption for almost one to two years. On top of that, there is an annual charge imposed to the patented product, and there is a high tendency for a patent to lapse if failed to pay the annual charge on time. Therefore, Incubatee 4 does not commit to patent either its product brand or product formulation despite tremendous changes occurred in the market in terms latest technology and new scientific inventions.

On the other hand, Incubatee 4 engaged quite actively in upgrading its existing essential oil-based cosmetic products whenever there is substantial demand from regular customers. In general, the product upgrades take place in Incubatee 4 organisation mainly in terms of resizing product packaging, product formulation improvement, and new flavour product launching. In reality, Incubatee 4 does not have the resources in terms of a strong financial position to develop new products or modify the existing ones, despite its small production scale and inconsistent production operation due to demand uncertainty.

Apart from that, Incubatee 4 has a group of three employees to ensure its production activity smoothness. So, by engaging in the product diversification, Incubatee 4 might lose its workers productivity who must engage in multitasks. As a result, this would lead to an increase in short-term capital cost and other debt expenses such as marketing cost, new worker recruitment and so forth.

In the following extract, Incubatee 4 reported its failure reason to undertake product diversification approach during the post-incubation period.

> *After the incubation period, I have developed a few prototypes of new cosmetic products based on essential oil extract, but I am unable to get access to utilise MARDI R&D facility mainly product testing equipment. As a result, I am unable to produce the new products because it has not proven scientifically safe to applied by the consumer in the market. (Personal Communication, 10 April 2018)*

However, incubator manager has countered the claim made by Incubatee 4 as baseless. The manager had clarified in detail about R&D support service to the incubatees as a whole.

> *We do allow incubatees to utilise our R&D amenities to test their respective new products prototype during the incubation period. Nevertheless, if any of the incubatee prefer to utilise MARDI's R&D facilities, they should request special permission from the head office. Of course, the approval is subjected to the R&D facilities available during the requested period by incubatee since MARDI is*

utilising the R&D facilities most of the time to test its new products prototype. (Personal Communication, 12 April 2018)

As a whole, the interviews suggest that incubatee cannot fully access or obtain some of the support services such as R&D amenities, production facility, and hands-on training during the post-incubation period. Although Incubatee 4 claimed that support services provided by MARDI during 1-year incubation period are insufficient to build their business capabilities, it is important to realise that Incubatee 4 is financially disabled because its entire business operation solely relies on the *Agropreneur Programme* grant assistance. Therefore, Incubatee 4 products are unable to sustain in the market during the post-incubation period.

(c) Production Technology Capability

In terms of production technology acquisition and management, Incubatee 4 had initiated its production scale at a small level during the incubation period. Indeed, the production machinery in the incubator station is deploying semi-automated technology which is suitable for initial learning and small scale production purpose. However, Incubatee 4 had decided to purchase its semi-automated machinery via financial grant assistance to facilitate its production operation during the post-incubation period. Of course, this machinery is fit and serve Incubatee 4 production operation especially at a small scale. Since, the production output that generated from the machinery is relatively small in terms volume and therefore, Incubatee 4 had decided not to expand the existing production machinery capacity from small scale to medium-scale despite demand uncertainty toward essential oil-based cosmetic products as a whole. Moreover, the small-scale production machinery maintenance cost is relatively lower in contrast with the other

three successful incubatees one. Nonetheless, Incubatee 4 does not initiate and trained its subordinates to undertake minor maintenance task on the production machinery. Different from the other three successful incubatees whereby they could minimise the production breakdown time significantly due to its readily available technical team.

Besides that, Incubatee 4 does not has any alternative plan to boost its output during production breakdown period rather than resume the production operation after undertaking the necessary maintenance action. Unlike the other three graduated incubatees that has their back-up plan by outsourcing the production operation task in other similar industry to avoid any unnecessary delay in terms of output delivery. Nevertheless, Incubatee 4 is unable to follow as such a similar approach like other successful incubatees due to its financial limitation and employee's incompetency in the technical field. As a consequence, Incubatee 4 production operation is an inconsistent mainly post-incubation period that significantly effects on its business sustainability as a whole.

In the following extract, Incubatee 4 explains why does not engage in out-sourcing production task to the third party.

> *Honestly, I am really concern about my product copyright as it is unpatented. So, there is a high tendency for any third-party producer to imitate my essential oil-based cosmetic products if I engaged in out-sourcing approach. Moreover, I am financially incapable of expanding my production equipment larger than the existing one despite facing demand uncertainty for essential oil-based cosmetic products. Perhaps, MARDI could extend its OEM practice in cosmetic production*

so that we can rely on as such support service during the post-incubation period. (Personal Communication, 10 April 2018)

As the interview findings indicate, MARDI does not establish OEM practice at that particular period mainly for essential oil-based cosmetic items production unlike in food-based production. It is undeniable that financial capability has a significant role in determining incubatee's production scale and business performance as a whole. Without substantial financial capability especially among new entrepreneur like Incubatee 4, then they can't attain success in the business within a short-term period.

5.3.4.4 Challenges

The mismatch in terms of services rendered to Incubatee 4 remains as crucial challenges. This because, currently almost every MARDI incubator stations are providing a set of standard services namely production space, R&D lab, ICT and internal hands-on training regardless of the nature of the respective incubatee's business. Important to realise that not every business operation either food-based industry or cosmetic based industry are requiring similar support services as another.

Surprisingly, Incubatee 4 reported that:

We are well-exposed in term of product development advisory service provided by respective incubator managers during the incubation period. Nevertheless, we are trapped at the middle stage during incubation period due to lack of insights and skill, particularly in marketing activities. Honestly, we are facing a great challenge to establish our products in the market despite facing stiff competition

with other competitor's products. Therefore, MARDI's management should restructure the incubator programme structure practically based on participant's needs in ensuring their business performance fruitfully during incubation and post-incubation period. (Personal Communication, 10 April 2018)

As the above interview report indicates that, in reality, Incubatee 4 is thirst for marketing, financial and human resource management types of advisory services since these services are essential to ensure business sustainability after the incubation period. For instance, marketing advisory service is essential since Incubatee 4 is unaware an appropriate marketing channel to promote their products in the market. Even though MARDI is organising annual agro-based products exhibition to promote their respective participant products but as such exhibition is limiting the product coverage among the limited number of visitors to the event. In term of financial service, there are information asymmetric circumstances occurred in Incubatee 4 context. In other words, Incubatee 4 does not has perfect information about financial assistance access. Of course, as such constraint may regress Incubatee 4 business performance during the post-incubation period. Apart from that, human resource management is crucial for Incubatee 4 to manage its worker's welfare, despite sustaining their skills and talents to facilitate the routine business operation smoothly.

On top of that, the incubation program duration is another challenge for Incubatee 4 to sustaining its business operation during the post-incubation period. In details, the current incubation period that has been revised from 2 years to 1 year is limiting Incubatee 4 graduation opportunity from the incubator programme. In fact, Incubatee 4 does not spare much time to acquire certain essential insights for product development and technical skills during one year of the incubation period. Noteworthy, sometimes the product

prototype development would take almost one year after went through an intense research process before proceeding it for production. At the same time, Incubatee 4 missed certain crucial opportunities as enjoyed by other three graduated incubatees during two years incubation period which eventually leads to better business performance during the post-incubation period. Therefore, MARDI needs to reconsider the current incubation duration for the benefits of some newly established start-up firms, which are unable to sustain their business operation in the market during post-incubation.

5.3.5 Summary of Case Studies

Table 5.2 shows the relevancy of support services rendered by MARDI incubator to its respective incubatees in both food and cosmetic industries. The MARDI incubator support services comprehensively cover space and production facilities, R&D facilities, in-house training, and advisory services mainly for product formulation. Noteworthy that, the utilisation of the services by both food-based business incubatees and cosmetic based business incubatees are varied according to their respective business nature. Nevertheless, the existing support services are limited to incubation program graduation purpose rather than sustain better business performance during the post-incubation period.

In terms of organisational learning, Table 5.2 displays that owner-driven knowledge occurred in both graduated and non-graduate incubatees organisations based on their skills and experience sharing to the supervisory group of personnel. Whereas, in terms of external knowledge flow among the incubatees, most of them are mainly engaged with MARDI as a prime source for technical and product development guidance since MARDI is a sole proprietor of product recipes that produced by incubatees.

