SUSTAINABILITY OF THE IMPACT OF EXTERNAL INTERVENTION WITHIN SME MANUFACTURERS

By

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DECLARATION

No portion of the work referred to in the thesis has been submitted in support of an application for another degree or qualification of this or any other university or other institute of learning.

ABSTRACT

Small Medium Enterprises (SMEs) are not usually prepared for an unexpected hit or crises, and thus, guidance is required frequently in order to maintain their businesses, particularly in sudden unpredictable periods. The concern is on how to embed the necessary knowledge and skills to secure that any resulting improvement is sustainable to SMEs. Viewing this deficiency, thus this study is aimed to explore the sustainability of the impact of an external intervention in SMEs by looking into the complexity of different journeys that companies experience through knowledge acquisition. It investigates how it results in achieving sustainable improvement in manufacturing based SMEs in the Northwest, UK.

In doing so, this research considers three theoretical concepts identified as Absorptive Capacity (Cohen and Levinthal, 1990; Zahra & George, 2002; Lane et al, 2006; Todorova and Durisin's 2007), Tipping Point (Gladwell, 2000, 2002) and Knowing Doing Gap (Pfeffer and Sutton, 2000, 2013). The purpose is to discover the role each plays in developing and supporting an environment so that SMEs can accomplish a degree of sustainable improvement leads to growth.

The focus was on in-depth intervention represented by the Knowledge Transfer partnership (KTP) scheme funded by the Technology Strategy Board (TSB), assessed as a platform that embodied the practical and theoretical concepts presented in this work. The term intervention (Done et al, 2011; Ismail, 2011) is defined as an instrument specific to those types of external support that SME's would seek in order to improve one or more aspects of their businesses. In this thesis, intervention involved three parties. The first of these saw provision of "knowledge experts" from academia –

universities and institutes. The second concerned technical experts that had already been working within the company. Finally bringing everything together is the KTP that allows transfer of knowledge to take place over the short term (i.e. 1 to 3 years). The results of intervention are critical. Done et al, (2011) suggests that it will have a long term impact by introducing new practices of short term activities such as knowledge transfer.

As a qualitative research project, the method used to obtain data was through interviews of selected companies as case studies. The investigation was conducted by revealing the interaction process within the implementation of intervention using an exploratory methodology. In the empirical stage, the framework by Bessant et al. (2005) and the Knowing-Doing Mapping tool were used in mapping the companies and the intervention projects they implemented. The input-process-output analysis produced evidence to support the results. Key criteria and influencing factors such as drivers and constraints were considered to evaluate the current companies' position, and how they may practically progress from one level to the next. Building on this, those factors were compiled to develop a framework for achieving sustainability. The framework represents an interacting process mapping out the various stages of improvements resulting from the intervention plan created around knowledge.

This study investigates the issues that the selected companies faced and their attempts to provide solutions through the use of knowledge transfer. The analysis developed a framework that allowed investigation of factors that impact on the sustainability of external intervention. The framework identifies the "enablers" and "barriers" facing SMEs in this process. Enablers were identified as drivers that motivate the company to move forward. Whilst barriers were identified as impediments that

SMEs need to avoid for reducing risk in applying embedded knowledge. Therefore it is suggested that by applying this framework companies would become aware of the path or route through which they can find a better chance of success and avoid relapse.

This thesis has identified a novel proposition to map and present the path that companies take through acquisition and adaptation of knowledge by engaging with an external party to undertake an intervention project. The results show that a successful journey to achieve a breakthrough can be substantially supported by the correct intervention plan implementation appropriate access of the SMEs to proper guidance. It is observed that successful intervention has geared companies to increase their flexibility and ability in continuous progress and development. In some cases, the company was totally transformed in this respect. This thesis is believed to offer a new approach and model to introducing and implementing interventions project in SMEs that will add value to SMEs, assist them to absorb their required knowledge, and sustain growth and innovation in the firm.

Keywords:

Intervention
Sustainability
Absorptive Capacity
Tipping Point
Knowing-Doing Gap

DEDICATIONS

I specially dedicated this thesis to all of my families with forever love:

- My beloved father TEGOH (who has passed during the works). He was the behind power for me to pursue this study.
- My beloved mother Patanah who always be my inspiration.
- Beloved family; husband, Amran and lively children, Aqilah, Izzati, Afiq and Najihah.
- All of my beloved families in my home country, Malaysia.

Your endurance patience, continuous support, understanding, and priceless presence in your own distinctive way in any circumstance all these years have put me in a peaceful and consistent state of mind. Without you, it would have been difficult for my dream to become true.

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involved in this work, your priceless continuous support and guidance throughout the whole years has helped made this work possible.

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List of Abbreviations

ACAP	Absorptive Capacity
B2B	Business to Business
C	Retail/End customer
C1	Case Study 1
C2	Case Study 2
C3	Case Study 3
C4	Case Study 4
C5	Case Study 5
C6	Case Study 6
C7	Case Study 7
ERP	Enterprise Resource Planning
FS	Formal System
H	High
HEI	Higher Education Institution
ICT	Information and Communication Technology
ISO	International Organisation for Standardisation
IT	Information Technology
KDG	Knowing-Doing Gap
KDM	Knowing-Doing Map
KPI	Key Performance Indicator
KTP	Knowledge Transfer Partnership
L	Low
M	Medium
MD	Managing Director
ME	Market Entry
NPD	New Product Development
NVQ	National Vocational Qualification
OF	Obtaining Finance
OI	Operational Improvement
PM	People Management
R&D	Research and Development
Sg	Strategy
SMEs	Small Medium Enterprises
SSM	Soft System Methodology
TP	Tipping Point
TQM	Total Quality Management
Vs.	Versus

Chapter 1

INTRODUCTION

If you can't explain it simply, you don't understand it well enough.
(Albert Einstein)

CHAPTER 1 INTRODUCTION

1.1. Introduction

This chapter presents an overview of the entire thesis with an objective of developing a research structure on how the overall research was conducted. It identifies the key elements of the research including the research background, aims, objectives, issues, gaps and contribution. In addition, it summarises the content of each chapter with a brief explanation on the main topics of these chapters.

1.2. Research Background

Significant research such as that by Julien, (1993); Deakins, and Freel, (1998); Levy et al, (2003); and Bessant, (2005) have been carried out to identify knowledge and skill factors that impact on SMEs' performance and growth. In addition, Levy et al, (2003) suggest that the knowledge gained can also be used by SMEs to add value in improving their competitive advantage. SMEs are often more vulnerable to changes in the business environment due to their size and their inability to acquire knowledge fast enough. The lack of these key skills places SMEs under more pressure than others when attempting to sustain or grow their businesses. To address this, enlightened SMEs have traditionally sought support from external bodies, such as consulting firms, trade associations and sector alliances, regional and national support bodies and less so higher educational institutions. The range of support offered by these bodies varies from training and skilling to addressing specific business vulnerabilities to in-depth support aimed at restructuring the business to become more viable.

This research focuses on how it is possible for an external intervention to help companies to expand their businesses by considering the impact on the outcomes of the implemented intervention.

1.3. Research Aim

How to sustain the gains from a successful intervention in a SME has not yet been fully researched. This research aims to make a contribution to knowledge by exploring ways to describe the complexity of different journeys that companies experience through knowledge acquisition when external intervention occurs. The main purpose is to identify critical factors impacting on the sustainability intervention, and develop them into a conceptual framework to guide intervention projects in SMEs.

1.4. Research Objectives

In order to fulfil the stated aim, in-depth analysis is required, the objectives of which are defined as follows:

i. To provide a greater understanding of the concepts of Absorptive Capacity, Tipping Point and the Knowing Doing Gap by reviewing the relevant literature.

ii. To identify enablers and barriers - the critical factors in the intervention process.

iii. To develop a framework that SMEs can apply as a roadmap and which motivates them to apply intervention projects for acquiring or exchanging knowledge to secure sustained growth and innovation.

1.5. Problem Statement

SMEs may not be aware that embedded knowledge is important for improvement of their business performance. Ambrosini and Bowman (2001) have argued that the required knowledge is difficult to implement and transfer. Often it is such as difficult to understand, write down or formalize that knowledge in practice. Amit and Shoemaker, (1993); Grant, (1991) and Rao, (1994) provide support to the view that the transfer of knowledge is difficult to process. They suggest that to absorb knowledge requires a process that can increase capability. Therefore it is believed that bringing knowledge into the company will allow them to improve their daily operation.

Unforeseen and uncertain external problems, such as economic issues, strategic problems etc. may cause a very intense rivalry which could have a deep impact to SMEs indirectly. This changing environment and continuous disturbance engender indecisiveness in SMEs. They are not prepared nor are they fully equipped to protect themselves. Catastrophic disruptions could adversely affect the operations and severely disrupt important activity of the company, leading to dysfunctional operations. Therefore, the worst case that could occur is that they may not survive. Thus, it is suggested that SMEs are in need of solid guidance to sustain their operations. In today's business environment, it would not be a surprise if the business that existed today is gone tomorrow. In the worst case, some of those SMEs can be easily wiped out with business turbulence without prior indication.

In a normal SME "lifecycle" (McMahon, 1998) they develop, grow and tip to a steady state in their businesses. Some of them have do extremely well, however, not many can grow further. The questions that remain are how they can be motivated to move on; how this can be done; what knowledge is required and what actions have to be taken to achieve their targets.The reality is, whatever state that they are in now, the position could be improved for better. There ought to be solutions to these issues. As such, this study will focus on how SMEs are encouraged to nurture their business. Issues arise as company needs to feel obliged to build on the expertise and knowledge provided to it, if it is to be sustainable. The question remains whether the push for sustainability suit the company's needs, or would the company have the capacity to keep going. This study will attempt to respond to this concern.

Investment in intervention is believed to add new values that can benefit the company in preparing for various contingencies. It shall be expected that with the attained knowledge, SMEs are better prepared for internal or external challenges as they become more knowledgeable in dealing with uncertainties. As a consequence, SMEs become more robust in protecting themselves, and resilient in facing unexpected changes. It is also anticipated (Done et al, 2011; Ismail, 2011) that intervention will raise awareness within SMEs of their capability to absorb knowledge and use it.

Julien, (1993) argues that SMEs are different from big firms and large organisations and therefore must be studied separately. An in-depth understanding of their important role in economic means will help to appreciate their dynamic characteristic of simple and flexible structures which is the uniqueness of their main driving force. These characteristics differentiate them from big firms as it takes into account their increasing importance in terms of numbers and job creation within economies (Julien, 1993; Ismail, 2010). Penrose (1959) looks at SMEs by highlighting their ability to fulfil needs

that cannot be fulfilled by larger organisations. However, Simon et al, (1958) and Lucas, (1978) suggest the difference is seen by differing abilities required by managers to run such companies.

1.6. Research Questions

The following questions are formulated to assess an empirical analysis and to find the determinants of sustainability of the impact of external intervention within Manufacturing SMEs (within UK).

Question 1.

How and to which extent can external intervention influence knowledge-transfer in helping SMEs to improve their business performance and lead towards sustainability?

Question 2.

Is there a need for a framework that enables a structured approach to be used, in order to support and enhance knowledge for SMEs seeking strategic and practical improvement in creating sustainability?

Question 3.

Are there any barriers in external interventions and transfer of knowledge, and what risks and obstacles are present in knowledge transfer process?

Question 4.

How a company can acquires knowledge and to what extent it may helps in sustainability of long term performance?

Question 5.

What are the influencing factors involved during the interventions processes that can lead to sustainability?

1.7. The Gap

Bessant et al, (2005) developed an extensive study of a framework which was consisted of factors including Absorptive Capacity (ACAP) and Tipping Point (TP) for identifying the factors that contribute to growth in SMEs. This framework represented the enabling factors against the level of knowledge as a starting key point for growth and sustainable business development, addressing four simple stages identified as ignorance, awareness, knowledge and implementation. However, the stages involved were not clearly addressed. From a practical view, this framework can be argued whether it functions and brings impact on SME. In fact, from the sustainability perspective, this model seemed too simplistic and generic.

In Bessant's et al (2005) framework there were no clear motivation or impediment factors that can be used as a roadmap to help SMEs. Practically, those factors are anticipated to be critically important as they guide SMEs in what they need to be aware of and careful about, what actions need to be taken for them to keep growing and what

to look out for to avoid relapse. The question remains that the probability of the company to succeed was not clearly presented in this framework.

At this point, there are no clear suggestions of the drivers and obstacles on how to implement the intervention to create sustainability in SMEs. The influencing factors of the sustainability remained unrevealed. Particularly, the impact after the implementation of intervention and knowledge absorption in applying this framework is still unknown.

Realising this deficiency, this study attempts to address this shortfall by considering another concept by Pfeffer and Sutton (2000, 2013) known as Knowing-Doing Gap (KDG) as an important element in achieving sustainability, which could strengthen the framework. Pfeffer and Sutton, (2000, 2013) describe the concept of KDG in terms of knowing that there is something wrong and not doing anything about it. This concept emphasises that "doing" is more important than the "knowing" in which "knowing" only is insufficient. The concept suggests by "doing the knowing" reflects more implication of taking the action to produce result. Simply put, it highlights the phenomena in organisation where there is knowledge or awareness that there is something wrong, however, no action is taken to rectify it.

Considering the importance of these concepts, however, theories remain unrevealed to put the integration of the three concepts (ACAP, TP, KDG) into one model. The existing framework of Bessant et al (2005) consists of combination of only two concepts (ACAP and TP). There are studies of ACAP done by (Cohen Levinthal, 1990; Zahra & George, 2002; Lane et al, 2006, Todorova and Durisin's 2007), however, are emphasising the individual concept with no attempt to integrate into one framework. This shortcoming is considered as a major gap that needs to be explored by integrating

the three concepts into one. It is viewed that it would be better if the various factors involved are clearly specified so that it can be used by academia or practitioner as a benchmark in implementing intervention. Hence, further work is needed to be done to scrutinize the influencing factors of sustainability known as “enablers and barriers” of intervention projects for sustained growth.

Another deficiency of current studies that is often termed as the integration of these three concepts (ACAP, TP and KDG) is newly receiving attention. Thus far the concepts have not been explored well in academic studies. Among the limited exploration of the idea most works are coming from the non-academic researchers and practitioners. This is evidenced by the fact that the existing framework by Bessant et al (2005) was developed based on an initial industry focused report, and the TP concept was based on a book. The individual concept seems to have reached theory saturation which requires new development. Therefore there is a genuine need for the endeavour to investigate and explore the concepts in-depth, so that it can become well situated as part of the larger body of knowledge in the subject area. Bringing this practitioner-orientated framework into the academic domain using empirical data will contribute to the existing literature. Through case studies, the study has reflected on the evolution of practical implication meaning into the theory of concept.

1.8. Thesis Structure

This thesis consists of seven chapters which are depicted in Figure 1.1. below.

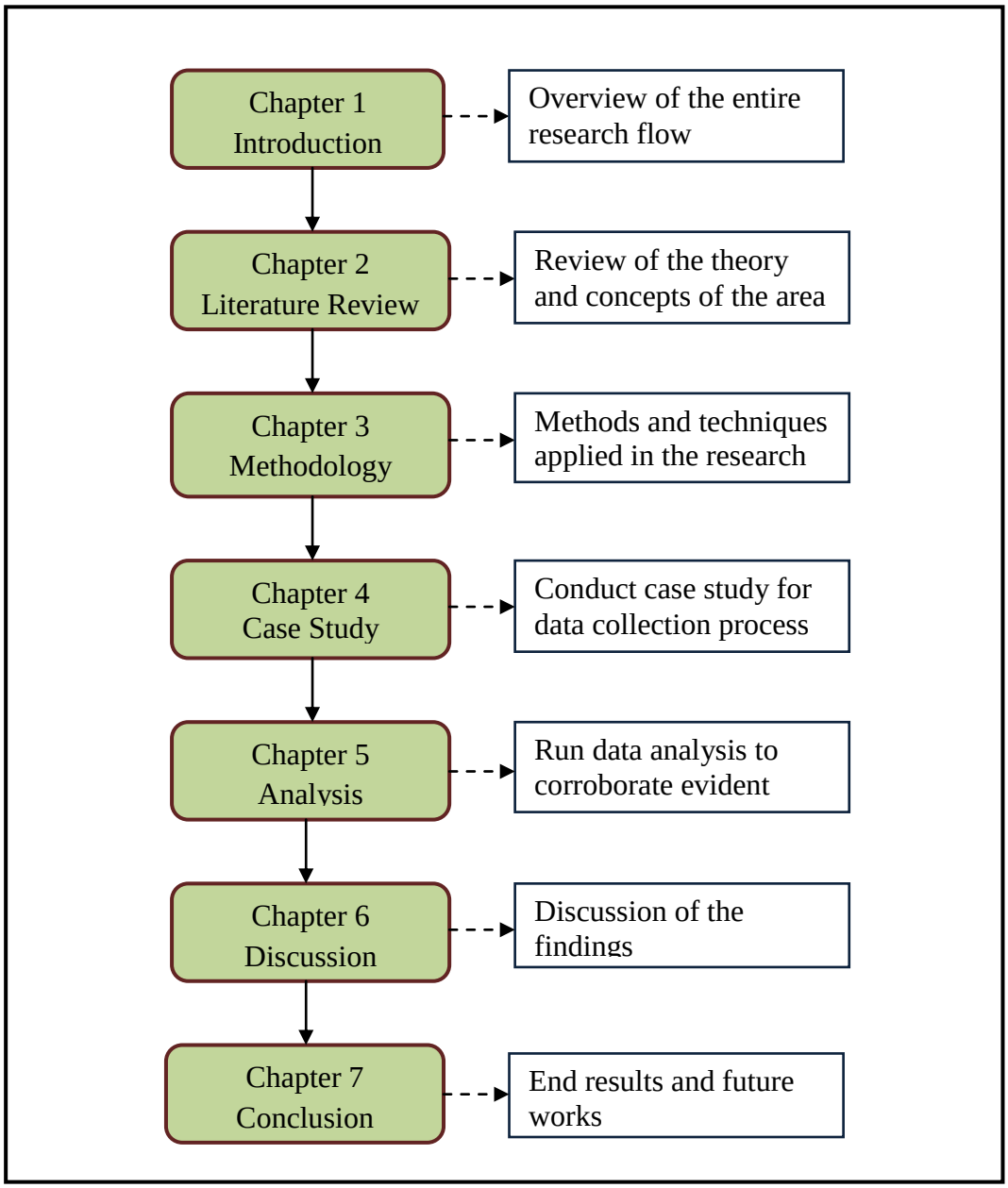


Figure 1.1: Thesis Structure

1.9. The Author's Contribution

This study has resulted in contribution to knowledge in a number of ways. First the study brings together some less theoretically explored concepts together to develop an extended theoretical view on sustained growth of firm through knowledge acquisition from intervention projects. Second the theoretical framework is enhanced by developing a practical view into the theory, where concepts of Absorptive Capacity and Tipping Point model by Bessant et al 2005 are combined with the concept of Knowing-Doing Gap (Pfeffer et al, 2000) in a much wider context. As the result "Knowledge Application" and "Sustainability" frameworks have been developed that can be used by SMEs as a roadmap. In the process the study has also presented a detailed account of factors that influence sustainability identified as enablers and barriers, which would be of practical use to SMEs. Guidelines when considering implementation were also suggested. This contributions explained are providing new grounds for further research on the subject, and are perceived to be useful to SMEs, practitioner and policy makers when considering intervention.

1.10. Summary

This chapter offers an introduction to the background to the overall thesis covering the main concern of the research, the aims, objective, issues, questions and the gap in the field. The needs of the research are identified and elaborated from the perspective of the business context and the research structure is also discussed.

Chapter 2

LITERATURE REVIEW

If the facts don't fit the theory, change the facts.
(Albert Einstein)

CHAPTER 2 LITERATURE REVIEW

2.1. Introduction

This thesis presents a research study on three key subject areas, namely Absorptive Capacity (ACAP), Tipping Point (TP) and Knowing-doing Gap (KDG), with respect to its practical application of these concepts in daily operation of manufacturing companies. An overall view of the literature for understanding the topic area is illustrated. It focuses on how these selected dimensions would potentially help companies to expand their businesses by concentrating on knowledge as the key element. It is aimed to create sustainability for improvement in the business. Fundamentally, it is an idea that would enable the creation of a mechanism for SMEs to constantly grow.

In this study, an external intervention is identified as the instrument to support introducing new knowledge into the company. It is viewed that by integrating these concepts empirically, a new approach could be proposed by developing a new framework focusing on achieving sustainable growth through intervention in SMEs. This is predicated on the view that the intervention (Done et al, 2011; Ismail, 2011) in the company will be viewed as a platform that embeds these concepts. The work progresses on the important principles in current literature, including definitions, theoretical concepts, views and reviews of the subject. Important criteria such as models and applications are considered from different perspective.

2.2. Absorptive Capacity

The term “Absorptive Capacity” or also known as “ACAP” (Zahra and George, 2002) was first proposed by Kedia & Bhagat (1988) where they suggested a conceptual model of technology transfer. However, further development by Cohen and Levinthal (1990: 128), viewed ACAP as “*a firm's ability to recognise the value of new information, assimilate it, and apply it to commercial ends*”. It is described further by (Lane et al., 2006: 856) as a “*firm’s ability to utilise externally held knowledge through three sequential learning processes, i.e., exploratory, transformative and exploitative*”. In other words it is the capacity that the company requires to absorb new knowledge for improvement and gaining advantage.

The author views ACAP as a new perspective of learning new things. Zahra and George (2002) argued that previous studies viewed ACAP as a set of firm abilities to manage knowledge. However, Zahra and George (2002: 186) defined ACAP as “*a set of organisational routines and processes by which firms acquire, assimilate, transform, and exploit knowledge to produce a dynamic organisational capability*”. They extended the study from ”Potential” to “Realised” as depicted in Figure 2.1.

This model (Zahra and George, 2002) links the antecedent, moderator and outcomes which highlights an external knowledge and experience as components of the antecedent. It also suggests other components of activation triggers, social integration mechanisms and regimes of appropriability of ACAP. The model indicates that both the “Potential” and “Realised” capacity particularly contribute to competitive advantage.

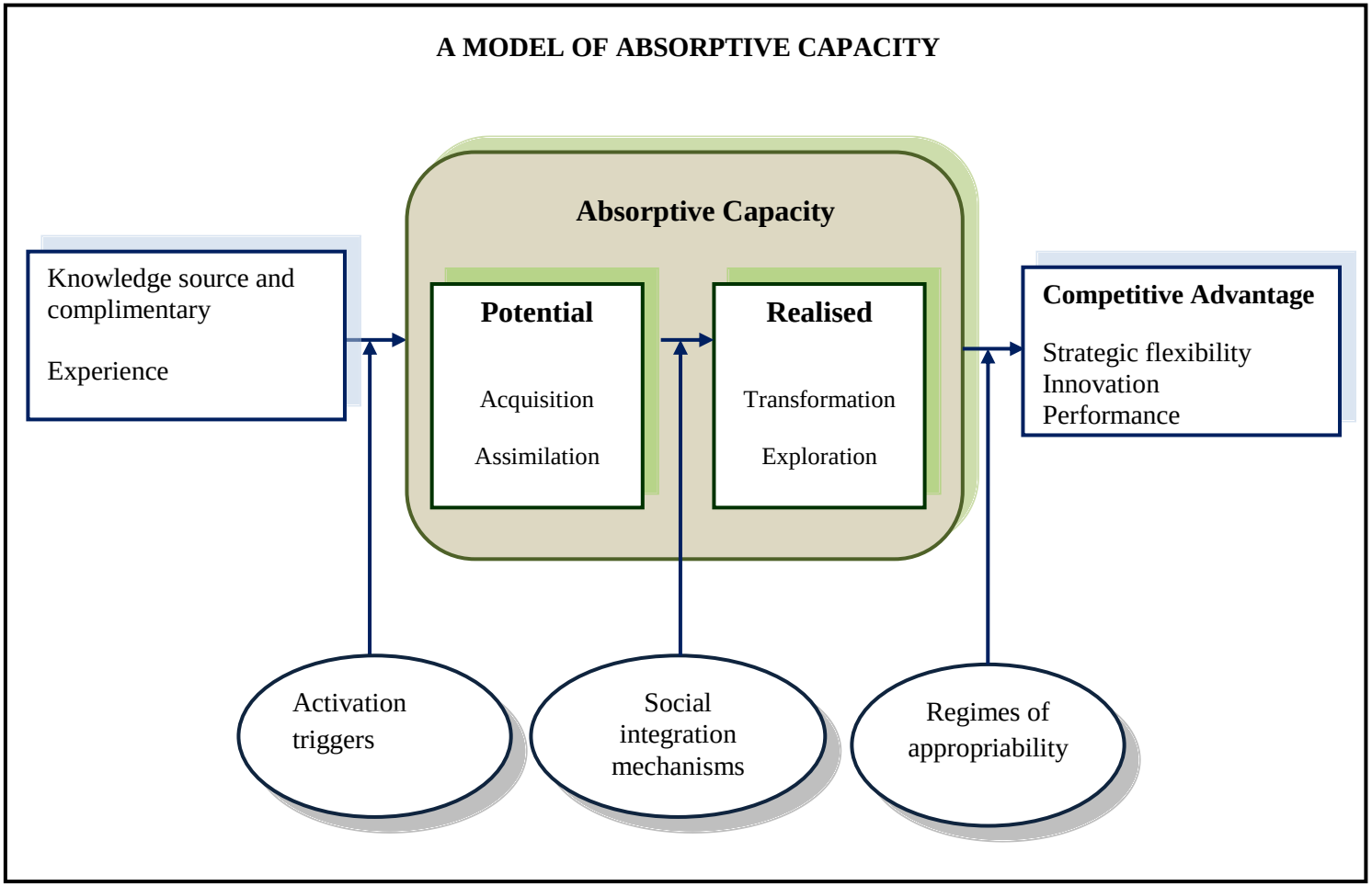


Figure 2.1: Source: Zahra and George (2002), Absorptive Capacity Model

Cohen and Levinthal (1990); Zahra and George (2002); Lane et al, (2006); Todorova and Durisin (2007), viewed ACAP as studies that involve a firm's innovation performance (Tavani et al, 2013), aspiration level, and organisational learning. Sensibly, it can be considered as a firm-level concept that captures the evolution of learning and utilisation of new knowledge which accumulates over time. Simply put, it is an innovation to a new concept of learning or an ability to explore the external knowledge. Precisely, it is a process of learning how to learn which is a capability to evaluate, absorb and transform knowledge-based information into implementation and utilisation.

Researchers in ACAP (Cohen and Levinthal, 1990; Zahra and George, 2002; Lane et al, 2006; Todorova and Durisin's, 2007), attempted to define those key processes involved in ACAP and have incremently extended these over the years. Table 2.1. summarises this evolution of the ACAP concept and application while Table 2.2. describes each of the proposed processes.

Table 2.1: Summary of the Absorptive Capacity (ACAP) Processes

Author	**Key Processes**
Kedia and Bhagat, (1988)	Introduced the first term of "Absorptive Capacity".
Cohen and Levinthal, (1990)	Contributed the concept of "*a firm's ability to recognise the value of new information, assimilate it, and apply it to commercial ends*".
Zahra and George, (2002)	Extended a new model into four dimensions; i. Acquisition. ii. Assimilation. iii. Transformation. iv. Exploitation. Reconceptualisation of capacity to; i. Potential. ii. Realised.
Lane, Koka and Patak, (2006)	Captured; i. Exploratory learning. ii. Transformative learning. iii. Exploitative learning.
Todorova and Durisin (2007)	Extended to; i. Recognition. ii. Acquisition. iii. Assimilation or transformation. iv. Exploitation.

Table 2.2: The Descriptions of Absorptive Capacity Processes

Activity	**Descriptions**
Exploration (Lane, Koka and Patak, 2006)	Discovery and leveraging the organisational knowledge that is required by the company. A process of recognising and understanding potentially valuable new knowledge outside the company through exploratory learning.
Recognition (Cohen & Levinthal, 1990; Todorova & Durisin's, 2007)	Identify new knowledge characteristics to generate technical knowledge.
Evaluation (Cohen & Levinthal, 1990)	Capability to evaluate the critical criteria to absorb and transform the knowledge-based information to implementation and utilisation.
Acquisition (Zahra & George, 2002; Todorova & Durisin's, 2007)	Recognise and acquire the value of new knowledge or external information that potentially generates competitive advantage to the company.
Assimilation (Cohen & Levinthal, 1990; Zahra & George, 2002; Todorova & Durisin's, 2007)	Adjust, refine and absorb external knowledge into understanding, learning capability and training. A process of assimilating factual information.
Transformation (Zahra & George, 2002; Todorova & Durisin's, 2007)	Develop and revolutionise knowledge transfer into new routines, professional connections. A process of absorbing valuable new knowledge through transformative learning into the company.
Exploitation (Zahra & George, 2002; Lane, Koka & Patak, 2006; Todorova & Durisin's, 2007)	Apply and utilise the newly acquired knowledge in products or services. Applying the assimilated knowledge to generate new knowledge and commercial outputs through exploitative learning.

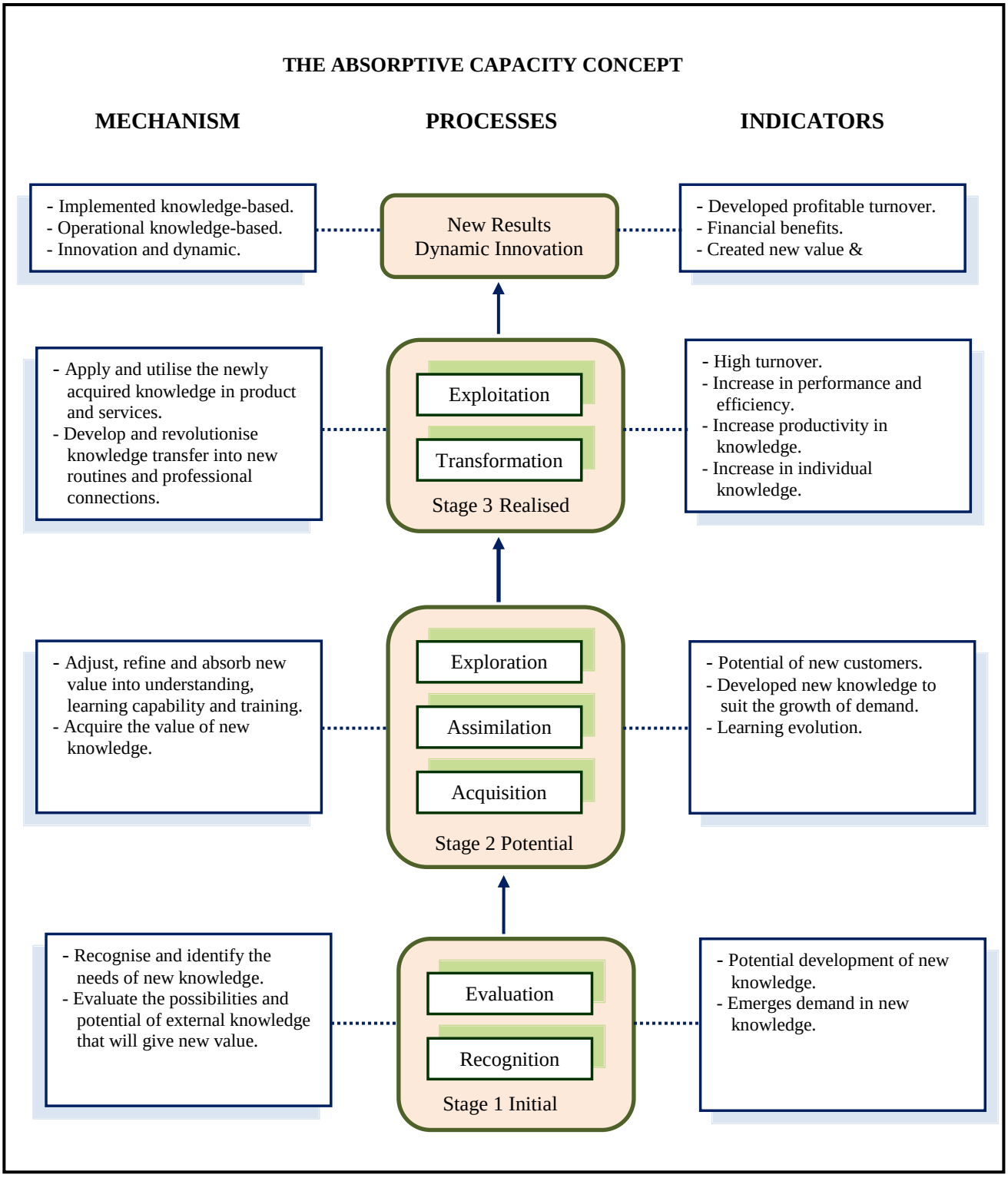


Figure 2.2: Source; The Absorptive Capacity concept reviewed from Cohen and Levinthal, (1990); Zahra and George (2002); Lane et al, (2006); Todorova and Durisin's (2007)

Studies (Cohen and Levinthal, 1990; Zahra and George 2002; Lane et al, 2006; Todorova and Durisin's, 2007) suggest that when ACAP process is realised and fully applied in practice, the new indicators will appear as a positive signal to sustainability as shown in Figure 2.2. In a way this good indicator has demonstrated that theoretical concepts will benefit SMEs in achieving business growth.