Apart from organisation learning, both incubatees graduated, and non-graduated had strategised independently in developing several capabilities in terms of marketing and product diversification and technology development at post-incubation phase. As MARDI's limited support services hinder incubatees initiative to upgrade their business operation via essential capabilities enhancement plan in escalating the business performance. In reality, none of the MARDI incubatees either graduated and non-graduated had left out from facing the challenges while improving certain capabilities at different incubation stages. Indeed, both graduated and non-graduated incubatees are expecting MARDI incubator management to provide certain crucial advisory services particularly financial management, latest marketing technology exposures, and product diversification strategy, production technology enhancement plan and human resource development. Moreover, the current revised 1-year incubation program duration had jeopardised some incubatee's business performance such as Incubatee 4 whereby unable to graduate from the incubation program successfully. It is not viable especially for an inexperience business owner to nurture and sustain its business perfectly within a year.

Table 5.2: Summary of Case Study Issues among Agro-Based Incubatees

Elements	Incubatee 1	Incubatee 2	Incubatee 3	Incubatee 4
Support Services	Benefited from reasonable support services at a lower cost.	Benefited more on R&D support service for product quality enhancement.	Benefited in terms of the small-scale production operation.	Just sufficient in facilitating its production operation but not business sustainability.
Organisational learning	Two-way learning approach (employer-employee) in terms of knowledge (creation-codification-dissemination-absorption). Learning from MARDI has benefited in terms of new product formulation.	Mainly concentrate on owner-driven knowledge, unlike employee-driven knowledge. Learning from MARDI has benefited in terms of R&D techniques.	Emphasising more on external knowledge source to spur innovation in the production activities. Learning from MARDI has benefited in creating a new idea on cosmetic products.	Mainly concentrate on owner-driven knowledge, unlike employee-driven knowledge. Learning from MARDI has benefited from producing various cosmetic products (essential-oil-based).
Capabilities Development	Has to strategise independently in undertaking marketing activity and product diversification at post-incubation phase. Upgraded production machinery to the latest version that yields a better result than the production machinery in MARDI incubator station.	Adoption of modern technology in marketing activity to maximise product's sales. Focusing more on product branding and product quality to retain consumers from both domestic and international markets.	Most of the capabilities development namely marketing and product development occurred via external collaboration. Capabilities development is undertaken in the organisation after considering the financial strength.	Unable to enhance and leverage most of the capabilities development namely marketing, product development and production technology development due to limited financial resources.
Challenges	Lacking key advisory services and training or courses in terms of financial management, latest marketing technology exposures and product diversification plan.	Lacking advisory services in terms of marketing strategy and product development for post business survivability.	Lacking advisory services in terms of marketing, human resource development, and financial management.	The current incubation period that has been revised from 2 years to 1 year is limiting the graduation opportunity from MARDI incubator programme.

5.4 Business Performance of Incubatees

5.4.1 Business Revenue

Table 5.3 displays the revenue attained by incubatees during incubation and post-incubation periods. In detail, Incubatee 1 has witnessed revenue increment approximately 13% between incubation and post-incubation period. Interestingly, Incubatee 1 successfully gain revenue during the incubation period, unlike the other three incubatees due to its well-executed production plan in terms of product branding, marketing strategy, product distribution channel and so forth. Whereas, Incubatee 2 started to gain revenue during a post-incubation period unlike Incubatee 1. However, there was no revenue gained by both Incubatee 3 and Incubatee 4 during incubation and post-incubation period. Surprisingly, Incubatee 3 keen to continue its business operation even though under that circumstance. Unfortunately, Incubatee 4 has dissolved the business operation during the post-incubation period because of its financial incapability to prolong the business operation.

Table 5.3: Revenue of Incubatees

Incubatee	Incubation (RM)	Post-Incubation (RM)
Incubatee 1	2,474,579	2,788,255
Incubatee 2	0	573,550
Incubatee 3	0	0
Incubatee 4	0	(Business Dissolved)

Source: Malaysian Company Commission (2018)

Note: The Revenue Coverage Comprise Different Years among Incubatees as (2 years during Incubation Period) and (3 years during Post-Incubation Period)

5.4.2 Profit and Losses in Business

As can be seen in Table 5.4, Incubatee 1 has sustained its business survivability with 35 % net profit increment between incubation and post-incubation period. Of course, Incubatee 1 penetration in both domestic and foreign markets has yielded an impressive profit growth, unlike the other three incubatees. While Incubatee 2 has recorded losses for both incubation and post-incubation period even though the losses have been minimised approximately 18% during post-incubation. As a result, Incubatee 2 has positively shown some improvement in its business performance between incubation and post-incubation period. Not only Incubatee 2 has recorded losses but also Incubatee 3 shows a similar result during incubation and post-incubation period. Different from Incubatee 2, whereby Incubatee 3 losses have increased by 74%. In fact, both Incubatee 2 and Incubatee 3 owners have actively invested in tangible and non-tangible assets to accelerate their business performance in the long term. Therefore, Incubatee 2 and Incubatee 3 are unable to witness their profit in the short term which is (less than five years) from the post-incubation period. Above all, Incubatee 4 has recorded RM 1848 as losses during the incubation period before wind-up its entire business operation at post-incubation phase. Of course, lack of experiences in the business sector and financial constraint hampers Incubatee 4 business progress, unlike other three incubatees that insist on continuing their respective business operation after incubation period even though they faced some loses.

Table 5.4: Net Profit/Loss of Incubatees

Incubatee	Incubation (RM)	Post-Incubation (RM)
Incubatee 1	131143	177624
Incubatee 2	-74191	-61058
Incubatee 3	-1230	-2140
Incubatee 4	-1848	(Business Dissolved)

Source: Malaysian Company Commission (2018)

Note: The Net Profit/Loss Coverage Comprise Different Years among Incubatees as (2 years during Incubation Period) and (3 years during Post-Incubation Period)

5.5 Relevancy of MARDI Incubator Support Services

Sections above in this chapter have presented the four case studies in this study. The following part of this chapter explores on the notion of how support services were instrumental in supporting capability development and linking the dynamic interrelationship between organisational learning and capability development in evolutionary perspective moving from the incubation stage to that of the post-incubation stage. Table 5.5 provides a summary on the level of relevancy of support services provided by MARDI in supporting their incubatees, as well as the additional supporting services required by the incubatees for business survivability. The more detail discussions are provided in the following subsections.

Table 5.5: Relevancy of MARDI Incubator Support Services

Existing Services Rendered By MARDI	Relevancy to Incubatees' Needs		Additional Services Needed by Incubatees
ICTs	Partially relevant		Insurance Coverage (Total Loss)
Advisory Service (R&D, Product Development & Legal)	Relevant		Advisory Service: • Marketing • Finance • Human Resource
In-House Training (hands-on product development)	Relevant		Workshop & Seminar on Skills Development
Space & Production facilities	Relevant		Extensive Storage Space
Internal Collaboration / Networking	Partially relevant		External Collaboration / Networking

Note: The services 'relevancy' is determined based on the incubatee's feedback during the interview session given that the rendered services significantly lead to incubatee business performance.

5.5.1 Training and Coaching

Essentially, priority is given for product development and quality enhancement during two years incubation period whereby MARDI used to have an internal expert for that reason. However, external training is not provided for product development during incubation stage since the product recipes and trademark owned solely by MARDI, and thus, any disclosure or involvement other external parties in the operation are strictly prohibited. Even though the hands-on based training is provided to incubatee internally for product development and quality enhancement but truly as such training solely is not sufficient to accelerate incubatee business performance in the long term. In fact, some of the graduated incubatees had claimed that there are facing difficulties in the market after incubation period as lack of external training exposures during incubation period mainly in terms market structure, product trends and so forth.

For instance, one of the graduated incubatee owners from cosmetic based business claimed that:

> *During the incubation period, almost a year was spent to champion product creation and formulation tasks. In the second year, we managed to sell our cosmetic products in the domestic market. However, we are unable to expand our cosmetic products in the international market. This due to the strict restriction in term of Non-Tariff Measurements (NTM) such as labelling, product information in different languages and safety information of the product. In fact, MARDI management should initiate external seminar or training especially in term of business development. Of course, by mastering the product formulation and its*

production techniques is insufficient if that particular product failed to reach a market either domestically or internationally. (Personal Communication, 6 December 2017)

In the same vein, the non-graduate incubatee from cosmetic based business, when describing the importance of external training in boost business performance, said:

There is a lack in term of external training and coaching throughout the two years incubation period. Honestly, I appreciated the hands-on training provided internally mainly on product development by incubator manager and other technical team members but relying solely on as such training is insufficient for the business development if several key essential pieces of training such as marketing, financial management, human resource management, resources management and so forth are neglected. (Personal Communication, 10 April 2018)

Therefore, the non-graduate incubatee is unable to expand the business after the incubation period, unlike other graduated incubatees. This because incubator failed to provide some other essential training in terms of marketing development, skill and talent enhancement whereby as such crucial training is needed to drive the incubatee business performance impressively.