2.3. Tipping Point

Gladwell (2002: 9), defines Tipping Point (TP) as "*a critical point which determines whether an idea, product, message, or behaviour will explode into mass popularity, conventional marketing wisdom, or connected by social networking*". Gladwell (2002: 9), argues that a TP is "*that one dramatic moment in an epidemic when everything can change all at once*." For a company, this could be viewed as a certain point when an initiative of changing the organisation culture or work pratices propagates in the organisation and develops its own momentum. TP is also viewed as a point of no return or relapse.

In Gladwell's (2000) study, three crucial rules have been set to strengthen the TP concepts which are:

- Law of few which explains why specific individuals are more influential than others at conveying information, trends, and behavioural practices. Other pertinent examples are advertising or other interventions for social change and influences.

- The stickiness factor which defends the sticky idea as memorable, practical, and personal. The sticky idea is adapted as such a “magnetic power” for the demand of a message or social practice.

- The power of context which elaborates the power of changing the environmental integrity to improve the associated situation or “connectedness”, for instance group size might play an important role to change the environmental perspective.

It is perceived that, in order to create a TP, influential people and sticky ideas need an environment where these ideas can flourish and engage with other areas of interest in that environment. Only then will dramatic changes occur. These factors help to achieve the fullest potential and to “hit the high points”. Alternatively, organising big events could also be a possible route to achieving this objective. The Tipping Point (Gladwell, 2000) concept is represented in Figure 2.3.

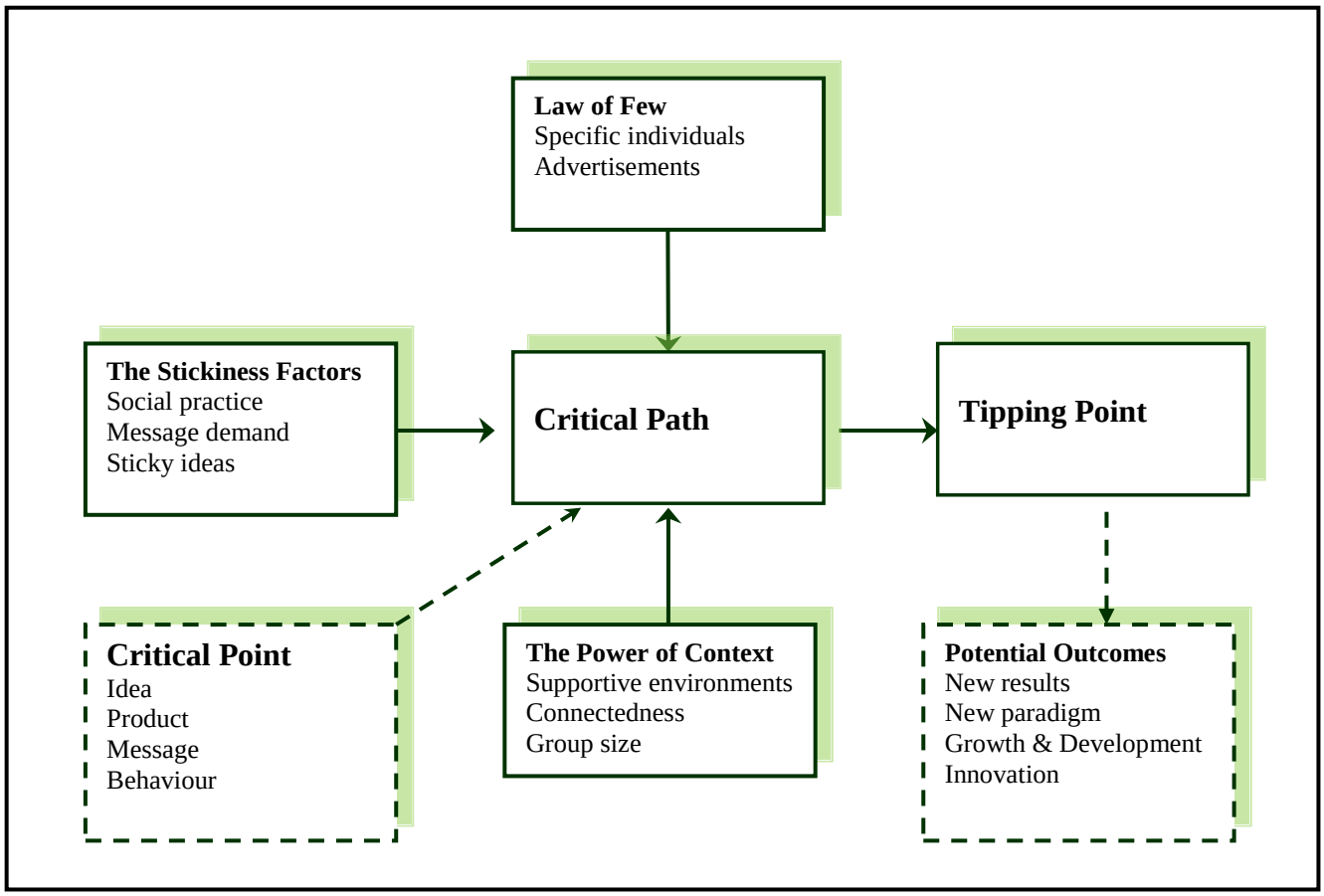


Figure 2.3: Source; The Tipping Point concept reviewed from Gladwell (2000)

Bessant et al, (2005) attempted to develop a two dimensional framework from both ACAP and TP. Conceptually it is a mapping framework of ACAP against TP for certain key issues which requires intervention and support for business development and growth.

The existing literature does not present any new findings on Bessant's (2005) initial framework. This study therefore intends and contributes with an in-depth exploration of the use of the framework. One perennial problem is that this framework is a report from an empirical study with little tendency to provide theoretical support for the offered thoughts and solutions. Existing studies have not shown interest to investigate this further, or in many cases studies have chosen to investigate individual cocnepts such as either ACAP (Cohen and Levinthal, 1990; Zahra & George, 2002; Lane et al, 2006; Todorova and Durisin's 2007) or TP (Gladwell, 2000, 2002), rather than combined concepts. Furthermore, the integration of two or more concepts can be said to be newly emerging (Ismail and Poolton, 2011). These deficiencies unquestionably make the current study unique.

Bessant et al, (2005) identified the scale or level of knowledge absorption and action which were categorised as:

- Ignorance of key issues.
- Awareness of key issues.
- Knowledge and understanding of key issues and solutions.
- Implementation of action to deal with the key issues.

In their study (Bessant et al, 2005), they also introduce a "state change" perspective of firm in the path of growth by considering the "state" as "characteristic" concept of individual, organisation, process and environment (Gartner, 1985). They define "state"

as internal firm characteristics, external environment characteristics, perceived key issues and knowledge, learning and innovation.

The Bessant et al, (2005) framework as depicted in Figure 2.4 conceptualises the ability of ACAP in the firm into four levels, namely ignorance, awareness, knowledge and implementation of the key issues. In this study, Bessant et al, 2005 suggest that intervention which corresponds to this framework is categorised into three types; dealing with raising awareness, dealing with collecting knowledge or knowledge absorption and dealing with implementing solutions. Eventually, the process is assumed to accumulate knowledge into the firm. Nonetheless, there was no clear evidence of the impact on knowledge absorption in applying this framework (Bessant et al, 2005) into the company. It is argued if this theoretical framework concept would work in practice, and if yes, how does it work and what is the impact on SMEs. These are amongst the investigations that are needed to be discovered, as to be aware of how important the knowledge really is. This is more so in a turbulent environment. The key issues that were pointed out by Bessant et. al., (2005) in the dimensions are shown in Table 2.3.

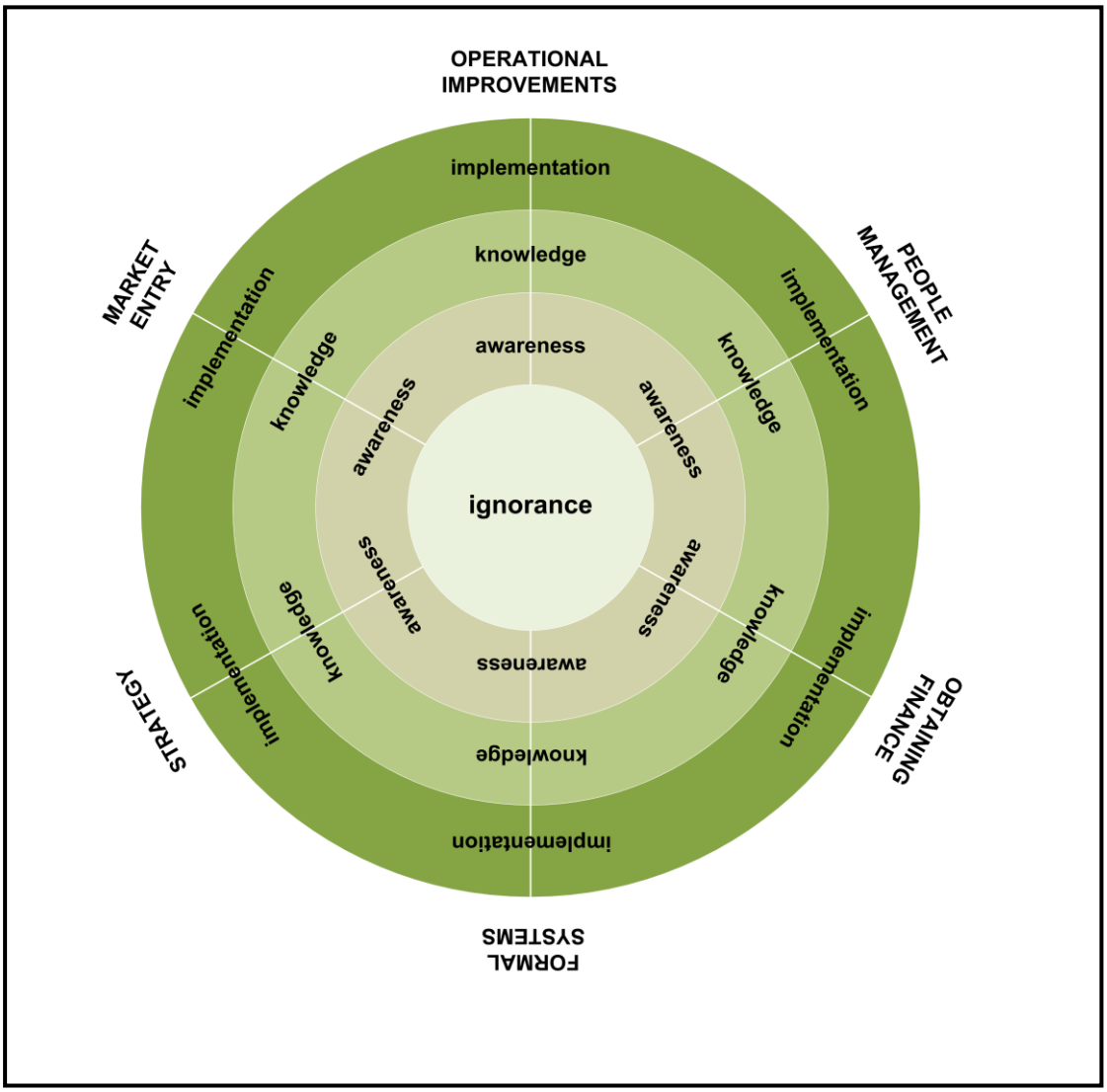


Figure 2.4: Source; Bessant, J., Phelps, R., & Adams, R. (2005), Absorptive Capacity and Tipping Point Framework

Table 2.3: The Key Issues of ACAP and TP (Bessant et al, 2005)

Key Issues	**Descriptions**
People Management	Managing human resources delegation of tasks, establishing functional or geographical teams, employing designer(s), or working with external consultancies.
Strategy	Strategy is a definition of types of work or plan to accept target or objectives, development of brand and market position**,** from opportunity to a very focused strategy. Examples**;** management strategy, marketing strategy, product/service development strategy, branding and communications strategy.
New Market Entry	New Market Entry is adapting the business model to the new market, scaling-up of business, and understanding new customer needs, demands, products, customers, etc. Customer needs research, market research, competitor research, trends analysis, assessment of different market opportunities, or adaptation of product offering. Examples: new customers, new areas and new products.
Obtaining Finance	Obtaining Finance is attaining external funds to grow and expand the business.
Operational Improvement	Operational Improvement involves an understanding of and improving the process capabilities and best practices being applied in the company.
Formalised Systems	Formalised Systems is developing new systems or procedures to ensure consistency and reduce risks of things from going wrong, from informal approach to formalised business systems. Examples: information technology, design process, product development process, customer feedback database, etc.

Operations management functions to manage the production of goods and services for markets (Davis, 1987). Slack et al, (2009) suggest that inevitably, it is important and challenging because it determines the overall result of an operation or process. Often, operation is the core production process that generates the main revenue to the company. Without operation, there is no production, and consequently no sales or

services of the company. For that reason, operations have a long-term impact which determines the success of the company. Roth, (1991) suggests that operation plays a strategic role in assessing the success of the company.

Most companies set out to perform the basic function of their operations which is to transform the available resources into finished goods for customers. However, running an operation is an enigma in the daily business cycle (Conway et al, 1988). A serious loss may occur if machineries are unexpectedly shut down, broken, tools are missing, operators or materials are unavailable, etc. The failure in operation can sometimes turn out to be worse and prevent addressing the causes of the problems, leaving the issues are unresolved. To prevent this from happening, the author holds the view that SMEs must have well-maintained production processes to avoid problems in operations. Also, the focus of effort should be on quality, to hold down the costs of materials and labour, to eliminate waste and all costs that add no value to the finished product.

If the operations malfunction, the core business is destroyed and it will also prolong the period in which the company will have no production. As a consequence customers will divert to other suppliers since their demands cannot be fulfilled (Anderson, et al, 1994). This will turn into an inopportunity. The company should therefore be aware of this danger and take precaution to prevent it.

Therefore from an improvement aspect, it is suggested that fully functional daily operations must take place; SMEs must continually strive to improve their operational efficiency. This is where the role of operations comes into view as critical issue which needs serious attention. However, in achieving so, it involves dedication and effort to attain these goals which requires certain knowledge and skills.

The formalised systems (or information systems or systems) posit that the same function must be critically and fully focused in the company. In the information age, it is not surprising that a company cannot survive without such systems. Fundamentally, systems have come to have a strategic role in any company.

Significantly, systems have conceptualised that the role of a particular activity in a working environment is changing (Rockart, 1982). However, Gurbaxani and Whang (1991) argue that this change in systems impacts the high costs that are associated with the acquisition, storing, processing and dissemination of the systems. Systems help a company make adequate use of its data, reduce workload and assist with compliance with various mandatory regulations. Also, systems can integrate data from various sources, inside and outside the company, keeping the company up to date with internal performance and external opportunities. Simply put, in today's business environment companies no longer store and manage their data manually. In addition, Ken and Oz (2014) pointed out that in nowadays business environment, systems are mainly used to make sound decisions and to solve problems, which are essentially the core foundation practices of every successful company.

The core function of the systems is to store, update and even analyse the information, which then can be used to identify solutions to current or future problems. Therefore, systems produce quick solutions to problems, in particular to run the operations management. Thus, systems play an important role in the company. As a result, through systems a company can make full use of sophisticated and comprehensive databases that can contain all imaginable pieces of data they require in their business operations to perform better.

In operations management, systems can be integrated with the manufacturing cycle to ensure that the products comply with its requirements standard. Myer et al, (2015) supported that systems play its important functions in covering a certain range of planning and handling tasks in operations. Also it simplifies the production process and removes unnecessary activities. Significantly, systems eliminate repetitive tasks, increase accuracy, and provide quick access to data and results in generating higher level of productions.

From these two perspectives, this study suggests that a view of operations and systems is an inevitable fact for SMEs to improve for future. As such, intervention is perceived to offer help to SMEs for satisfying the knowledge shortfall in operation and systems for improvement in the company.

Nonetheless, Burns (2009) argues there are issues that need to be clearly addressed particularly the TP process in Bessant's (2005) framework. The definition of each process involved is not clearly expressed. Hence there is no guideline that can be used as a benchmark as to what are the processes involved to improve or develop growth in SMEs. There is no mention anywhere about planning and communication, whereas these two aspects are perceived as critically vital in engaging the intervention.