5.5.2 Space and Production Facility

In general, the space facilities provided to incubatees in both incubator stations are reasonable and impressive mainly in term of security management and other communication amenities such as telephone, internet, and facsimile. As such, communication facilities may partially facilitate the respective incubatee business operation even though there are some reasonable charges imposed for the usage. At the same time, the new start-up enterprises are gifted to obtain the space facilities in MARDI incubator stations which would cost them RM300 monthly. Hence, most of the incubator programme participants do not seem worried about the space charges since the rental cost is relatively lower than the market value.

One of the incubatee owners from food-based business reported that:

> *We prefer to rent the production plant space even after incubation period due to low rental cost (RM300) compared to the external premise in the market. In fact, we are willing to pay slightly higher than the previous cost which paid during incubation system. Unfortunately, we are unable to obtain as such extension in the term of renting the premises and other facilities after incubation period even though if there is no new incubatee entry in the premise. (Personal Communication, 19 October 2017)*

However, a cross-interview session is conducted separately with the food-based incubator station manager about the incubatee claim, and the incubator station manager replied that:

I have highlighted the incubatee concern to my superior in MARDI headquarters because I personally do not have any right as an incubator station manager to allow or extend the incubatee occupancy in the premise without prior concern from MARDI headquarters. If the consideration is put forward, the approval process may take approximately three months. As a result, incubatees are unable to wait for as such long process which is intolerable especially when it involves their respective business operation. (Personal Communication, 16 October 2017)

As the above interview shows that, the lower rental cost allowed incubatee to invest their fund in other types of expenditure to develop their respective business such as marketing, R&D and so forth. However, there is inefficiency occurred in term of resource utilisation at the optimum level as the incubator premise left empty for a few months while waiting for the new participant. In fact, the incubator station manager stressed on the importance of optimum resources utilisation especially if it is benefiting both MARDI and another external party.

Ultimately, different sort of space and production facilities are needed for both rice-based products and herbs based cosmetic products incubatees. This because each of the incubatee's operation is entirely different in terms of preserving the raw materials for production purpose and storing the finished goods based on specific requirements such as an appropriate temperature, humidity and so forth. Equally important for incubator management to extend insurance coverage for incubatee personnel and its products during production operation. As such preventive measure would benefit both incubator and

incubatee in minimising loses due to several unanticipated incidents in the production premise such as fire and theft.

5.5.3 Advisory Services

Both incubatees from rice-based product incubator station and herbs based cosmetics incubator station are appreciated the advisory services mainly in terms of product R&D, product development and relevant legal acts pertaining to their products. Product development is essential for incubatee to undertake the correct measure of ingredients and so forth to achieve the product quality as prescribed in the SOP. Likewise, legal advisory service may be helpful for incubatee in term of obtaining the most appropriate license as mandated in Malaysian Food Acts despite follows the specific regulations in term of product labelling and other safety measures.

Nevertheless, one of the cosmetic incubator station managers commented on advisory services:

> *We are unable to provide various type of advisory services as per requested by our respective participant in the incubation program due to lack of experienced and ex-practitioner expertise in the respective area namely finance, marketing, and human resource management. However, in term of marketing, an annual expo organised by MARDI whereby incubatees can take part in the event by promoting their respective products to the public. Nevertheless, this expo is not applicable for both graduated and non-graduated incubatees even though there was a huge request from them lately. (Personal Communication, 12 April 2018)*

This excerption shows that none of any advisory support services rendered to incubatees after incubation period to ensure their long-term business sustainability in the market. In reality, incubatee still require advisory services in terms of marketing strategy, resource management and human resource development which are beyond internal training provider capacity. By doing this, incubatee may get an external exposure in terms of real market needs by reshaping the product to serve the actual demand in the market.

Nevertheless, some of the successful incubatees from both food and cosmetic based industries are managed to get external consultation firm services in term of marketing, financial management and as well as human resource management to develop their business performance (see Temali & Campbell, 1984; Allen & Rahman, 1985; Sarfraz A. Mian, 1994). Such services obtained by incubatees from external consultation firms are a bit costly. Therefore, most of the graduated incubatees are expecting MARDI's management to consider post-incubation support services at reasonable charges. This because graduated incubatee is still considered as an infant player in the market and of course needs certain types of supports to steer their business performance.

Nevertheless, some of the successful incubatees from both food and cosmetic based industries are managed to get advisory services via external consultation firm services in term of marketing, financial management and as well as human resource management to develop their business performance (Temali & Campbell, 1984; Allen & Rahman, 1985; Mian, 1994). However, such services obtained by incubatees from external consultation firms are a bit costly. Therefore, it is vital for MARDI's management to consider post-incubation support services at reasonable charges for graduated incubatee.

5.5.4 Collaboration and Networking

Even though internal collaboration partially accelerates incubatee business performance mainly during the incubation period but the establishment of external collaboration is vital to ensure the business operation continuity at post-incubation period. In fact, some of the success incubatees claimed an external collaboration is benefiting them to produce a product at a frontier level in the market. This different from the incubatees who are unable to graduate from the incubator programme as solely relying on internal collaboration. Sometimes, external parties such as suppliers, competitors and universities tend to invent some products which are really at a frontier level in the market. Likewise, Vanhaverbeke (2006) highlighted the importance of embedding in networks through geography, existing industry relationships and with public research networks, firms have both the opportunity to utilise networks as an external source of innovations, and to employ them to promote the commercial success of their own internally and externally sourced innovations.

Although this may be true, both food incubatees 1 and 2 respectively, mentioned the real constraints to establish external networking during the incubation period since the incubator was not provided as such avenue. To some extent, as such a scenario hindering the open innovation from taking place in the respective incubatee firms (Chesbrough, 2006). In fact, several previous scholars toasted the importance of establishing external collaboration in order to lead innovation and knowledge transfer (Spaeth, Stuermer, and von Krogh, 2010). Moreover, researchers have identified specific sources of external knowledge including suppliers (Li and Vanhaverbeke, 2009; Schiele, 2010), customers (Gassmann, Sandmeir, and Wecht, 2006; Grimpe and Sofka, 2009), competitors (Lim, Chesbrough, and Ruan, 2010), or universities (Cassiman, Di Guardo, and Valentini, 2010;

Harryson, Kliknaite, Dudkowski, 2008). Factors that influence the use of external sources of innovation include not only the characteristics of the external source, but also internal factors such as R&D capabilities and complementary assets (Teirlinck, Dumont, and Spithoven, 2010). Without undertaking continuous innovation, incubatees are unable to be competitive and vibrant among other players in the market for the long-term period.

On the other hand, the networking establishment process should extend to the government sector, university or research institution, market, and public. Therefore, Etzkowitz and Leydesdorff (1995) proposed that the three major parties in innovation are an industry (wealth generation), universities (novelty production) and public control (government) which known as Triple Helix. In details, they observed that the new environment for innovation is characterised by the strong role of universities, the active engagement of all levels of government in formulating policies, the strategic alliances of firms in developing and marketing products and product and process innovation within the industry (Etzkowitz 1998).

Under those circumstances, it would be irrelevant and meaningless for incubatee if relying solely on internal collaboration by neglecting an external collaboration in sustaining their respective business operation after the incubation period. Therefore, it is wise and essential for incubatee to establish both internal and external collaboration to lead open innovation (Chesbrough, 2003) besides ensuring business sustainability during the post-incubation period.

5.6 Status of Incubatees' Capabilities Development

This section response to the research question specifically on what types of capabilities have the incubatees developed during the period of incubation and post-incubation, and how these capabilities have evolved? Noteworthy, there are three types of capabilities in terms of marketing, product development, and production technology development. Each of the incubatee has developed several types of capabilities at various scale between during incubation and post-incubation period. Table 5.6 shows the capabilities development among both graduate incubatees (i.e., Incubatee 1, 2 and 3) and non-graduate incubatees (i.e., Incubatee 4) during the two phases.

The subsections after Table 5.6 provide an in-depth discussion on the elements of marketing, product development and production technology capabilities of the four incubatees. The importance of organisational learning roles in capabilities development is also discussed at the end of this subsection.

Table 5.6: Incubatees Capabilities Development

Types of Capability and its scale	**During Incubation** [a]				**Post Incubation** [b]			
	Incubatee 1	Incubatee 2	Incubatee 3	Incubatee 4	Incubatee 1	Incubatee 2	Incubatee 3	Incubatee 4
Marketing [1]	Medium	Medium	Small	Small	Large	Large	Medium	None
Product [2] Development	Medium	Medium	Small	Small	Large	Large	Medium	None
Production [3] Technology Development	Small	Small	Small	Small	Medium	Medium	Small	None

Note: [a] The incubatees capabilities development occurred during the incubation period via incubator support services.

[b] The incubatees capabilities development occurred during the post-incubation period via incubatees' own initiatives.