Besides, the accurate determination of time and method of delivery of the external knowledge should be clearly specified. If this occurs, then project planning can be scheduled and requirement to deliver that knowledge can be set in place. Also, an accurate determination that the external knowledge is required is not stated, for instance; from whom, when or what knowledge is required by the company. The crucial aspect particularly in a piece of qualitative research is that there is no reliable method for measuring the absorptive capacity, which thus remains unknown. Thus, this

framework may also not supply a reliable metric on how to measure the absorptive capacity occurred in the company, as this concept is reasonably assumed as subjective.

The author viewed that the combination of those two dimensions which represent knowledge absorption of ACAP (Cohen and Levinthal, 1990; Zahra and George, 2002; Lane et al, 2006; Todorova and Durisin's, 2007) followed by the TP (Gladwell, 2000, 2002) appeared to be advantageous to SMEs as a starting key point to growth and continuously sustain their business development.

It is believed that the absorbed knowledge will increase an individual's knowledge and provides them with more expertise to manage operations. In consequence the new improvement has transformed the company to new changes in progressing which is assumed the level of tipping point is reached.

Studies suggest there are important aspects that can causes TP to happen (Aladwani, 2002; Caloghirou et al, 2004; Corso et al, 2006; Dominique, 2007; David, 2009; Henk et al, 2009; Burns, 2009). Caloghirou et al (2004); David (2009); Dominique (2007) argued that unexpected demands of growth may occur in the company without prior indication. However, viewing this from a positive perspective, this sudden unexpected increase in demand potentially develops growth in the company. To grasp the opportunity inevitably the company has to find solutions to support and consequently fulfil these new demands.

Changes in technology also play an important role in reaching TP (Aladwani, 2002; Burns, 2009; Corso et al, 2006). It is suggested that the company needs to comply with the current technology changes which move very rapidly. As a result, these changes will accelerate the productivity and performance of the organisation.

Forced changes due to new direction also play an important role (Caloghirou et al, 2004; Corso et al, 2006; Dominique, 2007). Clear goals and well defined targets create a new paradigm in a company's direction. As such, the company is capable of communicating a clear direction whilst assembling the resources required in achieving goals.

Crucially, the optimistic and strategic leaderships are vital in achieving TP in the company (Dominique, 2007; David, 2009; Henk et al, 2009). It is perceived that highly motivated leaderships with high profile leaders are essential in delivering the conversion to new ideas that bring rapid fundamental change to the company.

In achieving TP, inevitably barriers exist (Aladwani, 2002; Burns, 2009; Caloghirou, et al, 2004; Corso, et al, 2006; David, 2009; Dominique, 2007; Henk et al, 2009; Lagerstrom et al, 2003).

The depth and level of existing knowledge is viewed as a main barrier in absorbing new knowledge (Lagerstrom et al, 2003; David, 2009; Dominique, 2007; Burns, 2009). Lack of knowledge can arise from poor training or lack of attendance in training programs, low level of technical and technological knowledge, low level of education or low skills and experience of employees. Hence, lack of knowledge leads to lack of technical expertise in any specific field.

From the human perspective, de-motivated staff (Aladwani, 2002; Dominique, 2007; Henk et al, 2009) can stem from various factors. It is rooted from over-detailed job specifications with no proper rotation. Performing the same task recurrently lead to employees feeling unappreciated for what they do. As a consequence, it discourages them to develop their skills. It also can stem from the benefits offered by the company being below the employees' expectation. Often, lack of authorisation or staff

empowerment prevents employees from performing better. They have knowledge and skills; however, due to certain restrictions imposed by company policies, they may not be allowed to expand their skills.

Another barrier that prevents TP is limited resources (Aladwani, 2002; Caloghirou, et al, 2004; David, 2009). This factor prevents companies from expanding their business. Also, it can be caused by lack of access to capital and funding which normally exists in the beginning of the business, or if the company is facing a difficult time. Besides, resources can also appear from unsolved operational problems or obsolete equipment and machineries.

A barrier can also be identified from the perspective of management, of unclear direction (Lagerstrom et al, 2003; David, 2009; Henk et al, 2009). Therefore, the company moves with no clear or future direction. Barriers in management can also arise from poor business and managerial skills (Caloghirou, et al, 2004; Corso, et al, 2006; David, 2009; Henk et al, 2009). The lack of management skills creates to organisational and internal issues that prevent the company from growing further.

The author believed that the driver factors and positive indicators lead the company to reach TP and potentially to sustain and move ahead. On the other hand, it is assumed that the barrier factors could cause the company to become stagnant and stop growing.

Study by Ismail and Poolton, (2011) suggest that there is limited use of the tipping point concept in SMEs, whilst in organisation this concept is used to bring change (Kim and Mauborgne, 2003). This concept is widely used in health education sector (Kushner, 2003; Coye et al, 2003; Simmons, 2007, and many others). Hence, what this seems signify is the shortfall in the studies about the tipping point exploration in SMEs.

2.4. Knowing-Doing Gap

Pfeffer and Sutton, (2000: 4) identified the Knowing-doing Gap (KDG) as "*the challenge of turning knowledge to enhance organisational performance into actions consistent with that knowledge*". This initiative emphasised the gap between knowing and doing as being more important than the gap between ignorance and knowing. This is a concept about how to convert knowledge into action. In their study, Pfeffer and Sutton, (2000, 2013) highlighted significant and costly failures to apply what has been learned. From this perspective, the author viewed that people have knowledge and absorbed intelligence but somehow were very ignorant about how to apply what they have learned. They know the right answer of what to do, however, they failed to put them into action. The concern here is why knowledge of what needs to be done frequently fails to result in action. This is where the challenge comes into view.

In their studies, Pfeffer et al, (2000) suggest that there are five major barriers that prevent knowledge from being transformed into action which are illustrated below.

Firstly, when talk substitutes action. This "action" of expressing suggestion does not really count as action is not taken. Thus, no follow up action is done. Therefore no progress can be made. There is big difference between talking a lot and doing a lot; talking a lot means doing nothing, whereas doing a lot means progressing.

Secondly, when memory substitutes thinking. This scenario can be expressed when people carry expectations from the past about what is and is not possible, and what can and cannot be done, into the future. Therefore the past history prevents employee from progressing further to develop their skills in the company.

Thirdly, when fear prevents action. These symptoms can be seen in the organisation such as when employees withhold good suggestions for improvement just because they are fearful of expressing that suggestion. Therefore, there is no action that can be taken for that positive suggestion which is just left unsaid. Hence, no new knowledge can be embedded which prevents further development.

Fourthly, when measurement obstructs good judgement. This situation can be seen for example when employees in the company focus on an individual measures rather than the big and overall purpose of certain objectives or target. Therefore, the big objective may be unachievable.

Finally, when internal competition turns friends into enemies. This symptom is very common in companies. Here the employees are racing and compared to each other, in certain cases to colleagues within the department. The way this takes place is by the manner in which their tasks are managed, resulting in intimidation of the employees, making them feel under scrutiny, constantly being compared with internal rivals' progress in the company.

However, to accept these contentions, they (Pfeffer and Sutton, 2000, 2013) also suggest guidelines for action. The "why before how" philosophy is important. Generally employees want to know "how" in terms of detailed practices rather than "why" it needs to be implemented which is more important. The important point in learning and developing in the company is measure what matters most. Thinking about what can turn knowledge into action is always recommended which can bring changes for improvement.

SMEs are identified as the object in this study. The rationale was to observe the success or failure in carrying out the improvement through support from the

intervention project. However, in the SME context, to build partnerships and trust over the lifetime of the intervention project is complex (Ismail et al, 2011; Easterby-Smith et al, 2008). This applies particularly building up trust, confidence and motivation to engage in change. The situation is more difficult if the controlling hands with power of SMEs (usually the top management or owner-director) are lacking of responsibility to engage (Bridge et al, 1998). Hence improvement is unlikely to be achievable. Viewed from another perspective, improvement would be more feasible if these people were more committed to the intervention project and included it in their strategy and plan of the company.

Improving performance in a company depends on implementing what is already known, rather than from adopting new or previously unknown ways of doing things. Thus, better methods of working cannot remain secret for long. It needs to be shared in order to enhance the company's performance and for better.

In the context of KDG, there are many ways of conveying knowledge into the business. Gibb (1997) implies that the prevalent learning method is that of dealing with the task structure, such as learning from peers, learning by doing, learning by copying, learning by experiment, learning by problem solving, learning by opportunity taking, and learning from mistakes. However, beyond these methods, it was considered that the most effective approach is learning by doing, or learning through experience. It was because, simply by applying the knowledge into a daily practice, the expected outcome which will add new value to the learning experience will then be realised. Only then SMEs will appreciate the new value of learning.

From the reviewed concepts, the author took the view that when "knowing" is transformed into "doing" anything is possible. The "gap" is filled with new action.

Therefore, if this concept is applied in a company, it is believed that company could create new improvement which brings positive indications of ensuring sustainability.

2.5. SMEs

Conceptually, there is no universal definition of Small and Medium-sized Enterprises (SMEs). In the contemporary economy, especially in developed countries, the definition of a small business is not straightforward, primarily because determining whether the enterprise is small, medium or large depends on various factors which varies across the countries and sectors. Generally an SME is an independent business (Hvolby and Trienekens, 2002) managed by its owner or part owners and has a small market share either by number of employees or turnover. It creates the most jobs and controls the highest rates of entrepreneurship.

Another view of SME as defined by European Commission Recommendation 96/280/EC (European Commission, 2003, 2005) is the a micro, small, and medium-sized enterprises (SMEs) category that is made-up of enterprises which employ fewer than 250 employees which have an annual turnover not exceeding 50 million Euro, and/or an annual balance sheet total not exceeding 43 million Euro, and not more than 25% owned by a non-SME. The European Commission (2003, 2005) classified SMEs in terms of the number of employees: 0-9 employees is a micro enterprise; 10-99 employees is a small enterprise; and 100-250 employees is a medium enterprise. Nonetheless, there was no clear evidence or consensus on the definition itself, as variations exist between countries, industries or even agencies within one country.

To relate with the concept of learning and capability, SMEs need to be different. Clarke et al, (2006) supported that the unique point for SMEs in learning aspect encompasses “action learning” or “learning by doing”. Unlike others who acquire learning through processes such as students in a classroom, SMEs need to have direct engagement of the learning activity. In action learning SMEs are engaged in hands on, practical training, for example by conducting the training in their premises on how to use the equipment, machineries or other supply materials to run it effectively. Hence, this offers more engagement and practical application to the knowledge that is relevant to work issues which is useful to them.

In attaining knowledge, SMEs need to be dynamic. The motivation for SMEs in building the ACAP of the acquired knowledge is that their unique and dynamic characteristic (Deakins and Freel, 1998) which enables them to correspond to the constantly changing environments. This is critical as knowledge is often very meaningful for SMEs to manage a business through everyday practice as a result of their contribution from new knowledge to remain competitive.

Nonetheless, Gibb (1997) argued that SME learning is always linked with business performance. Therefore the driver for SMEs in applying the acquired knowledge is that they need to bring that knowledge into experience in order for them to compete and survive in business. With new knowledge SMEs need to keep up their performance for the company to keep improving. Only then the applied knowledge is transformed significantly in improving performance as an individual or collectively.

Whilst failing to practice the obtained knowledge, it is questioned if there are constraints to the transferred knowledge. Levy, (1993) highlights lack of access to finance and technology niches as constraints to learning. Consequently, the level of

ACAP then continues to be undeveloped which then fails to move the company. Hence, the internal strategy for developing the ACAP is almost unreachable.

Other than learning notion, debate still remains on why and what makes SMEs so obviously important. Ismail et al, (2011) suggest that the importance of SMEs that is widely known is their positive impact on the economies such as wealth creation, jobs opportunities, and innovation (Birch, 1987; Mulhearn, 1995; Rothwell and Zegveld, 1981). It is therefore undeniable when Parker et al, (2009) state that SMEs are significantly important to an economy's growth, accounting for 99 percent of businesses in the UK (Revell and Blackburn, 2007) and 99.7 percent of businesses in Australia (ABS, 2007). In this situation, not only do SMEs contribute to innovation and competition in the market, but more importantly, they contribute as a source of job creation.

The author hold the view that it is difficult to reject that SMEs are the underlying foundation to the economic growth. For instance, generally SMEs offer many employment opportunities, producing products and services, which economically gives a significant positive impact on the economy as a whole. Many have not realised it but most of the large firms were grown out of SMEs. As a result, it is evident that SMEs are a strong influence as they are the main basic supplier to the large firms. Moreover, SMEs are capable of producing specialised products and services to meet their customers' and suppliers' demand. However, some relatively important criteria of SMEs need to be considered, such as barriers and strength.

Lange et al (2000) and Bessant et al (2005) categorise the barriers in SMEs in particular for improvement into four aspects; cultural, financial, access and provision and awareness. First, cultural barriers are associated with primarily about attitudes

towards skills development. Next, financial barriers are referred directly to the cost of training, which is investment in human to increase knowledge. Subsequently, access and provision barriers are related to problems in accessing the expertise for skills development opportunities or perceived lack of appropriate provision of learning. Finally awareness barriers are linked to the ignorance that prevents recognition of the learning opportunities available.

Viewing from the stance of strength, SMEs are very unique and dynamic (Ritchie and Brindley, 2000; Noori and Lee, 2006). These characteristics enable SMEs to take very smooth action, move very quickly to become a responsive organisational structure or company. Strategically, the size of SMEs which is "about right" has allowed them to adopt flexibility with less complexity. The result is to motivate SMEs to become more responsive to the changing environment whilst adapting to new changes within their limits and capacity.

Another element that is sought is the existence of empowerment (Wilkinson, 1998) in SMEs which enables personalised management and own-management with little delegation of authority. Therefore SMEs have the power over control mechanisms which enables quicker decision making; subsequently action can be taken promptly in running daily tasks. In particular, when empowerment in SMEs occupies a position of unique influence, serving as the locus of control and decision making, therefore immediate tasks that require urgent decision can be solved. Inevitably, the empowerment in SMEs results in big impact to SME development in the long term.

SMEs are specialised in their own context; by all means this characteristic differentiates them from larger organisations. As part of their dynamic capability (Ritchie and Brindley, 2000; Noori and Lee, 2006), SMEs are capable of producing

high quality and specialised products. The job control characteristics (Elovainio et al., 2001) empowered in SMEs employees, such as decision-making authority, opportunities to use skills and knowledge, and opportunities to participate enhances specialisation in producing outputs. Admittedly, this characteristic of specialisation can also lead to high innovation rate in products and processes. From the context of production costs, it is widely accepted that SMEs produced lower costs of products and services compared to larger organisations. As an advantage to SMEs' customers and suppliers, they usually received greater attention from the company.

Overall, SMEs are crucially important to the economic growth as they are the underlying entity that makes the large firms become stronger and well-established.

2.6. Issues in SME's

In general, SMEs have limited resources, limited cash flows and for that reason, they generate only few customers (Parker et al, 2009). Futhermore, SMEs are frequently engaged in 'ad-hoc' or 'fire-fighting' management. It can be assumed that they are concentrating on current performance rather than concentrating on a strategic long-term focus (Hudson et al, 2001), as such possibly have high staff interchangeably and a flat managerial structure.

It is evident that knowledge training is a vital element to build up skills for improving competitiveness (Lange et al, 2000). Within this context, the learnt knowledge that employees gained from specific training are used and maintained. The benefit which can be achieved is that the increase of accredited knowledge source and experience from the training creates skills development. However, training in

knowledge and skills development is often lacking in SMEs which in due course could initiate barriers. Besides, sustaining the competitiveness and skills development relies on a higher level of formal training.

Ismail (2010) suggests that SMEs are not prepared for "sudden turbulence" that may possibly hit them without prior notice or at any time. In this case, SMEs are opened to unexpected distractions and vulnerable to external environment (O'Regan et al, 2005; Nilmini and Sharma, 2005; Sharma and Bhagwat, 2006). Therefore, as a preparation to better protect their business, it is essential for SMEs to take action for the future before any unforeseen circumstances might happen. One of the actions is to be prepared with a knowledge base and expertise. This ensures that whatever happens, SMEs will have alternative solutions for varied occasions.

Another issue in SMEs is that there are severe resource limitations in terms of management, manpower and technical expertise (O'Regan et al, 2005; Sharma et al, 2005; Sharma and Bhagwat, 2006). Supported by Dibia, Dhakal and Onuh (2011) who suggest that optimization and waste elimination concept of lean can be achieved within the manufacturing processes from the view of human perspective if the human resource are well organised, motivated and adequately managed. Again, in their latter study (Dibia, Dhakal and Onuh, 2014), they added that people process in manufacturing is equally important in achieving continuous improvement in operational process excellence.

Clearly they are lacking in strategic management with limited power in resource allocation, in running their business operations and creating knowledge. This clearly happens when the operations are not well-managed and not fully organised. In the long run, it may generate an ineffective cost-benefit analysis which in return could reduce

their efficiency or revenue. Issues that occur in SME's might be rooted in insufficient support from external expertise, agencies, etc. to bring in technical knowledge and guidance. Inevitably, they need external support for improvement and new motivations in order to sustain their business position. That is where intervention comes into the picture, with an intention to assist SMEs in delivering technical knowledge.

In summary, it is essential that SMEs are able to reach their full potential through looking clearly into the issues surrounding them. It is believed that with help from the external support they can do better in increasing their capability.

2.7. Intervention

An intervention as defined by Done et al, (2011) is a series of short activities which are designed by the organisation to introduce new practices in the short term that offer a long term impact. It is envisaged as crucial to provide external support of embedded knowledge and expertise in seeking growth. This is true when occasionally, SMEs need a different point of view from external parties to introduce new knowledge activities in their planning. As such, seeking an intervention of knowledge transfer may help improve the effectiveness of the business policy and practice (Caira et al, 2009) by offering new values to SMEs. The knowledge transfer process enables SMEs to absorb the subject matter better and identify how to improve significantly. Furthermore, successful implementations offer new possibilities for the business growth.

In this study, an intervention was identified as a platform to embed knowledge which consists of the integrated concepts of ACAP, KDG and TP. The argument residues on why intervention was chosen rather than other method. As suggested by

Done et al, (2011: 501) "*intervention can lead to improvements that are sustained in the long term*", implying that the short-term changes from the intervention practice can contribute to the long term performance. In a way, an intervention is able to carry out changes and provide support so that it will be the trigger for long-term success in sustaining best practices. Intervention types are various depending on the nature of intervention itself and the appropriateness of the company it is engaged with. Principally, the basic concept is to deliver training with embedded knowledge for improvement and development.

Ismail et al, 2011 highlight intervention types in many designs or approaches including seminar, company visit, student placement, workshop, mentoring and supervision, and Knowledge Transfer Partnership (KTP). Other types of intervention added by Johnston et al 2008 are training and skills development, consultation and sponsored intervention.

Awareness seminar (Ismail et al, 2011) is designed to create awareness in the specific knowledge area. Therefore the seminar helps participants to interact and understand the concepts of the subject.

Another approach is the company visit (Ismail et al, 2011) which involves a visit to a company. The purpose is to learn directly from the company on how things are established or implemented. Therefore new skills can be developed from this practical experience obtained during the company visit.

As opposed to a company visit, a student placement (Ismail et al, 2011) is designed to expose the student to work experience. This training encourages the student to practice their knowledge besides gaining hands-on industrial work place experience and skills.

Another good approach of training which is thought to be helpful is workshop (Ismail et al, 2011). This more active learning method which is interactive offers an opportunity to the participations to involve in seeking solutions to the current issues or problems. The participants can develop their skills upon workshop completion.

Unlike workshop, mentoring and supervision (Ismail et al, 2011) is a more intensive method of conveying knowledge. This method allows for the opportunity to focus closely on the subject that needs to be looked at. Therefore the issues and problems can easily be transferred from the mentor or supervisor to the mentee or whoever is learning. This learning process can be considered as much attached to the learner which also specialised in the subject.

Another type of intervention is training and skills development (Johnston et al 2008); which have more of a real world experience. The feel and focus of the problem can be presented such that knowledge of how it actually is in the real world is experienced. This gives a first impression on how the reality works, apart from developing own skills.

A consultation design (Johnston et al 2008) is a learning process from the expert. It involves seeking opinions and options before a decision is reached. Besides, it gives employees a reasonable opportunity to express their views, and taking those views into account. Another practical training approach is venture capital activities, which has more involvement in activities with the training provider.

A sponsored intervention category (Johnston et al 2008) is a regional support such as Business Link which is described as a funded scheme for business advice and guidance service with the purpose to invest in training in SMEs for business growth.

Out of all categories, the most important knowledge transfer method which is crucial to this study is the KTP (Ismail et al, 2011). This is a national funded scheme by the Technology Strategy Board (TSB) with intensive training over a particular duration of time. KTPs are always associated with Higher Education Institutions (HEI) engagement and collaboration. Other training methods of this kind which are funded nationally or by private investors are innovation vouchers, growth accelerator, manufacturing advisory boards, etc.

In specific cases, Higher Education Institutions (HEI's) have their own method for engaging with SMEs to improve and even develop their ACAP potential (Ismail et al, 2010). The Knowledge Transfer Partnership project (KTP) is a nationally funded programme designed to be an intervention with an agenda to encourage the transfer of knowledge from HEI to SMEs. The scheme brings together a company with a need for knowledge in a specific area with a higher educational institution with expertise in this area. The scheme operates by placing a recent graduate (KTP Associate) for a period of between two to three years in the company who is supervised by both an academic from the HEI and the supervisor from the company (refer to the KTP web site and papers on KTP). The role of the Associate is to assist in the transfer of knowledge. The area of the intervention could range from technological to social and should result in a step change to how the company operates. For these projects to be funded they must demonstrate that they will have an impact on growth and performance as well as is in embedding the knowledge into the company. The programme offers a more hands-on approach to knowledge transfer where the intervention provides an external resource to ensure that it is not distracted by the company's business activities.

It is evident that knowledge is relatively important to sustain a competitive business. It is true when Argote et al, (2000) suggest that firms can develop knowledge as a basis for competitive advantage by means of creation and transfer of knowledge into the firms. This theory works by embedding the knowledge within the firms that involve people interaction that can affect the knowledge transfer internally. This in turn leads to direct improvement in practices. Without a doubt, knowledge can be embedded in daily tasks and interrelationships. As such, the knowledge transfer derived externally provides a basis for competitive advantage.

The context of knowledge transfer has become fundamentally critical to the companies or SMEs as knowledge is considered as a valuable strategic asset that provides proprietary competitive advantage and innovation. However, a critical part of knowledge management is to deploy, make accessible and usable within the companies, knowledge creation. Without constant creation of knowledge, a company is destined for poor performance. Inevitably knowledge is anticipated as a critical resource for the company or SMEs that needs a serious attention.

Explicit knowledge is the knowledge that has been articulated, codified, documented and stored in certain media (Lave and Wenger, 1991; Dienes and Perner, 1999; Ellis, R., 2004). It can be readily transmitted to others. The information contained in journals or textbooks are good examples of explicit knowledge.

As opposed to explicit, tacit knowledge is the knowledge that is difficult to write down, visualize, verbalised, transmitted or understood (Reber, 1989; Polanyi, 1997; Von Krogh et al, 2000). It is knowledge that needs to be explored which is difficult to explicitly transfer to others. For that reason, the interest of this study is to explore this

tacit knowledge in SMEs and to interpret it to become explicit that it can be used by others as a guideline.

Creating knowledge is associated with difficulty in transferring that knowledge (Szulanski, 2000). It is rather a process that requires effort to implement it. The general expectation with knowledge transfer is that it is correlated with difficulty of processes and barriers associated with it. Barriers arise from the levels of learning in the company that include lack of the required knowledge, level of education or slow dissemination of knowledge (Sun and Scott, 2005). Also, the transfer of knowledge is often associated with laborious, time consuming, costly and difficult experiences. Thus the opportunity to transfer that knowledge is likely to affect the success of the execution of that transfer. Besides, the difficulty of the process is predicted to increase after the transfer phases up to the transition of knowledge deployment. However, regardless of all the obstacles, it is viewed that there is a need for the company to transfer that knowledge to keep on developing. Therefore, knowledge transfer is considered as a fundamental process of development which is central to learning and in turn is critical to remain competitive.

It is widely accepted that organisation or company which managed knowledge effectively, is potentially providing greater strategic advantage (Zack, 1999; Smith, 2001). The available knowledge can be used effectively and shared explicitly with others in the company via the same mechanism. In this context knowledge can be leveraged from individuals to collectively to improve the performance of the company. As anticipated, appreciating the role of knowledge is thought to be an effective approach to develop a robust competitive foundation for companies. Companies can derive significant benefits from the correct application of knowledge. However, in

doing so, company needs technical experts and capability for knowledge processing, which may involve external support and intervention, which is the focus of this study. Therefore intervention is a process of knowledge transfer, creation and storage in the company as a repository. Over time the cumulative knowledge will then create a rich knowledge based company.

Amin and Patrick, (1999) argue that in order to be successful in the challenging business world, individuals, teams or organizations require effective learning capability. Supported by Eugina and Sarri (2011) who suggest that learning could be defined as skill learning, knowledge improvement or attitude change. Inevitability, SMEs need to acquire the ability to learn to facilitate improvement and to remain competitive. Intervention is identified as a process of acquiring knowledge from the expertise and experience in the subject to enhance delivery of improvements tailored to the SMEs' needs and requirements. The purpose is to offer a direct support, as a definition of providing a hands-on and experiential training to SMEs. Consequently, it is a process of transferring the learning resources into practices to producing a new value. Hence, learning by training during intervention is needed to acquire knowledge, enhance skills and to be able to transfer the learning capability to personal and professional practices. The importance of learning is supported by Revans (1982: 64-75) who suggests that; "*There can be no learning without action and no (sober and deliberate) action without learning*". Therefore action learning (Revans, 1982, Meehan et al, 2009, Trehan, 2009) is equally important in educating managers or staff to support in sustaining their competence in business.

Devins et al, (2002) added that intervention could explore the extent to which the involvement in training has encouraged a process of lifelong learning and increased

competiveness of business agendas. Thus, intervention could explore the extent to which the involvement in training has motivated a process of lifelong learning and has increased competiveness of business agendas as the transfer of skills and new knowledge in the workforce will encourage the business to undertake whatever circumstances that they have faced. The main issue that needs to be addressed is the real necessity of the intervention that is believed could solve the current issues within SMEs. Therefore, the challenge to the required intervention is on 'what we need to know', 'how to' and 'who with' basis. In this sense, SMEs need to know what they need to learn, what knowledge is exactly required, how to learn and whom to learn from. Precisely, the nature of the intervention needs to be identified before the intervention is implemented. Therefore, a training intervention could be expected to assist in the creation of partnerships and learning circles (Gibb, 1997), either formal or informal training.

Principally, in order for intervention to work effectively, it is really important to clearly recognise the needs and establish what kind of intervention it is. Only then, the intervention could demonstrate the real business benefits (Cannon, 1997). Clearly, intervention is a significantly effective and appropriate means of knowledge transfer when a complicated situation or process fundamentally needs a new solution.

The rationale of intervention is to improve the skills, attitudes and aspiration (Lange et al, 2000; Devins et al, 2002) as the trained staff are secured to remain in the labour force. Intervention strategies are often a vehicle of business transformation. Essentially it brings awareness of improving the skills of the individuals through training and educational activities. The question remains on why do skills matter to an individual or a company and what are the underlying factors.

Training is often a driver to push the company and staff to produce new improvement. As a whole, it impacts on the range of business performances. Unquestionably training contributed to the establishment of improved business practices. Lange et al, (2000) suggests that businesses are always seeking to develop their workforce by providing the best training with aims to improve skills or final products. Inevitably, skills development is vital with an aim to create competitiveness in the company, as the skilled workforce who could compete more effectively and positively will contribute to the economic growth.

Viewed from a positive perspective the impact of intervention on business performance, it can be said that intervention brings advantages to SMEs as suggested by (Collis, 1996). The correct implementation of intervention significantly gives a high impact to SMEs which in turn will improve the company's revenue as a whole. Firstly, it brings continual improvement in the efficiency or effectiveness of its performance in operations, products or services. As a result, the company can carry out the new practice of the embedded knowledge to perform better. From the people management perspective, the embedded knowledge creates individual expertise or developed R&D for the company.

The exploration and exploitation therefore leverage the knowledge to be more beneficial in creating new innovation, strategy and new value creation. In a bigger context, it increases the amount and productivity of knowledge that will accumulate over time which gradually generates a knowledge-based-rich company, besides renew knowledge stock. Not only does it create opportunity for competitive advantage but it also provides new motivation for SMEs to change. Another important point is that it develops intangible assets which create distinctiveness to the company. And finally

from the economic perspective, it will develop strategies and sustainable growth for SMEs.

Contrarily, Collis (1996) also observed that there are weaknesses of intervention in SMEs. First, it is a demanding and tough process to learn new knowledge, as the learning process is difficult (Szulanski, 2000). It requires great courage to put knowledge into daily practice. Further, it also requires additional costs that are not in the plan or budget.

It is viewed intervention is critical as an "investing in knowledge" and "buying skills" mechanism to improve competitiveness to keep business moving. However, the argument still lies on the critical factors of the capability of the company itself towards the embedded knowledge. This uncertainty rests on whether the company possesses the ability to learn, to innovate and to apply the learned knowledge. Ultimately, if the company can deal with these abilities, the impact of intervention is presumed to add tremendous business value that will end up with a sustained and growing business.

2.8. Sustainability

The term "sustainable development" is defined by Brundtland (1987) as "meeting the needs of the present without compromising the ability of future generations to meet their own needs" (Werbach, 2013:8). A different view from World Council Economic Development (WCEC) of the word "sustainability" is to connote a company that had a steady growth in its earnings (Drexhage, J. and Murphy, D. 2010; Werbach, 2013). For this research study, the sustainability is related to the economic growth within the SMEs.

Sustainable growth or sustainability is considered as a comprehensive way of running business (Holiday 2001), rather than a "stepping-up" performance. In this context, the company or SMEs is viewed as capable of generating economic value which creates an extensive variety of new opportunities, including new business models, which could be developed for competitive advantage. Factors such as healthy culture, skilled workers, the buy-in from the top management and a strong leadership (Mohamad, Dhakal and Bennett, 2012) are fundamental in determining the success of the company or SMEs. Other advantages that can lead to substantial business growth including new products, markets, partnerships, intellectual property, enhanced quality, etc. Capitalising on these advantages to generate value through sustainability, however, requires persistent determination and definitely relentless resolve, and if it can be stated as hard tasks. Only then, the intervention effort really pays.

On the other hand, sustainability does not hold and in fact might turn into a relapse instead. Wolfe and Kolb, (1984); Cope and Watts, (2000) outlined relapse as the individual who remains unchanged by the new knowledge and experience with no significant personal development or increased awareness. By definition, to a certain extent, learning has immediate utility which applies to a routine and immediate task. However, in the long run it gives no developmental implications. Rather, the individual deteriorates back to the same level such as before experiencing any training.

From the author's point of view, sustainability is crucial to SMEs as it supports the drive to reach a TP. Vitally, it creates persistent improvement and readiness to face whatever "business turbulence" that SMEs might encounter. As such, it is a key point enabling the company to grow and subsequently to move to the next level. Otherwise, if SMEs are not sustaining knowledge, they can easily become vulnerable and in a worst

case, they might end with winding their business up. Inevitably, sustainability is critically important because it provides direct impact on business performance.

2.9. The Theoretical Concepts and Its Role within SMEs

From the literature the author ascertained that ACAP (Cohen and Levinthal, 1990; Zahra & George, 2002; Lane et al, 2006; Todorova and Durisin's 2007) is defined as a capability to learn. This means that it represents the capability to learn and to accumulate knowledge within the company. It is required for value gain, particularly knowledge creation, which is investing knowledge to increase value to the company. Again, as it relates to the capability to learn, as well as the other concepts it underpins, the company is perceived to be capable to evaluate, absorb and transform the knowledge-based information into implementation and utilisation. The critical point that could probably be derived from these concepts is therefore, observing the new improvement or favourable innovation that takes place. Of course, a company is distinguished by being able to appreciate the value of external information to remain innovative. Cohen and Levinthal (1990) emphasised that in order to be innovative, an organisation should develop its own absorptive capacity. As such, the new measurement of growth can be identified as the achievement of knowledge absorption, thus enabling them to move from a previous state to a higher level of improvement or valuable innovation. The indication can be assessed from the new output gained from the delivered intervention, new changes or new impact. These are the mechanisms that are critical to keep the business sustained.

The theory of KDG proposes the conversion of knowledge into action, hence, this is the point of transforming significant knowledge into implementation. By applying the knowledge and using it, competitive advantage is created in the form of best practices, transformations or future development.

TP in this context is where the company is recognised as reaching a state whereby the likelihood of relapsing to a previous state is low. This is often as a consequence of acquiring and embedding new knowledge and work practices. As such, it is the starting key point for the company to sustain and be ready to embrace any circumstances and to move to the next level. At this point, the company is perceived to achieve the "tipped stage" which is seen to consistently move ahead.

Nevertheless, in author' opinion, along the process for the company to achieve a TP and remain sustainable, there are challenges in applying the knowledge such as motivations and constraints (or "enablers" and "barriers"), which also can be considered as sustainability factors. The focus of this research is to discover what are these factors which the company faces throughout the overall process of knowledge transfer.