[1] The marketing strategies are categorised into three main scales as:

- Small-scale marketing strategies: (identify marketing channels- electronic vs. non-electronic, identify potential customer and estimate marketing cost).
- Medium-scale marketing strategies: (examine competitors marketing strategy, identify other capabilities needed to compete and identify product distribution channel).
- Large-scale marketing strategies: (conduct market survey, analyse product market share and meet certain certification requirement in the market).

[2] The product development is categorised into three main scales as:

- Small-scale comprise (product creation and product branding).
- Medium-scale comprises (product quality enhancement and product diversification).
- The large scale comprises (engage in product copyright and lead product supply chain).

[3] The production of technology development is categorised into three main scales:

- Small-scale comprise (mechanical based production machine, low acquisition, and maintenance costs).
- Medium-scale comprises (semi-automatic production machine, moderate acquisition and maintenance costs).
- The large scale comprises (fully- automatic production machine, high acquisition and maintenance costs).

5.6.1 Marketing Capability

In general, marketing scale is representing the scope of market coverage. As shown in Table 5.6, Incubatee 1 and Incubatee 2 have developed their marketing capability from medium-scale during the incubation stage to large scale during the post-incubation stage. Likewise, Incubatee 3 has improved its marketing capability from small scale to medium scale. Along with the evolution phase since from incubation period until the post-incubation period, the graduate incubatees namely Incubatee 1, Incubatee 2 and Incubatee 3 are continuously revising their marketing strategies via trial and error approaches. On the other hand, Incubatee 4 has failed to sustain its marketing capability after the incubation period, unlike other counterparts due to lack of online marketing approach to promoting its products in social media platform and other online business platforms. In

fact, studies by European Comission (2002) and Brooks (1986) suggests that most graduated incubatees are encountering constraints in obtaining substantial financial capacity as well as sophisticated ICT amenities in strengthening their marketing capability and products survivability in the market.

During the incubation period, most of the MARDI's graduated incubatees have undertaken a market survey before launch their products in the market. For this reason, the incubatee owners and managers have deployed information technology system as the main tool to conduct the market survey for their respective products via online. While the latest shopping trend is concentrated on social media and other online platforms and therefore, most of the firms are shifting the marketing cost towards digital marketing platform mainly on social media (e-Marketer 2014). Likewise, Rapp et al. (2013) agreed with the social media role as an interactive channel for both firm and customer. Furthermore, firms can display the features of their respective products including brand, price, and ingredients whereas customers can extend their interaction with the respective firm and people within their network. For example, in 2011, more than 50% of social media users follow brands on social media (Van Belleghem, Eenhuizen, & Veris 2011) and companies are increasingly investing in social media, indicated by worldwide marketing spending on social networking sites of about $4.3 billion (Williamson 2011). In this case, Incubatee 1 has produced rice-based snack products and successfully identified its potential customer group that comprises mainly youngsters. Since most of the youngsters nowadays are well exposed to numerous social media platforms, and therefore, Incubatee 1 has adopted social media-oriented marketing approach such as Facebook, WhatsApp, Twitter and so forth to advertise its snack based products.

Although this may be true, it is important to realise that online marketing strategy does boost not only the incubatee product's sales but also reduce the transaction cost as a whole (Colwyn 2014). To put it differently, business owner and the customer can buy and sale numerous products via online platforms such as Lazada, Ali Baba and Amazon with reasonable transportation cost compared to conventional delivery approaches. In fact, the overall spending for products advertised in social media like Facebook, YouTube and so forth have inched up to 33.5% between 2014 and 2015 (Allton 2016; eMarketer 2015). This due to a large number of clients engaging actively in social media platforms whereby 1.55 billion internet users actively involved in Facebook followed by YouTube, which has 1 billion users. Correspondingly, Labrecque et al. (2013) stressed on social media's notable impact whereby it intensifies consumer roles in several aspects, namely comparing prices among a pool of sellers and obtaining product details based on other customer comments. Moreover, the tendency for customers to make the right product choices via social media platform is reasonable.

Obviously, social media play an essential role in the business organisation in attracting and retaining customer loyalty towards the products despite taking their feedbacks and complaints into consideration. By getting the feedback and criticism from their potential customers, the products enhancement and improvement process took place before the product launched widely in the market. Therefore, the MARDI's graduate incubatees were undertaken as such a similar approach in meeting and retaining their customer's satisfaction during incubation and post-incubation period.

5.6.2 Product Development Capability

Innovation and the introduction of new products are often the sole dimensions on which new ventures, compete and are a common means by which managers diversify, adapt, and sometimes reinvent their organisations to meet changing market and technical conditions (Ahlstrom, 2010; Brown & Eisenhardt, 1997; Schoonhoven, Eisenhardt, & Lyman, 1990). Consequently, regular products upgrade leads graduate incubatees at the frontier level and competitive especially at the international market. At the same time, new products need to accompany product branding. Essentially, product branding is necessary for ensuring product reachability among its targeted consumer group. Similarly, MARDI's graduate incubatees had successfully established their respective products brand during both incubation and post-incubation periods. In fact, the past industry market research shows that consumers become brand fans because they have had a positive experience with the product (Van Belleghem, Eenhuizen, & Veris, 2011).

On top of that, product diversification is an important strategy to provide a set of product choices for consumers to purchase it. In other words, product diversification is expansion into product markets new to a firm. For several decades, product diversification has been a highly popular strategy among large and growing industrial firms in the United States, Europe, Asia, and other parts of the industrialised world (Chang & Choi, 1988; Hoskisson & Hitt, 1990). In this case, most of the graduate incubatees realise the importance of product diversification and successfully retain it in their business scope. For example, Incubatee 1 has produced numerous type of food products including for both human and pets consumption during the post-incubation period. Likewise, during the post-incubation period, Incubatee 3 is also produced various types of skincare products and other relevant beauty care products to diversify its products market share. It is important to realise that

product diversification beyond the origin business scope may significantly affect incubatee's competitive advantage on the respective products. In other words, a competitive advantage exists when the firm can deliver the same benefits as competitors but at a lower cost or deliver benefits that exceed those of competing products (Barney, 1991).

5.6.3 Production Technology Capability

Based on Table 5.5, both graduate incubatees from the food-based industry have extended their production technology capability from small scale to medium-scale between incubation and post-incubation periods. The production technology capability upgrades are undertaken after considering several key elements such as financial capacity, technical team capability and so forth. Unlike, the graduate incubatee from cosmetic-based industry known as Incubatee 3 has just remained its production technology capability at small scale during both incubation and post-incubation stages due to its financial losses in the business operation. Nevertheless, Incubatee 4 does not initiate to improve or remain its production technology capability during the post-incubation period due to its financial and technical team incapability despite facing continuous losses in the business operation.

In general, most of the graduate incubatees have extended their production technology capability scale via production machinery and other related equipment purchasing. In fact, as such purchase is considered as a potential investment for incubatees to continuously produce its respective products in the market at long-term basis besides ensuring the business performance progress during the post-incubation period. Surprisingly, some of the graduate incubatee is preferred to lease the production

machinery as a whole. This due to the evolution of equipment technology from time to time. For instance, Incubatee 1 is keen on leasing the production machinery as technology is evolving over time and therefore it is wise and benefit them to upgrade the production technology capability via as such approach.

According to Incubatee 1 general manager:

> *We prefer to lease our production machinery from external counterparts, as this would be the safest approach since the latest technology is booming rapidly. Therefore, we are really keen toward leasing concept in term acquiring our organisation production equipment or machinery. (Personal Communication, 19 October 2017)*

Above all, the cost of maintenance of purchased machinery relatively is lower than the leasing one. In details, low hand technology products tend to have stable, well-diffused technologies. The technologies are primarily embodied in the capital equipment; the low end of the range has relatively simple skill requirements. Many traded products are undifferentiated and compete on price: thus, labour costs tend to be a major element of cost in competitiveness (Figueiredo, 2002). In contrast with medium technology machinery as they tend to have complex technologies, with moderately high levels of R&D, advanced skill needs and lengthy learning periods. (Figueiredo, 2002). In this case, Incubatee 2 and Incubatee 3 were just spent between RM1000-RM5000 monthly to pursue the purchased machinery maintenance whereas Incubatee 1 who leased the medium technology production machinery spent relatively higher for production

machinery maintenance than Incubatee 2 and Incubatee 3 which is approximately RM 30,000 to RM 50,000 monthly.

In reality, the graduate incubatee owners are well versed in term of accessing the latest production machinery technology knowledge via internally (via subordinates) and externally (suppliers and open source). For instance, Incubatee 1 brainstormed with their current employees about their previous organisation production technology capability. By gaining as such precious insights from their respective employees, Incubatee 1 can find advance solution especially in making a crucial decision on their production machinery matters.

5.6.4 Organisational Learning as a Catalyst for Capabilities Development

Above all, the capabilities in terms of marketing, product development and production technology development have evolved and strengthened through substantial organisational learning approach. In brief, organisational learning comprises knowledge creation, knowledge dissemination, knowledge codification and as well as knowledge absorption. In terms of knowledge creation, it has divided into two categories namely internal knowledge creation and external knowledge creation. Internal knowledge creation occurs via an organisation learning process between employer and employee that comprise physical knowledge flow and tacit knowledge flow. In this case, one of the critical internal knowledge channel and sources of graduate incubatee such as Incubatee 1 is the employee's tacit knowledge and skills.

For instance, Incubatee 1 plant manager reported that:

The business development attained over the period is due to well-managed and well-trained knowledgeable employees in the firm. Importantly, our firm employees experiences significantly translated into a positive growth in terms of building necessary capabilities such as marketing, product development, and production technology. As such passion among employee toward the organisation development moulded via an appropriate reward mechanism by top management. Hence, as such a reward mechanism surely encourage every employee regardless of their position to give their insights and opinion for the firm betterment and development over time. (Personal Communication, 19 October 2017)

As the above interview findings, indicate that Incubatee 1 employee's tacit knowledge and technical skills as a main instrumental in driving the organisation performance. Apart from those skills, employee's experience and networks have to be leveraged not only Incubatee 1 owner but also the owner of Incubatee 3. Similarly, Bstieler et al. (2017) state that organisational learning involves the accumulation of individuals' knowledge shared with other individuals within an organisation, and inter-organisational learning revolves around the same theory that involves the accumulation of different organisations' knowledge shared with other organisations within a domain. Nevertheless, several other incubatees such as Incubatee 2 and Incubatee 4 are emphasised on owner-driven knowledge due to their respective employee's knowledge and skill limitations. Indeed, it is vital for as such incubatee owners to drive the organisation performance by themselves rather than relying on their unskilful and incompetent subordinates.

In terms of external knowledge creation, some of the graduated incubatees such as Incubatee 1 and Incubatee 3 are still engaging with MARDI during the post-incubation period. Importantly, Incubatee 3 has managed to extend its external learning source with other cosmetic based business owners and raw material suppliers. By doing so, Incubatee 3 has gained current market updates which are helpful to determine the production direction in the long term. Above all, acquiring innovation from external sources may be through the acquisition of knowledge or technology or the use of acquisitions of the innovation suppliers. By doing this, incubatees believe could enhance and improve their business performance, product quality, and competitive advantages regardless of firm size, sector or localisation (Rizzo et al., 2013).

Apart from knowledge creation, knowledge dissemination plays a significant role in transferring both tacit and non-tacit knowledge between employer and employee. In fact, most of the graduate incubatees such as Incubatee 1, Incubatee 2 and Incubatee 3 were engaged actively in knowledge dissemination mainly via training and meeting to ensure the respective organisation's survivability in long-term (Zollo & Winter, 2002) unlike Incubatee 4 which does not actively engage in knowledge dissemination task.

In the following extract, Incubatee 1 general manager explains how knowledge dissemination activities take place in their organisation:

> *Normally, we used to engage with both managerial level and non-managerial level staff whenever it involves any important decision making for the organisation progress and sustainability. Both level staff is encouraged to provide their respective point of views during the meeting session on the particular*

discussed issue. The staff is involved actively in the brainstorming activity by providing constructive insights for the organisation development as there is a reward system for that employee provide the best solutions or ideas during the meeting session. As a result, as such a reward system able to cultivate some responsibility and motivate the employees to take part in meeting discussion actively. (Personal Communication, 19 October 2017)

Apart from knowledge dissemination, Incubatee 1 and Incubatee 3 do engage in knowledge codification such as preparing production guideline manual and establishing documented hands-on training tools (Cohendet & Meyer-Krahmer, 2001; Sorensen & Lundh-Snis, 2001). By doing this, the employer may ensure the knowledge and skill spillover to the new employee rather than overspending for new employee training purpose.

Since knowledge transfer involves both transmission and receipt, therefore knowledge receipt has been analysed in terms of the absorptive capacity of the recipient (Cohen & Levinthal, 1990). In this study, the knowledge absorptive capacity occurs effectively among employer and employee particularly between Incubatee 1 and Incubatee 3 due to substantial working experiences in the relevant field, relevant academic qualification and the usage of a common language which is known as (*Malay language*).

As shown above, the organisational learning is the main driver in accelerating most of the graduate incubatees business performance during both incubation and post-incubation periods via several crucial capabilities development in terms of marketing, product development capability, and production technology development. Noteworthy, both

internal and external knowledge creation is vital for graduate incubatees because this lead to open innovation in the respective business organisation (Chesbrough, 2003). Even though acquiring external innovations tends to be done by less innovative firms like MARDI's incubatees during incubation stage, but these acquiring firms potentially tend to become more innovative after the acquisition (Ceccagnoli et al., 2010). Under those circumstances, MARDI's graduate incubatees have high tendency to sustain their business performance successfully during the post-incubation period.

5.7 Arising Issues in MARDI Incubation System

There are plentiful hurdles to advance capabilities development in terms of marketing development, product development and production technology development from the incubation period to post-incubation period. Noteworthy that, none of the MARDI incubatees either graduated and non-graduated had left out from facing the challenges while improving certain capabilities at different incubation stages. The following sub-sections discuss key constraints to enhance certain crucial capabilities in most of the incubatee's business operation.

5.7.1 Incubatee Selection and Programme Duration

The participant selection criteria for the incubator programme remain a crucial issue in the study despite the incubator programme duration. Firstly, inexperienced participant involvement in the incubator programme leads to a higher failure rate end of the programme. For example, as many as 23 incubatees have been involved in the incubation program since 2005 and by 2017; there are only six incubatees successfully graduate from the programme. This due to lacking business exposure in the particular agro-based field

which has been promoted by MARDI. As a consequence, this would lead to inefficient resources allocation problem if the resources channelled to as such incompetent and inexperienced participant. Noteworthy that, the selection of inexperienced participant for the incubator programme had occurred due to lack of experienced business owner apply to participate in the MARDI incubator programme. At the same time, the incubator programme duration has been revised from 2 years to 1 year effectively from 2017 to train entrepreneurs in agro-based industries. In reality, the 1-year incubation period is too short since incubatees need to spend between 3 months to 6 months to study only the new product formulation and its production techniques before devise any marketing strategy to promote its product in the market. For this reason, most of the incubatee especially the inexperienced one had failed to attain on-time graduation during the end of the incubator programme.

5.7.2 Insufficient Support Services during the Incubation Period

In general, the support services provided by MARDI incubator in terms of production facilities, in-house training, R&D advisory service, and internal collaboration are limited during incubation period only. Even though as such rendered services are essential for incubatee at the start-up stage, but the support services are continuously needed as their respective business evolve especially during the post-incubation period. Truly, certain crucial support service like R&D amenity is highly required by incubatee during the post-incubation period, since as such amenity setup cost is unbearable for incubatee immediately after incubation programme. In reality, the tendency for incubatee in acquiring additional support services from MARDI is relatively high notably during post-incubation as they just penetrated the real market. For that reason, the graduated incubatee need to strengthen their capabilities mainly in terms of product development and

production technology development despite sustaining their business performance competitively. Must be remembered that most of the graduated incubatees are a struggle financially especially after graduated from incubation programme, as they are required to enhance several essential capabilities in terms of marketing, product development and production technology development to sustain their business operation in the competitive market.

5.8 Summary

As can be seen, most of the incubator stations are providing the essential amenities in terms of space, coaching, training, advisory service and networking platform to their respective incubatees during the incubation period. Nevertheless, such support services are insufficient to prepare incubatees to face any significant challenges in the market at the post-incubation stage, which eventually affect their business performance. The support services provided in most of the incubator stations are quite standard and not targeted based on the particular industry requirement. For instance, a meeting room, facsimile, and telephone facility may be relevant to a certain group of incubatee and may irrelevant for another group of incubatees. Therefore, the real support services in term of establishing an external network and external training are an essential milestone for incubatee in realising the real market needs rather than producing something which is not feasible to sell in the market. In reality, the incubator support services are not extended during the post-incubation period mainly the consultation service from respective MARDI experts to graduated incubatees. This sometimes may hinder the incubatees progress in the market whenever they keen to develop new products or enhance products quality with appropriate guidance from MARDI experts.