Table 2.4: The Author's View of the Integration of Dimensions

Dimensions	**Functions**	**Integration**
Absorptive Capacity	Capacity to absorb new specific items in knowledge.	- Leveraging company resources on new knowledge. - Defines a new framework or model. - Develop a road map guidance to inform policy and practice.
Knowing-doing Gap	Taking knowledge into action and translating it into practice.	
Tipping Points	Embedded knowledge and sustained action.	

Table 2.4 illustrates the author's opinion on the integration of the three theoretical concepts of the dimension.

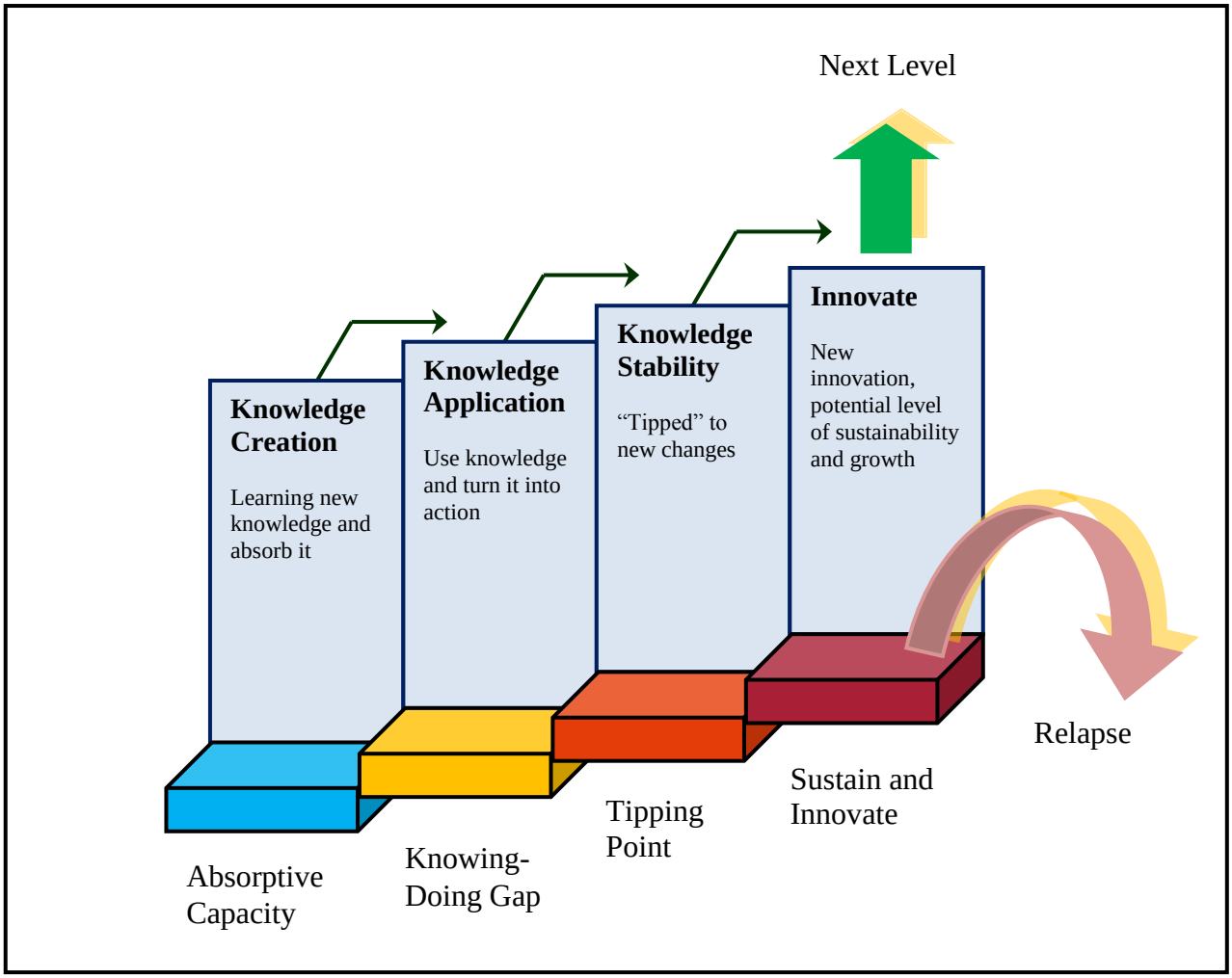


Figure 2.5: The Logic Model of Conceptual Integration

Figure 2.5. is a proposed model based on the reviewed literature describing what it has to offer. It illustrates a logical model of the journey when the three main concepts are integrated to build a structure in a coherent manner to produce the expected findings. This model has been developed based on the view that with the integration of these theoretical concepts and taking into consideration intervention as a platform, a company has the potential to achieve success and move to the next level.

This model differs from other models as it represents the logical stages of knowledge deployment and application. Unlike other models, this model demonstrated the sequential order of knowledge development process from the beginning stage of knowledge creation, application, stability and finally innovation. It is believed that the cyclical process of this model contributes to the success of knowledge exploitation.

The logical concept of ACAP, KDG and TP is described below.

i. **Absorptive Capacity;**

The process of knowledge creation, is learning new knowledge and absorbing it. It is believed that the absorbed knowledge will increase the individual's knowledge. The more knowledge that individuals acquire, the greater expert the individual will become.

ii. **Knowing-doing Gap;**

The process of applying the knowledge, taking knowledge into action and transforming that knowledge into practice for better performance. Thus, the action of doing the knowing is envisaged to fill in the gap between knowing and doing.

iii. **Tipping Point**;

The level of "tip" and sustainability is the point at which new stable changes occur in action and implemented knowledge. It is a level at which the company can claim to be established and satisfied with the progress achieved, in consequence of the impact of the absorbed knowledge and the doing action, and is believed to be unlikely to relapse to the old practices but to move forward.

iv. **Sustain and Innovate;**

It is professed that the integration of these three concepts (ACAP, TP and KDG) is building constructs needed to achieve sustainability. Rich-knowledge based company combined with action taken is believed to lead to reach a tipping point to become sustained. Once a company is established in a new transformation, it is assumed there is a prospect that company will be in a better shape to innovate new possibilities. As a result, an opportunity to increase more likely business succeeding is wide open.

Above all, however, there are factors that need further exploration. For instance, there is no consensus on whether the theoretical foundation is sufficient or is still lacking, or whether it becomes optimal, obsolete or ineffective. The question remains as to how a company's level of knowledge capacity can be measured. Rather, learning and knowledge absorption may correspond to cognitive change that seems difficult to observe or quantify (Marsick & Watkins, 1990). Occasionally, a company tends to show exaggerated capabilities or prove to be modest. Also, the identified dimensions are still unclear. It is justified to say that the important processes are not clearly addressed as to how it can influence the viability of practical constructs of the framework or dimensions. Therefore, it is suggested that this is insufficiently shown in

the current studies and the residual argument is whether this concept is applicable to all businesses, particularly to SMEs.

Companies use knowledge in different ways. However, there is no guarantee of success in the knowledge commercialisation processes. Logically, before engaging in the intervention, the company needs to understand the necessity and nature of knowledge and its value to the business thoroughly. In certain occasions, the company needs different kinds of knowledge application. Capability and ability itself is not enough to remain sustained in the business. Business motivations also need to be considered in knowledge absorption.

2.10. Summary

This chapter investigates three main concepts in the literature, namely ACAP, KDG and TP and their impact in embedding new knowledge in a company and sustaining this impact. The gap is identified as the need to develop a framework for an integration of these three concepts into one model. Also, since this study is newly emerging and does not yet exist in the academic literature, therefore it is seen as a new contribution to bringing this practitioner-orientated framework into the academic domain.

Clearly, a holistic mixture of interventions is essential to achieve optimum improvement which assists SMEs to remain sustainable in their business operations. As a consequence, it is envisaged that there is a need to develop a framework to describe how the processes and stages are involved in carrying out the interventions. Thus, this framework should be capable to identify the important factors including issues, drivers, barriers, enablers, planning, implementation and the impact affected throughout the

intervention. A clear working framework of sustainability processes definitely needs to be realised as an incentive to SMEs.

Chapter 3

METHODOLOGY

You have to learn the rules of the game. And then you have to play better than anyone else.
(Albert Einstein)

CHAPTER 3 METHODOLOGY

3.1. Introduction

This chapter describes the methodological approach applied in this thesis which includes methods and techniques adopted in the entire research effort. It presents the research design process, followed by a description of how the overall research flow is managed. To complete the research cycle, this chapter also provides a demonstration on deployment of data collection strategies, data analysis process and framework development.

3.2. Research Methodology

The purpose of this research is to identify and present the critical influencing factors that determine success in SMEs when acquiring external knowledge for improvement. Three theoretical concepts (Absorptive Capacity, Tipping Point and the Knowing Doing Gap) have been considered in the knowledge transfer process of intervention. The different journeys and individual complexities that firms experience throughout the intervention process are the key focus of the exploration.

In order to achieve this purpose, the research is set to gain extensive understanding of the real issue of sustained growth in SMEs, and to acquire new insight into the various dimensions of the subject. The study revolves around examining the complexity in intervention process for which a case study method is found to serve as the most suitable approach. This study is therefore categorised as an exploratory research (Berg

and Lune, 2004; Barzelay, 2007; Creswell and Clark, 2007; Yin, 2014) in which questioning the "why", the "how" or the "what" of the concerned topics are undertaken. The case study approach is retrospective based on an existing portfolio of government initiated intervention project, KTP, that are undertaken by the University of Liverpool. The cases are analysed using recorded and archived document of the projects as well as a revisit of the firms to examine the experiences and current state of the firms. It is expected that the result will be helpful to provide significant insight into a specific given situation in industry that also offers new academic value.

A qualitative approach is chosen for this study. Bodgan and Biklen (1982) also agree that a qualitative piece of research attempts to objectively study the subjective states of their subjects. Thus, the purpose of this research is set as to scrutinize thoroughly the understanding of the phenomenon related to SMEs complexity of intervention through the case study.

The process involved includes interview questions, data collection in the participant's setting, data analysis inductively building from particulars to general themes or pattern, and the interpretations of the meaning of the data. Furthermore, the final written report has a flexible structure. Thus, this form of inquiry supports a way of looking at this research that credits an inductive style, a focus on individual meaning, and the importance of rendering the complexity of a situation which is most relevant to SMEs situation.

Contrarily, a quantitative approach employs an experimental or correlational design that hampers clear perception of social facts (Cronbach, 1975). Quantitative research is focusing on testing objective theories by validating the relationship among variables. The analysis process is measured on variable parameters, so that numbered data can be

analysed using statistical procedures. The final report has a set structure of statistical results. Therefore this approach is considered as deviated from the purpose of this study.

This study is designed to be qualitative research. The justification for the qualitative nature of the research is that the study represents an exploratory investigation of the effect that embedded new knowledge has on the company performance. The study attempts to discover specific qualitative value within the subject area. Hence, it is anticipated that the search is for the actual meaning of the topic, mining in depth the source of the main subject. Therefore, as an exploratory study, it will then produce a detailed description with a comprehensive explanation. This also highlights the rigorous data collection and analysis techniques applied.

Further to the above, qualitative research can be recognised as systematically and rigorously conducted (Greening et al, 1996). Strategically managed, it is flexible and contextual. Certainly, this method is a collective explanation of the intellectual question. It produces results using extensive causal judgements (cause and effect). Not only it is a critical self-reflection to the given answer, in fact, it is not seen as an isolated or unified set of practices. Indeed, it is an ethical practice within an understanding of the business context.

According to Eisenhardt, (1989) and Voss et al, (2002) a hypothesis is needed as a prediction of the outcome of a study, which is formulated from theories or research questions. In most case based research, hypothesis building is often required (Voss et al, 2002) which proposes an explanation of phenomenon derived from the case. Often, exploratory research is used to generate a hypothesis to test theory.

However, in this exploratory study, the search circles around the “why”, “what” or “how” of the phenomenon happened in the company, in which case the outcome is predicted to be flexible. It would be more useful if the outcome is to be unexpected. In this case no prediction to the outcome is to be made. Also, there is no theory that needs to be tested or developed. For that reason no hypothesis is envisaged as required.

It is difficult to arrive at a reliable estimate of a number of cases that need to be explored. Besides, a theoretical saturation is reached where it is felt that no new material was emerging. Cooper and Schindler, (2003) argued that there is no clear definition of what is the ideal number is of the cases to conduct analysis. As agreed by Yin (1984) who suggests that case studies can involve either single or multiple cases with numerous levels of analysis. It is accepted that the intensive study of a single case unit can be a perfectly appropriate method in conducting the entire research (Achen, (2002); Barzelay, (2007); Gerring, (2007); Gerring and McDermott, (2007), for instance, if the case is considered as a very rare and there are no other cases. This one possible exception would be a sufficient experiment in which the given case can be tested repeatedly; returning to the origin or source after each test. However, it is viewed that the satisfactory analysis is always grounded in the representativeness of the much-studied and well constructed cases rather than the number of cases.

Considering the above view, seven cases were selected for this study as it was thought appropriate and sufficient to conduct the exploration. The cases were selected based on the matched criteria set, especially the participants who involved closely with the project and were still in the company. Hence, it was considered as relevant to the project and model that is investigated. Besides, the number of cases was also chosen based on the accessibility of the company’s information for data collection, even

though some of it was restricted as confidential. Also, as these companies were referred in the previous related study, therefore it strengthened the validity of the case.

The case study approach is selected as a strategy which focuses on understanding the dynamics of the events within the case (Eisenhardt, (1989); Flyvberg, (2006); Yin, (2009). It is used to accomplish the aim to provide description and exploration (Kidder, 1982) from numerous sources of evidence in building theories. Thus, it enables the examination of the data closely within a specific context.

Inevitably, case studies are often labelled as being lengthy, descriptive, difficult to execute and producing massive documentations (Yin, 1984, 2009). In particular, case studies of longitudinal nature can extract a great deal of data over a period of time. The risk emerges when these data are mismanaged or disorganised.

In this study, an in-depth longitudinal examination of cases of intervention was used to provide a systematic way of observing the events, collecting data, analysing information, and reporting the results over a long period of time; a two year project. Multiple seven cases were selected to enhance and support the results. An analysis was conducted by replicating the case through pattern matching and a technique linking several themes from cases to some theoretical proposition. This helps raise the level of robustness of the method. The detailed qualitative result produced is not only help to explore or describe the real event, but also explains the complexity of the situation which is not captured in the experimental of quantitative approach.

Interestingly, Flyvberg (2006) highlights the goal of the case study is to be unique. The concept emphasises that the interpretations of the study is to be different things to different people. Therefore different background of readers may have sought different

conclusion from the same case. Above all, the interest of this approach is to create understanding from the case study evidence which can be used as a guideline.

It is needed to note that research methodology explained in section 3.2 is different from the reflections done on research method explained in section 3.4. Research methodology (3.2) is concerned with the underlying theory that allows research to take place. It is about the principles that guide our research practices. McGregor and Murname (2010) suggest it refers to the rationale and the philosophical assumptions that underlie any natural, social or human science study. Methodology is the study of how research is done, how things are found out about and how knowledge is gained. Therefore, methodology explains why certain methods or tools are used.

In comparison, the research method is the tools, techniques or processes that are used in the research (Patton, 1990; Joy, 2007) and which are shaped by the methodology. It involves the practical application of techniques and tools that can be used in experiments, tests, surveys etc. that allows researcher to carry out the research. These might be for example included; case studies, surveys, interviews, or participant observation. The research method aims to provide practical solutions to the research problem.

3.3. Research Design

Knowledge is identified as a core element in this study which is believed can bring improvement to SMEs. It is assumed that companies benefit from it and allow them to improve their position and move forward (Macpherson and Holt, 2006). This research is designed to integrate the three theoretical concepts identified earlier as Absorptive Capacity, Tipping Point and the Knowing-Doing Gap. The argument relies on how

these concepts can be integrated to benchmark the impact of implemented knowledge. Empirically, it will be assessed in the intervention process of the company which is considered as a “platform” to deliver knowledge and is assumed to have the ability to transform those theories into practical.

The entire research process is designed as depicted in Figure 3.1. below.