On the other hand, most of the graduated incubatees initiated their learning initiatives since the incubation period, and it was evolved until the graduation period. Even though both graduated and failed incubatees engaged in knowledge acquisition via internally and externally but the knowledge utilisation by several incubatees in terms of capabilities building (e.g., marketing, product development, and production technology development) still occurs at different phases. Important to realise, the knowledge utilisation via internal and external learning process had benefited the incubatees in developing different capabilities based on their organisation needs and strength. Undoubtedly, incubatees (e.g., Incubatee 1, Incubatee 2 and Incubatee 3) that are well-established in terms of marketing capability, product development capability and production technology capability tend to extend their business operation sustainability in the market unlike Incubatee 4 which is failed to develop as such capabilities due to its incapability in terms finance.

As a whole, this study result strongly supports the dictum that incubatee's performance significantly influenced via the necessary support services rendered by incubator during the incubation period. Moreover, the relevancy of incubator support services was found to be significant in explaining the capabilities development evolution among incubatees. At the same time, this study provided evidence based on personal interview sessions in terms of the challenges faced by both graduate and non-graduate incubatees in developing several essential capabilities. In brief, this study takes a step forward to better understand the entire agro-based incubator programme by intensely examining the incubator support service relevancy in facilitating incubatee's capabilities development in terms of marketing, product development and production technology development for its long-term business sustainability. Thus, the outcome of this study signifies the importance of

promoting agro-based incubation system as new economy catalyst besides recognising its potential contribution toward the national agriculture system.

CHAPTER 6: IMPLICATIONS AND CONCLUSION

6.1 Introduction

Undoubtedly, the role of MARDI as a leading agriculture-based research institution in steering agro-based incubator programme is vital for the Malaysia agriculture system. For this reason, it is vital to examine the relevancy of MARDI incubator services intensely in facilitating and accelerating agro-based business performance during incubation and post-incubation periods. In this chapter, the major findings of this study are presented as a response to the research questions determined in section 1.3 of this study. Furthermore, the findings of this study have constructed via inductive reasoning methodology and narrated as a case study approach. At the same time, the entire MARDI incubator programme process during incubation and post-incubation periods has been captured and demonstrated in this chapter.

On top of that, the key issues related to MARDI incubator programme and its implication toward key policies are highlighted in the discussion. In fact, the policy implications insights derived from this case study that is a matter for MARDI to improvise its existing incubator programme. Last but not least, the limitation of the study and the possible future research direction this area are addressed in this chapter. At the end of this chapter, the contribution of this study in agro-based incubator programme has greatly emphasised.

6.2 Recapitulation of Main Findings

Overall, this study consists of two analytical sections in Chapter 5. The first part of the analysis intensely examine the main data, information and findings gathered through the interview sessions and field visits in terms of services and their relevancy to incubatees over different phases of development and as well, as determine the processes of capabilities development among incubatees and its challenges toward their business performance. Whereas, the second analytical section synthesis the incubator support services in facilitating incubatee's capabilities development and its business performance particularly at post-incubation phase.

Even though there is a significant amount of research progress achieved in the incubator studies as a whole, but the issue of incubator's services relevancy to incubatee is still rarely treated in the previous literature. Hence, the key evidence from both analytical sections is essential in providing some precious insights and improvement action plans for the betterment of MARDI's incubator programme.

Figure 6.1 illustrates the summary of overall findings as discussed in Chapter 5. Firstly, the incubatee selection process is undertaken by MARDI's Business Unit during the pre-incubation phase. The selection process is begun by identifying the potential incubatee for MARDI incubator programme given that, the applicant fulfilled key criteria such as provide business registration documents and comprehensive business plan that relate to MARDI incubator programme. Next, the selection committee members would shortlist the potential incubatee based on their business nature either food-based production or cosmetic based production activities. Once the shortlisted participant is finalised, MARDI's Business Unit will issue an offer letter to the potential incubatee. At the same

time, incubatee should comply the terms and conditions as described in the incubator programme agreement such as proceed with a security deposit payment of RM3000, commit strictly to monthly maintenance fee of RM300 as well as comply incubation program duration up to six months. Essentially, based on the MARDI's incubator programme agreement, incubatee is entitled entirely on its product sales during incubation. However, if incubatee failed to proceed with the security deposit payment of RM3000 within a month from the offer letter date, then, the respective incubatee is not allowed to participate in the MARDI incubator programme.

Then after, the selected incubatees assigned to two different incubator stations namely Alor Setar and Kuala Linggi based on their business nature. Once, the incubatees developed their products prototypes, the respective incubator station manager render necessary support services to them based on the guideline as prescribed in the MARDI incubator agreement. Noteworthy, most of the support services notably space, production amenities, R&D facility, hands-on training and permission to incorporate MARDI trademark on their respective product packaging are sufficient for incubatee during the incubation phase. Nevertheless, there are lacking on highly relevant support services including external training or workshop, extensive advisory services, and external networking platform that not available in neither incubator stations (Figure 6.1). Surprisingly, this study found that non-graduated incubatee is lacking as such support services to develop key capabilities in terms of organisational learning and networking. Undoubtedly, the organisational learning and networking parameters play a significant role in this study since both acts as a mediator between the support services and capabilities development. In other words, knowledge flow in the organisation is a key determinant to facilitate incubatee in terms of acquiring the relevant support services from incubator despite capitalising the support services for other crucial capabilities

development notably marketing, product development, and production technology development. In the long-run, these capabilities are vital for incubatee not only during the incubation period but also at post-incubation period particularly in steering their business operation towards an impressive performance.

Different from graduated incubatees whereby they were initiated by themselves to acquire the additional support services, which not rendered throughout the incubation period. In fact, as such variation occurred between graduated and non-graduated incubatees due to their respective financial strength. In other words, incubatee that is financially resilient, manage to graduate successfully from the programme and sustain their business performance impressively during the post-incubation period even though there is some mismatch or partially relevant of support services during the incubation period. In contrast with the incubatee that financially unstable tend to struggle throughout the incubation program especially in developing several crucial capabilities notably marketing capability, product development capability, and production technology capability. This failure impedes them from commercialising their products successfully in the market besides sustaining impressive business performance in the long-term.

In reality, a distinct observable feature is a complex interaction between organisational learning and capabilities development. Both have helped mutually reinforce Incubatee 1, Incubatee 2 and Incubatee 3 to acquire the necessary ability to perform. In other words, the process is non-linear and it evolves continuously over time. Interestingly, information technology has aided and bridged the process of learning and capability development, especially among graduated incubatees. Likewise, incubatees established their competency in using social media in promoting their products. In fact, the advertisement cost for marketing via online channels are relatively cheaper than conventional mass

media channels. This due to an open-source of information sharing platform provided by most of the social media at a minimal cost. For example, during the incubation period, the graduated incubatees have undertaken a market survey before launching their products in the market. For this reason, the incubatees' owners and managers have deployed information technology system as the main tool to conduct the market survey for their respective products via online despite ensuring the business performance, especially at the post-incubation period.

As for product development capability, it can be divided into several dimensions such as product branding, product diversification, product upgrading and product patenting. The graduated incubatees (i.e. 1, 2 and 3) realise the importance of product diversification and successfully retain it in their business scope. For example, Incubatee 1 has produced numerous type of food products, including for both human and pets consumption during the post-incubation period. Likewise, during the post-incubation period, Incubatee 3 is also produced various types of skincare products and other relevant beauty care products to diversify its products market share. It is important to realize that product diversification beyond the origin business scope may significantly affect incubatee's competitive advantage on the respective products.

In terms of production technology capability, Incubatee 1 and 2 from the food-based industry have extended their production technology capability from small scale to medium-scale between incubation and post-incubation periods. The production technology capability upgrades are undertaken after considering several key elements such as financial capacity, technical team capability, and so forth. On the other hand, Incubatee 3 has just remained its production technology capability at small scale during both incubation and post-incubation stages due to financial constraint in their routine

business operation. Whereas, Incubatee 4 did not initiate to improve or remain its production technology capability during the post-incubation period due to its financial constraint and technical team incapability despite facing continuous losses in their routine business operation. The incubatees had utilized maximally the production amenities and the technical knowledge mainly in terms of production machinery operation and its maintenance as provided by incubator during the incubation period.

Above all, this study takes an important step towards better understanding the entire agricultural incubator programme by closely studying the relevance of incubator support services to facilitate incubatees to develop marketing, product development and production technology capabilities for their long-term business sustainability. Thus, the outcome of this study signifies MARDI's prominent role as a leading national agricultural research institution in promoting the agro-based incubation program as a new economic driver despite acknowledging its potential contribution to the national agricultural system.

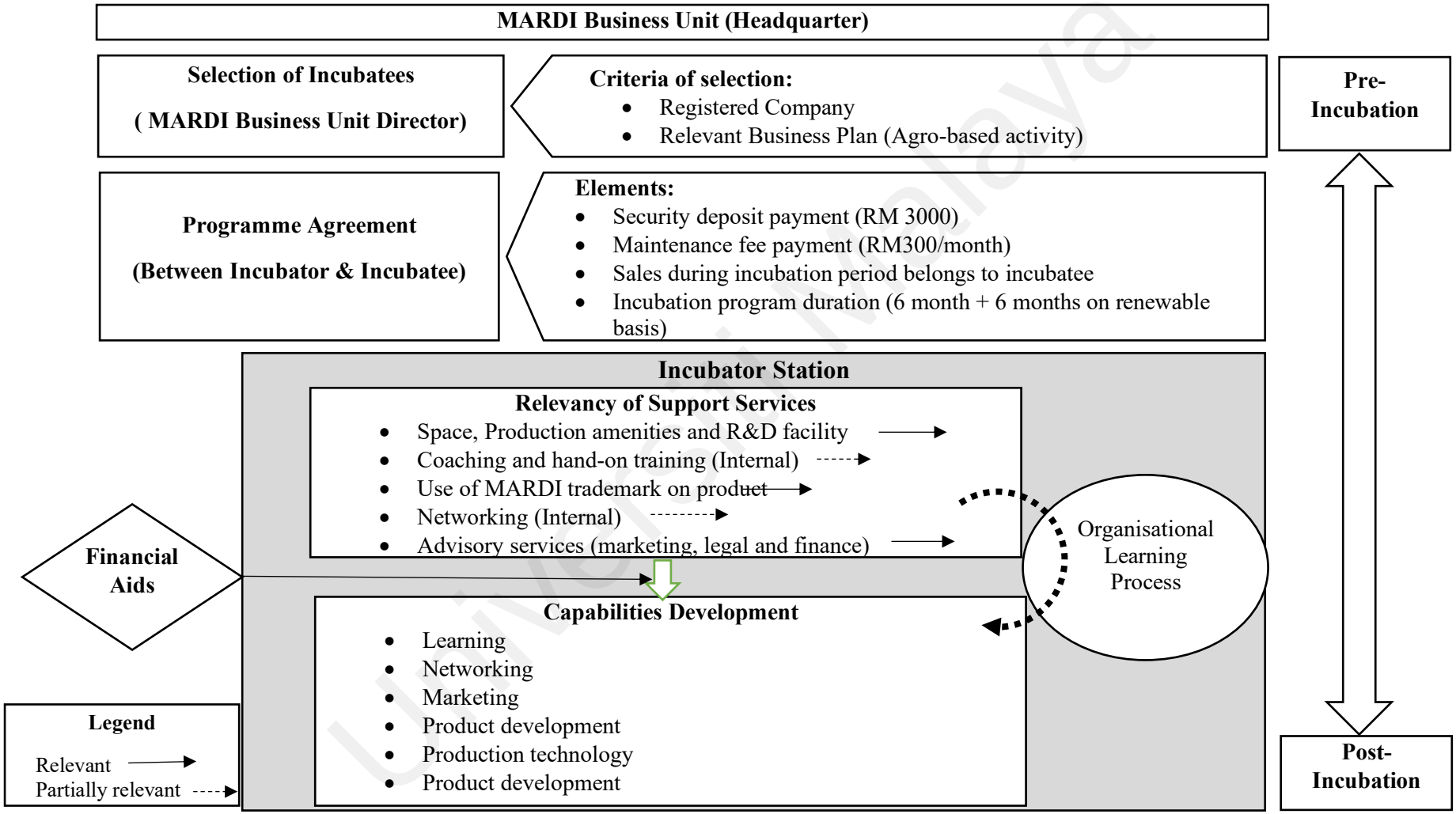

Figure 6.1: Summary of Study Findings

6.3 Policy Implications

Based on the key findings, issues, and challenges derived from the case studies, this study proposes the following policy implication:

a) Setting up a one-stop integrated platform for networking

The existing collaboration between incubatees and other external parties are more likely toward the fragmented type of collaboration. In other words, incubatees have to liaise with various stakeholder notably learning institution, suppliers, public sector and consumer in different platforms. Establishment an integrated networking system comprising various stakeholders notably government agencies, private sector-(past graduate incubatees), research institutions and the business association remains as an essential need for incubatees whereby the respective stakeholders could share any relevant info particularly with the agro-based industry. Indeed, lacking an integrated database system in MARDI incubation system is limiting incubatee's performance in terms of gaining several key necessities to develop its capability development notably marketing capability, product development, and production technology development at different incubation phases. Under those circumstances, MARDI has to play a catalyst role in establishing as such one-stop information centre via a database by integrating incubatees with other key stakeholders mainly supplier, agricultural universities, consumers for any of its new product development. Consequently, both incubator and incubatee could obtain the first-hand insights from other key players particularly in the agro-based market at three different phases namely pre-incubation, during incubation and post-incubation.

b) Promoting diversification and targeted downstream products

Selection of high value-added based product remains as a key challenge among agro-based incubatees. This is because most of the incubatees products are focusing on the broad market rather than a niche market. In other words, newly graduated incubatees would encounter stiff competition in the market if continuously producing homogenous types of products which broad targeting market than a specific one. At the same time, most of the agro-based incubatees are lacking in terms of diversifying their products toward a niche market rather than focusing the broad one. Also, incubatees can't target the broader market segment for its product due to the financial limitation in undertaking necessary promotional activities such as advertisement, publicity, exhibition and so forth. Given that, Ahmad & Suntharalingam (2009) stressed the importance of venturing into specialised niches and more downstream-based activity to escalate incubatees competitiveness via technological change and innovation in sustaining and enhancing its international advantage.

In reality, a greater value-added could be attainable through downstream activity unlike in upstream activity. For instance, presently cosmetic based incubatees are solely targeting a broad market by producing upstream based products from essential oil namely soap, shampoo, facial and so forth. Conversely, cosmetic based incubatees can shift their focus to a niche market by producing downstream-based and highly R&D intense products such as herbs based medicine for chronicle diseases. Ultimately, it is vital for Malaysia's PRIs such as MARDI perform mainly downstream or applied research in order to be relevant to their target customers in the long term (Thiruchelvam, Chandran, Boon-Kwee, et al., 2013). Of course, by engaging with as such downstream activity,

incubatee could intensify their business position at the frontier in the market despite sustaining its business performance during both incubation and post-incubation periods.

c) Nurturing open innovation and learning cultural

Even though the existing graduated incubatee had successfully established its network with various key players in the market but it is vital for them to reconsider in initiating cooperation with former agro-based incubatees domestically and internationally. It has provided that, former agro-based incubatees that are well-versed in both operations (e.g., product development and technology development) and non-operation activities (e.g., marketing and organisational learning) able to facilitate incubatee in undertaking a necessary initiative to accelerate their business performance during both incubation and post-incubation periods. At the same time, as such networking mainly with foreign agro-based start-ups could provide a better understanding and opportunity for incubatee in sustaining their business performance for long-term. To put it differently, local incubatee able to acquire insights from foreign agro-based start-ups in terms of new product development and other technical solutions despite identifying the new potential market for its products. Therefore, it is vital especially for MARDI in initiating collaboration via networking with other foreign agro-based incubators for the entire incubation program betterment since as such collaboration yield an extensive knowledge flow both technically and non-technically that eventually lead to open innovation as stressed by Chesbrough (2003).

d) Aligning national development plans and policy directions

The agricultural oriented incubation program has been inaugurated during the Ninth Malaysian Plan for the period of (2006-2010). The key thrust of this programme during the plan period is to accelerate the commercialisation of agricultural-based research findings and nurture young *agropreneur in agro-based industry.* However, this study argues that the Ninth Malaysian Plan does not provide comprehensive work-plan or strategies in materialising the incubation program objective. One major weakness has identified in the plan whereby it is merely targeting the commercialisation in agricultural incubation program as a whole without giving due consideration on the type of activities and products involved. The result through this study supports that mismatch of support services and other drawbacks occurred throughout the incubator programme since there was no attempt in reviewing and evaluating the programme effectiveness during Tenth and Eleventh Malaysian plans. As a result, there were a significant amount of non-graduated incubatees notably 21 incubatees unlike five graduated incubatees throughout MARDI incubation program since 2006. Besides, it is also important for policy reason to distinguish how to differ graduated incubatees in contrast with non-graduated incubatees in terms of prior business experience, choice of products, technology advancement, product development strategy, marketing strategy, and organisational learning process. Undertaking as such evaluation in advance could minimise non-graduate incubatees rate throughout the incubation program.