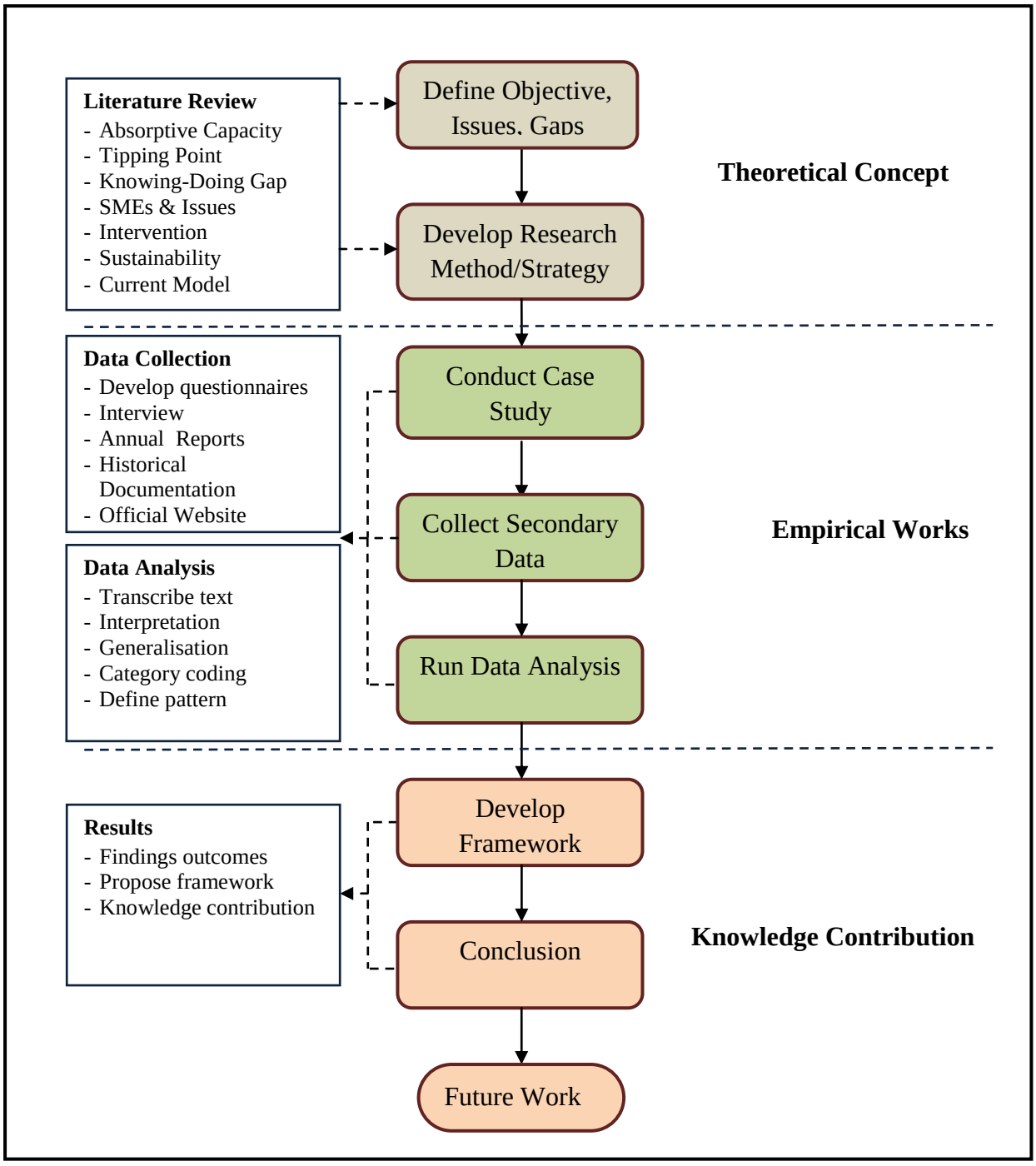


Figure 3.1: Research Design Process

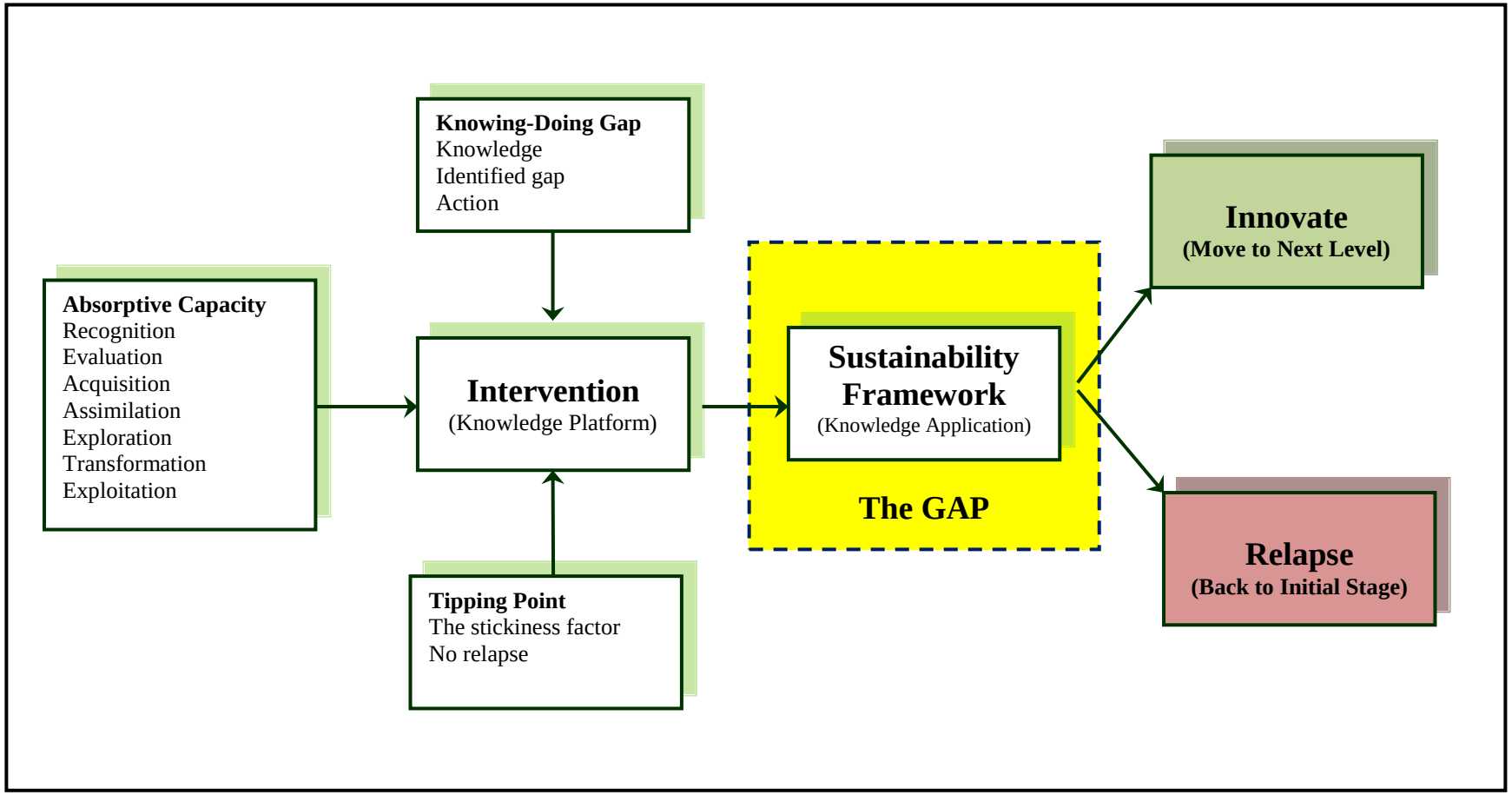


Figure 3.2: A Proposed Sustainability Conceptual Framework

Figure 3.2. depicts a construct that is viewed by integrating the conceptual theory of ACAP, KDG and TP to develop a proposed sustainability framework. In this context sustainability means that the knowledge that is applied constantly provides a platform under which increased business performance is achieved. The results are seen through new product development, entry into new markets, new product design, plant expansion, new business investment, etc. It is assumed that at this level the company is established and ready to move forward.

3.4. Research Method

As an exercise in qualitative based research, a case study technique (Yin, 2009) is used. It is one of the most suitable methods available to researches. It is perceived that the case study approach builds teamwork (Eisenhardt, 1989), between researchers and the company to generate the understanding of the research matter in depth. It allows the identification of the research development process in a real-life context. Hence, it investigates the main interest of the study area in more detail. It is to some is viewed as "the most powerful research method", (Voss et al, 2002: 195) which relates to the pertinent context.

Yin (2009) also suggests that considering a large number of case studies will not only provide stronger data, but in fact it will substantiate it. In this situation, more cases were selected to allow rigorous analysis to be completed as well as to distinguish fully the scenario. The conducted case study is based on the use of an external intervention process in companies and the sustainability of its after it is completed.

Companies that had undergone the intervention process and fulfilled a number of criteria were selected for case study. Seven case studies were conducted. Each had taken part in a Knowledge Transfer Partnership (KTP) project for two years. The case study involved reviewing a post completion analysis. KTP was identified as a very structured approach, with good aspects and a good example of an intervention process. Initially, all companies were selected on the basis that they had not had any prior of intervention and this was the first time they had engaged in a KTP project. Therefore, this is an effective test to study the questionnaire in real research. In fact, it was an excellent model of showing methods into practice from the real showcase, in addition to the step of applying the method across by testing the questionnaire accordingly. Importantly, it is a prospect to demonstrate the areas that the research focuses on.

Within the case study approach, the structured interview (Eisenhardt, 1989) is understood to be the best approach to deliver findings. Therefore, it was identified that the involvement of key representatives would be the people with interest and engaged in an intervention capacity within the company. It is designed with an intention to seek descriptive and exploratory information about a particular phenomenon that existed to shed light of the topic of interest. Essentially, it is concentrating on how the external knowledge is embedded within the intervention to the advantage of the company. For instance, to justify the impact of the training experience that has been delivered to the specific person, and how it can change the individual's performance for the purpose of improving their issues in the company.

3.5. Ethics

Consideration of ethical issues also needed to be taken into account. To ensure that the research was carried out in a professional manner the following approach was taken:

i. **Consent Forms**

Before data collection took place, all participants involved in the case studies were requested to sign consent forms. These forms provided participants with an acknowledgement that they had been invited to participate in the research. They were also informed that they could withdraw their participation at any time should they so wish.

ii. **Anonymity**

The interview was designed to be anonymous and confidential. As such, participants involved were assured that personal and the corporate details would not be disclosed. Participants would not be identifiable in the research findings. These measures were adopted to ensure the confidentiality of the participants.

iii. **Ethical Approval**

Ethical approval was sought and approved by the University of Liverpool Ethics Committee before data collection took place. This was to ensure that the research carried out conformed to the highest ethical standard.

3.6. Data Collection

The primary source of data is through transcription of the interviews. Simultaneously, a secondary source of data was collected from annual company's report, historical documentation and website for each company selected for case study. The main purpose of collecting the data is to explore the impact of the intervention process within the company. The first goal is to identify issues that may occur in the company. Secondly, to identify whether the company has engaged with the external intervention to bring possible solutions with advantage of added value to the sustainability of the business expansion.

For the primary data, structured interviews were visualised to be the best approach to deliver data collection. The use of interviews is recommended as articulated by Voss et al, (2002) who suggest that interview methods are the typical major data source for case study research. The process conducted in interviews allows in-depth data analysis which includes theory exploration, theory building and theory testing and extension, which lead to conclusive data exploration within the data collection process. Previously validated scales or frameworks were not used as it is felt not required.

The structured interview (Eisenhardt, 1989) was used for data collection with the purpose to develop reliable standardized measures as well as to generate constant result against all cases. The aim of this approach is to ensure that each interview is presented with exactly the same questions in the same order. This ensures that answers can be reliably aggregated and that comparison can be made with confidence across all cases.

The target populations for each of the interviews comprised:

- The company director who is the controlling hand of the company who drives the intervention and seeks improvement.
- The business manager who is usually the person in control of overall project implementation.
- Staff who have undergone training that allows them to use the knowledge.
- Other staff who might have been involved in the intervention and benefit from it.

These interviewees were selected based on the criteria of their full involvement in the intervention implementation, such as whether they were the industrial supervisors or the associates (KTP) closest to the project objectives and were more aware of the impact and results. Therefore it is believed that they have the most knowledge of the activities and processes who should know all the answers.

One interviewee was selected for the interview in each company, who was the key person in the firm, using the same set of questions. The interviewed person was either the industrial supervisor or associate who was closest to the project and still in the company. For that reason the reliability of the information could not be questioned since their full involvement and commitment towards the success or failure of the project was a priority. The informant knew all or most of the plans, activities and processes throughout the implementation. Besides, the use of proposal reports and final progress reports as documentation strengthened the validity of data.

The cases had a number of common factors. Firstly they were all SME's, participating in a very structured intervention process i.e. the KTP project. Secondly the

project was well planned and included an initial proposal with clear targets, which were well monitored both monthly and quarterly in the tangible benefits reports. Finally the project allocated sufficient budget for implementation, particularly for the training to the team involved. Since the projects were typically run over two years, it was considered as sufficient time to measure how well the knowledge was embedded as projected in a final progress report.

Table 3.1. illustrates how questions are linked to the theoretical concepts.

Table 3.1: How questions relate to the theoretical concepts

1.	**ISSUES**	**How do questions relate to the theoretical concepts**
a.	Were there any critical internal and external issues that have prompted the company to urgently seek changing and what were these?	Identifying issues exist, awareness, needs for new knowledge (ACAP)
b.	Were there any internal and external barriers that were stopping the company from growing or slowing down its growth rate at that time?	Impediments factors (Barrier, TP, Sustainability)
2.	**RECOGNITION OF NEED**	
a.	Was there a need for external support for the company attempting to implement new knowledge enhancement?	Needs for external support to engage intervention (ACAP - Potential)
b.	Why do the company needs an intervention?	Recognition, Evaluation (ACAP - Potential)
c.	What was the nature of intervention?	Knowledge nature (Bessant; Dimension)
d.	What was the area that needs to be focused on?	Dimension (Bessant; Operation, Systems)
e.	Were there any support and motivation from internal and external that have driven the company to urgently seek changing and what were these?	Driver from the company to engage with intervention (Enabler)
3.	**OBTAINING SUPPORT**	
a.	Was it normal for the company to seek external support when internal change or new knowledge is required?	Acquire knowledge (ACAP - Potential)
b.	Has the company obtained external support before this intervention?	Existed knowledge evidence
c.	Has the company attempted to address the above critical issues internally first? If yes why did this not work, if no why not?	Recognition, Evaluation (ACAP - Potential)
d.	How did the company go about obtaining external support to address these issues?	Recognition, Evaluation (ACAP - Potential)
e.	What were the factors that drove the company to proceed with the intervention?	Driver within the company (Enabler)
f.	What was the nature of the intervention?	Knowledge nature and dimension (Bessant)
g.	How long ago did this intervention occur?	Project duration
4.	**INITIAL STATE**	
a.	What was the company's initial level of awareness and knowledge in the area of intervention?	Recognition and evaluation (ACAP - Potential)
b.	Was there any initial internal resistance to seeking this external intervention?	Impediment factors (Barrier)
c.	Who internally championed this intervention?	Main driver – enabler (people management)
d.	Was there a budget set for this intervention?	Financial planning