Meanwhile, in order to address rural poverty especially the income disparity between traditional and commercial farmers, the first National Agricultural Policy (1984-1991) was established by the Malaysian government. Consequently, in the mid-1990s and late 1998, the Second and Third National Agricultural Policy, respectively was launched

aiming to meet the key challenge in agricultural sector mainly encounter the demand of agro-food products for both domestic and international markets and address national food security agenda. In reality, none of these three National Agricultural Policies had highlighted any strategy thrust in addressing the productivity and competitiveness across the agricultural sector value chain. For this reason, the National Agrofood Policy (NAP) was initiated in late 2011. The policy primarily targets to intensify the agricultural food industry as a competitive and sustainable industry despite escalate agro-based entrepreneurs income. The NAP is not only focusing on agro-based industry sustainability but also create an opportunity, especially for healthcare based food products development. For this reason, the NAP identified 15 main agro-based products based on the potential market demand and consumer preferences besides prioritising the national food security objective.

However, the MARDI incubator programme objective is not in tandem with NAP. In other words, there is a mismatch between products promoted via MARDI incubation program and NAP. In fact, the list of products promoted by NAP is inclined towards Malaysian staple food products, different from MARDI incubation program that is mainly promoting snacks oriented products. Of course, it is unfair to accuse MARDI in promoting as such products since most of the incubation program participant are keen towards snacks based products which could maximise their profit. Therefore, MARDI needs to revise the choice of its existing products by streamlining with NAP agro-based products especially herbal and organic-based products despite promoting healthy diet intake among Malaysian.

Above all, none of the agricultural policies highlighted specifically the necessary support services both technical and non-technical supposedly should be rendered to

entrepreneurs in the agro-based industry. Essentially, the production of each agro-based product comprises different types of support services in terms of production space, R&D facility, raw material, and production technology. Indeed, the result through this study highlights the importance of appropriate support services to entrepreneurs in the agro-based industry in developing several essential capabilities notably marketing, product development and technology development for better business performance in long-term. Thus, this study shed new light on the agro-based start-ups business sustainability by integrating necessary support services via organisational learning approach in enhancing key capabilities development. Ultimately, understanding these key elements integration particularly in agro-based start-ups is vital to outline specific policy drives.

e) Strengthening incubation program coordination

MARDI incubator programme creates a promising opportunity for young entrepreneurs to venture agro-based businesses. Although numerous support services provided by MARDI to local entrepreneurs since 2006, an appropriate and focus coordination with the right support services are essential to accelerate agro-based start-ups business performance. In other words, the study findings suggest that coordination should cover every aspect of both incubators and incubatees. In the case of the incubator, an internal review committee should be formed to examine intensely the support services relevancy in sustaining incubatees business performance during and after incubation periods. Furthermore, MARDI needs to extend its coordination role especially during the post-incubation period since that it was the most challenging period for both graduated and non-graduated incubatees in accelerating their business performance its survivability in long-term. Indeed, MARDI can coordinate better on incubatee's business operation, and its performance gave that, incubatee proactively share some precious insights with

MARDI for the incubation program betterment as a whole. Hence, appropriate support services and focus coordination on MARDI incubation program is essential for incubatee to capitalise the opportunities in the agro-based industries.

f) Revisiting MARDI technology transfer mechanism

The latest technology dissemination is another crucial issue in the MARDI incubator programme. In fact, some of the incubator stations managed to develop indigenous technology such as production machinery that serves accordingly to their business nature. Despite the latest technology adaptability and catch-up challenges in both incubator stations, it is vital for MARDI in venturing into licensing its technology to agro-based incubatee so that the right stakeholder can utilise the technology optimally as well as efficiently. Of course, as such a strategy will create a platform for MARDI to innovate and improvise the agro-based production technology with other latest technology features in enhancing its production's productivity. It is important to realise that, the most innovated and improvised technology deployment is essential for incubatee particularly in agro-based production operation to attain a competitive advantage such as economy of scale. By engaging with as such improvised and innovated production technology, incubatee able to produce output at minimal cost besides maximising its profit and productivity optimally with limited resources utilisation.

g) MARDI role beyond incubator

Philosophically, incubator including MARDI is aiming to nourish new businesses by safeguarding them from the competitive environment. This because newly established businesses survivability in the market remains a key challenge for most of the incubators.

Therefore, incubator such as MARDI needs to expand its role from solely being an incubator to become an accelerator. By acting as an accelerator, MARDI can ensure the incubatees business survivability at post-incubation phase by devising an appropriate support services mechanism. Furthermore, the accelerator role is beyond than incubator role that accelerates incubatees business engagement in adapting and learning new things quickly according to the current market trend (Cohen, 2013).

In reality, the majority of the accelerators are initially from the private sector and take an ownership stake in the participating companies (Cohen, 2013). Furthermore, there are several accelerator managers became angel investors in providing financial support service to the ventures. Nevertheless, incubators are largely owned by the state and regulated by managers and not own any investment funds (Cohen, 2013). As a consequence, incubator such as MARDI needs to secure top management support for building acceleration mechanism mechanisms because it is a challenge to the conventional way of doing business. (Kupp, Marval and Borchers, 2017).

6.4 Research Limitations

The limitations of this research findings warrant some attention. As indicated in Chapter 1 (section 1.5), this study deploys a micro-level case study approach based on a single agriculture research institution known as MARDI. Although this study has argued for the merits of the frameworks used in terms of permitting an in-depth understanding of the single case study, as in any research, this study too has its limitations. Firstly, this study uses a smaller sample size (four cases) comprise both graduated and non-graduated incubatees. Moreover, this study is unable to increase sample size particularly the non-graduated incubatee in examining their failure factors intensely as most of the non-graduated incubatees business operation was dissolved after the incubation period.

Secondly, this study focus is limited to two incubator stations and four incubatees from both Kedah and Malacca states. Furthermore, certain viewpoints from the interviewees are quite subjective especially in answering certain questions that related to their future business prospect. Thirdly, the study is limited in terms of secondary data availability in order to validate the entire study findings quantitatively. Indeed, as such constraint limiting the study to examine the evolution of incubatees business performance from pre-incubation to post-incubation periods. Finally, the study findings and lessons are not generalisable among incubators in other sectors as a whole since this study specifically focusing on the agricultural oriented incubation system. Since the limitations of this research findings warrant some attention, and therefore, the policy implications that drawn from this study is particularly applicable in the context of MARDI incubation programme rather than generalising across incubation program as a whole.

6.5 Future Research Direction

All the objectives determined at the beginning of this research have been achieved. This research takes a step forward to understand the entire agro-based incubation system better. By specifically, this study findings highlight the mismatch of support services in intensifying several key capabilities development in terms of marketing, product development and production technology development for incubatee's business performance betterment. At the same time, this study demonstrates the most precise support services required by incubatee at different phases namely during incubation and post-incubation in sustaining their respective business operation and its performance. The importance of agro-based incubation program and its contribution toward the national agricultural system has been examined intensely. Essentially, the overall outcome of this study also signifies the contribution of the study towards establishing new policy direction in intensifying national agricultural systems through agro-based start-ups promotion.

However, for future research, it is suggested that a similar framework applied to examine the start-up's performance from various economic sectors. This due to the generalisation of the research finding as a whole. Apart from that, more focus should be given towards failure start-up business as this type of research provides precious lessons for other newcomers in a similar industry. It would be interesting if the start-up based case studies conducted at three different phases notably pre-incubation, during incubation and post-incubation by deploying the similar research strategies and analysis tools in assessing several essential indicators such as the capabilities development, learning process, business performance and so forth.

Apart from that, the future research pertaining to agro-based incubation system should extend beyond cross-country comparison, as there was a lack of past studies carried out particularly in the agricultural sector. In the same vein, it is vital to undertake any future research in examining the variation among different types of incubators namely business incubator, social incubator, university incubator, and technology incubator. In fact, the similar parameters that deployed in this study notably relevancy of support services, organisational learning and capabilities development can be used whenever conduct a comparison study among different types of incubators.

6.6 Contribution of Study

This study takes a step forward to better understand the entire process of agro-based incubation system from pre-incubation to post-incubation phases by incorporating the incubatee's selection process, the relevancy of support services and crucial capabilities development via organisational learning into the analysis. By specifically integrating the incubator support services with organisational learning as well as capabilities

development, the analysis in this study contributes, particularly to incubation system literature. Furthermore, the outcome of this study also signifies the contribution of the study towards establishing new insights in escalating incubatee's business performance at both during and post-incubation periods.

This study also highlights important links between support services, organisational learning process, capabilities development and potential pitfall in contributing significantly to business performance. In other words, support services is not a key factor in determining incubatee's business performance unless incorporating organisational learning process systematically to develop several essential capabilities for performance betterment. As a whole, the contribution of the study includes forming a new conceptual framework as well as providing new insights for agro-based start-ups policy implication.

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