5.	**PLAN**	
a.	Who was the driving force for implementing the intervention?	Main driver - enabler (people management)
b.	Was there any internal plan being set for this purpose or was it arranged with external support?	Planning of engagement – recognition (ACAP – potential)
c.	Was there an internal implementation team put together for this intervention?	Team involvement (people management)
d.	Were there initially any specific targets set for the intervention?	Target set (Improvement indicator)
e.	Did the intervention plan include a training element? If yes how wide was this?	Embedded knowledge plan (ACAP – Assimilation, Exploration)
f.	Were staffs made aware in advance of the intervention?	Awareness (Bessant 2005)
g.	Were there any other actions being taken to initiate the intervention?	Other plans (ACAP - Eevaluation)
6.	**IMPLEMENTATION**	
a.	How long did it take from recognition of need to planning to implementation ?	Recognition (ACAP – Potential to Realized)
b.	What external and internal resources where used to implement the plan?	Available resources for the implementation (KDG, ACAP – Realized)
c.	Where there specific targets set? Did they change during the intervention?	Improvement indicator
d.	Where there any milestones throughout the intervention and where they normally achieved?	Target, Deployment (KDP, TP, ACAP - Realized)
e.	Which part of the company was intervention directed at initially?	Dimension – Operations, Systems (Besant)
f.	Where there other parts of the company not originally planned for also affected?	Other Dimension (Bessant)
g.	What was the duration of the intervention? Was this set in the plan?	Plan for implementation (KDP, TP, ACAP – Realized)
h.	Was the external support intervention continuous or intermittent?	Assimilation, Exploration, Exploitation, Doing the Knowing, (ACAP, KDG, TP)
i.	If intermittent, how often and what was the duration of each session?	Risk (ACAP, KDG, TP)
j.	Did the intervention involve any formal training of staff? Did the staff have a chance to apply the lessons from the training during the intervention?	Assimilation, Exploitation, Doing the Knowing, Sustainability (ACAP, KDG, TP)
k.	What was the level on interaction between the external intervention staff and the targeted staff in the company? (Formal, informal, through documented meetings , training, mentoring, etc.)	Implication to the relationship building
l.	Were there any barriers to the implementation?	Impediment factors (ACAP, KDG, TP)
m.	What were the enablers that facilitated the implementation stage?	Motivation factors – enabler (ACAP, KDG, TP)
n.	Where there any incidents that would have jeopardised the intervention?	Impediment- barrier (ACAP, KDG, TP)
7.	**IMPACT**	
a.	What were the company areas affected by the intervention?	Dimension; Operation, Systems (Bessant)
b.	What was the significant improvement gained from the intervention?	Transformation (ACAP, KDG, TP)
c.	Were there any targets missed or not achieved and why?	Relapse (TP)
d.	Was there any point where the company deteriorated as a result of the intervention?	Relapse (TP)
e.	Was there any kind of new knowledge skills or expertise being embedded during the implementation?	Transformation (ACAP, KDG, TP)
f.	What was the depth of knowledge gained from the intervention in terms of scale and scope?	Absorbed knowledge, exploitation (ACAP, KDG, TP)
8.	**SUSTAINABILITY**	
a.	Has the intervention continued to achieve an impact beyond the end of the intervention? If yes how, if not why not?	Transformation, Sustainability, Relapse (ACAP, KDG, TP)

b.	Does the company still follow or apply the knowledge or procedures acquired from the intervention? If not why not?	Acquisition, Exploration, Exploitation, Sustainability, Relapse (ACAP, KDG, TP)
c.	Have external support providers returned to deal with issues still arising from the intervention?	Exploitation and deployment, Sustainability (ACAP, KDG, TP)
d.	Do the staff still manage to apply the knowledge from this intervention unaided?	Exploitation and deployment, Sustainability (ACAP, KDG, TP)
e.	Since then, have the staff applied the acquired knowledge in other areas of the business?	Exploitation and deployment, Sustainability (ACAP, KDG, TP)
f.	Since then, have the staff modified or customised any other processes/products/operations based on the knowledge acquired from the intervention?	Exploitation and deployment, Sustainability (ACAP, KDG, TP)
g.	Have staff acquired any new knowledge in this area without external intervention?	Assimilation, Exploitation (ACAP, KDG, TP)
h.	Have they changed what they learnt? Was there any kind of new innovation as a consequence of the embedded knowledge?	Deployment, Transformation, Innovation (ACAP, KDG, TP)
i.	Are there any key staffs with the role of searching for or acquiring new knowledge?	Team involvement (Enabler)
j.	Would you consider the staff better at receiving new knowledge as a result of this intervention?	Deployment, Transformation (ACAP, KDG, TP)
9.	**REFLECTION**	
a.	Would the company embark on a similar exercise again and why?	Implication of the intervention implementation
b.	What would you do differently if you were embarking on this intervention again?	Future works and thought

The literature review (Chapter 2) led to the development of questionnaire. Details about the questionnaire were chosen thoroughly and were thought to be close to the factors related to the context. The rationale behind the questionnaire was not only concerned with anlaysing the effect of intervention but also corroboration of theory. And certainly, the goal is to test out the questionnaire as to whether it is satisfactory enough to conduct a detailed exploration of the intervention processes or whether it is otherwise still lacking. The issue that might occur is the extent to which this questionnaire observes the overall possibilities throughout the intervention process.

However, after extensive review of the literature (Chapter 2) with detailed consideration of the pertinent context, the questionnaire was perceived can shape the overall research to produce results. Thus, the questionnaire was rigorously developed to satisfy and fulfil the necessary information required consists of critical observations that need to be explored in the case studies. In order to meet the purpose, interview

questionnaire was set by looking into the practical application of those three dimensions (ACAP, TP and KDG) that became apparent within the company.

Questionnaire was divided into several stages with each stage representing one functional purpose. The steps involved and approaches to the investigation were then applied. The stages were regarded as the main headings of the questionnaire which were then followed by the actual questionnaire that looked into the detailed investigations. For in-depth exploration, stages were identified based on certain criteria such as prerequisite, implementation and impact which in turn represent the pre, during and post intervention stages.

The questionnaire was designed to allow observation of the sequential processes involved throughout intervention implementation. These processes comprised of issues, recognition of the need, obtaining support, initial state, plan, implementation, impact, sustainability and reflection. These stages which define the 'life-cycle process' of the intervention arranged in chronological order in the sequence in which the questionnaire was posed to the interviewee. The idea of 'life-cycle' process is to identify the factors-related context and to observe every perspective throughout the entire process. It was designed as such, in order to identify the entire movements of the process of intervention. The longitudinal research study was planned to ensure that the data gathered would be as effective as possible and employed attention to detail. As a result, it is perceived to provide enough evidence to be analysed.

The sequence of stages is crucial as this will determine the success of the overall process to be researched. As such, the data collection method can be said to be robust as all the important aspects would have been covered. The questionnaire was also designed to ensure that to be easily understandable by the target population so that

misinterpretation of what is being asked is minimised. The questionnaire phase will be followed by the the data collection method in the form of interviewing the selected SMEs.

In conducting the investigation, the sequential stages were identified as; issues, recognition of needs, obtaining support, initial state, plan, implementation, impact, sustainability and reflection are essential to complete the full cycle of the intervention process.

i. **Issues**

Firstly it is perceived as critical that a company needs to be aware of what type of current issues and barriers existed which require immediate attention. The focus is on what dimension the main issues are related to (Bessant et al, 2005), whether operation, formal systems or others that need to be resolved. Based on the frameworks borrowed from the literature (Bessant et al.'s (2005); ACAP; TP) awareness of issues is the initial point to start with. Rectifying issues is identified as the most critical part, as this needs to be resolved. Not only that, it will also slow or prevent the company from growing, and have prompted the company to urgently seek changes. However, due to the unresolved emerging issues, it was recognised that the company was in a state which needs external support for solution or improvement. The condition of the state can be assumed, such as unorganised workplace, fire-fighting process, unclear process and procedures, excessive stock, waste, etc. As such, an external engagement was considered to be a judicious decision to put things straight and back in place.

ii. **Recognition of Needs**

The next stage is identifying the need for intervention to resolve issues. Therefore the recognition of need of new knowledge to be applied as literature suggests (Cohen and Levinthal, 1990; Zahra and George, 2002; Lane et al, 2006; Todorova and Durisin's, 2007). At this level, business problems and issues should have been addressed, as this will determine the nature of the intervention. Once the issues were recognised, it was possible to decide on the kind of knowledge that was required with the correct requirements that were needed. The team involved and the key person who played the role need also to be identified. It was important to put the right materials and resources in place, so that successful implementation can be achieved. Implementing the right requirements for the right issues can result in improvement for the company.

iii. **Obtaining Support**

The drive to seek the external support was identified soon after the importance of the intervention was acknowledged. Also, the existence and experience of the intervention provider were recognised. How the company engaged with the external support was also identified. At this stage, the idea to engage with the external intervention was to get support in the form of the expertise in fixing the identified issues. That is not to say that the company was not capable of fixing the issues themselves, however, with the help from experts externally, it will be able to produce better improvements as an outcome. Not only do the experts know the problems in and out, but eventually, the knowledge that they delivered can become transferable to create expertise besides knowledge-based company. Thus it benefits the company in adding new value and developing skills.

iv. **Initial State**

The initial level of the company to acquire new knowledge and readiness to initiate the intervention began at this point. Important criteria of what knowledge is required were considered. Knowledge evaluation of ACAP (Cohen and Levinthal, 1990; Zahra and George, 2002; Lane et al, 2006; Todorova and Durisin's, 2007) is applied at this stage. The activity also involved in identifying the current position of the company and how they shall go from this point onwards.

v. **Plan**

At this stage, the entire planning of the project was designed. The requirements to carry out the intervention were set such as the available resources, main driver, target, team involved, duration and action plan. The interventions in these case studies were based on the KTP format. Since KTP's are 60% funded by the state, a proposal stage was required that detailed the issues, project objectives along with a detailed plan are and the management team. In this preparation, the detailed project was planned in putting up strategies for setting the overall implementation which includes; who was the main driving force, selected team involved, who was setting the plan, specific target set, type of training that was required and action being taken to initiate the implementation.

vi. **Implementation**

The intervention practice began with the recruitment of the KTP Associate who acts as the "mediator" between the external provider (academic supervisor) and the company supervisor. The processes involved were then identified as important where the project really played its role. The plan set out was implemented as scheduled. The main purpose was to achieve the set target and to identify the result throughout the

duration of the implementation, whether it brings new changes for improvement or otherwise. During the implementation, an attempt to identify the overall processes involved as much as possible was made. It was an explorative investigation to find out the overall processes that were involved. However, the concern was about how the intervention was delivered; such as was the target that was set achieved. Execution of key components of the intervention such as the required knowledge, the type of training, duration, participant, the benefit, how it was impacting the operation, and relevant factors was evaluted. Importantly, the motivations and impediments were examined in this stage. Effort to observe the application of proposed framework of integrated concepts (ACAP, KDG and TP) was made. The inquiry circled around the framework.

vii. **Impact**

The impact covers the results delivered from the intervention which was the consequence of the new output and the affected area that were involved. It was a process of application, of mastering the most important skills required and to be transferred into the company for new practices in their daily operations after the intervention is completed. The investigation concerns the outcomes such as how the project was impacting on the company, what were the changes that occurred and whether the company was continuously applying the new changes. The investigation attempted to observe the implication on the daily processes in operation. The concern was demonstrated around knowledge deployment, in suggesting the implication and the significance of the framework. It is believed that if the applied framework was viable, new performance should be indicated.

viii. **Sustainability**

The point of the recent embedded and applied knowledge after it was realised (Zahra and George, 2002) was established and sustained. This was the beginning of new improvement or further growth that was assumed to be occurring. New transformation was being built, such as new skills, expertise, expansion, new market or products, increased in revenue, innovation, etc. At this point, the company is believed to be at the "tipping and sustain" point with regards to the implemented intervention, applying new practices and continually moving ahead. The focus was on how the company deploys the completed intervention into a new transformation of the company. The concern was to find out the impact of the sustainability of intervention whether it moves ahead or otherwise back to the old practice.

ix. **Reflection**

This was the future vision of intention to possibly implement the same intervention again. The inquiry focused on why the company wants to adopt the implementation again if they need to. Also, the search remains whether the company embarks the same exercise within the same area again or exploiting on a new different exploration. Factors such as what would the company does differently or why the company feels that it needs further intervention are also considered. The degree of relapse to the old practise if existed will also be explored.

3.7. Data Analysis

A case analysis approach is adopted. Eisenhardt, (1989) suggests that the initial process of the case analysis is to outline a detailed write-up for each case. Starting from this step onwards, the critical context of the subject will become apparent. He added that it is important to provide sufficient information to enable the reader to evaluate the adequacy of the research process and results. In this context, to produce a quality case research, it is crucial to consider consistency in logic as an analytical foundation. Besides, frequent reading of each case will ensure that the significant point is not missing in the context. Overall, the idea of conducting a case study is to learn what lesson can be derived from the real event. By understanding a deeper context of each case, in consequences, it generates contribution that could eventually conclude as a theory.

The analysis is envisaged to measure the qualitative data. It was conducted based on guidelines by Miles and Huberman (1994); Dey (1993) and Coffey and Atkinson (1996) which corroborate a combination of categorical analysis (coding and thematic analysis). It has been justified that preliminary themes and patterns were identified (Miles and Huberman, 1994) and noted using the word processor to run the analysis. The transcripts from interview were read closely, highlighted, coded and analysed based on the created theme. Audiotapes were played and listened several times to circumvent any possible missing points.

To justify why this method is used, the aim of the qualitative study is to describe and explain (at certain intensity) a pattern of relationships (Miles and Huberman, 1994) which can only be carried out using a set of specified conceptual analytical categories or themes. Coding and thematic is popularly known as one of the qualitative analysis approaches (Rose and Sullivan, 1996; Madison, 2005). It is identified as the most

suitable method for the qualitative analysis research. The method to code the important points will enable the extraction of the data from the interview and subsequently the interpretation of the data into the required analysis findings. Data can be easily transcribed from the interviews. A step by step approach allows the data to be analysed systematically and rigorously. The structured process will be able to describe, generalise, and link the qualitative data. In other words, the processes involved enable the transcription and annotation of data, input of the data, coding the category based on the themes, connecting, interpreting and finally corroborating evidence to test the data. As such, it was thought that this method enables the consistent analysis of data throughout the study. Logically, it will connect the evidence of the case study engagement with the conceptual literature in order to produce results.

The overall analysis process is pictured in Figure 3.3.

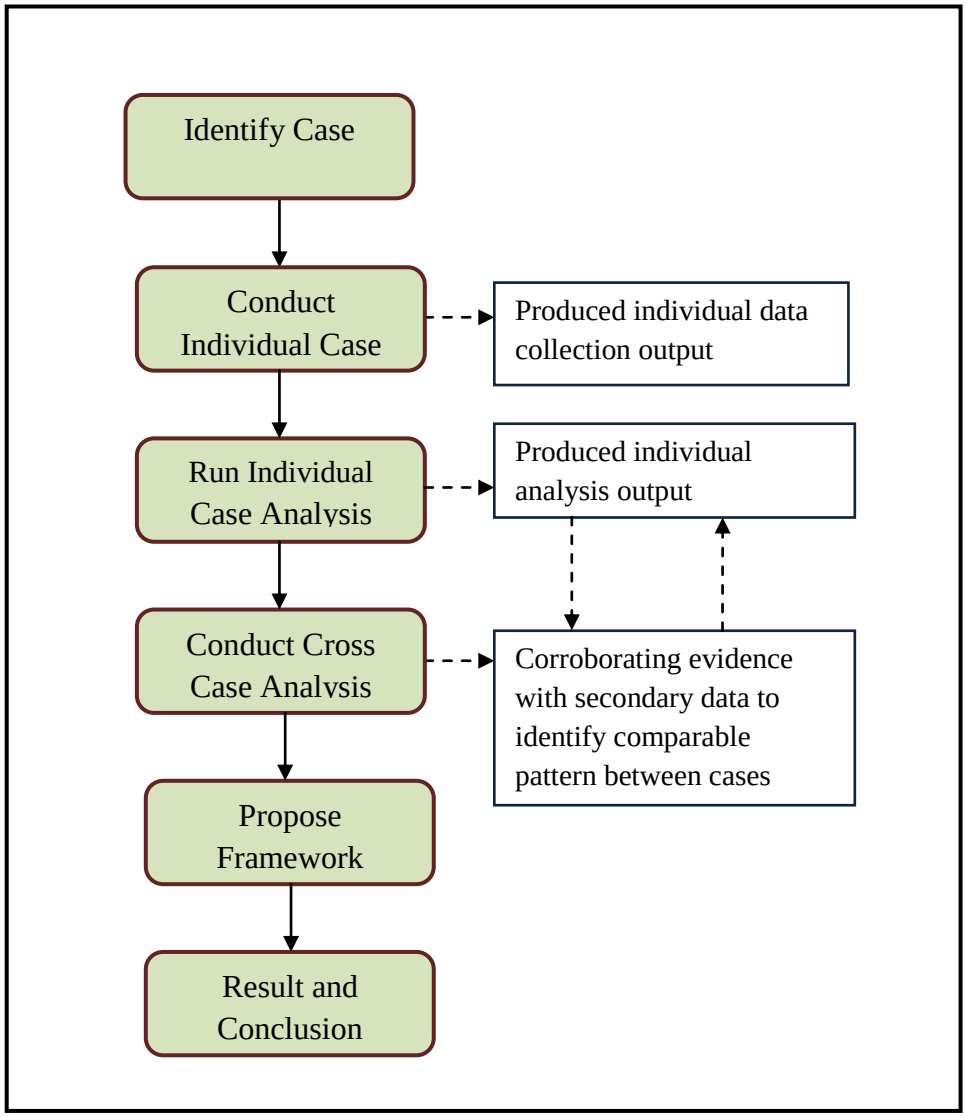


Figure 3.3: The Case Study Method

3.6.1. Soft Systems Methodology (SSM)

As part of the analysis and to substantiate the rigorous investigation, Soft System Methodology (SSM); (Checkland, 1981, 1990), was adopted to run the case analysis. Throughout this research, the concerns were circled at the "how", the "why", the "what" and the "who". During the phase of establishing findings of these research inquiries, SSM is predicted to be an appropriate approach as it dealt with these kind of questions. Other than the logic-based analysis of world-views (Checkland, 1981, 1990), SSM was developed to help make sense of the difficult problems of internal contradictions.

SSM was developed by Peter Checkland (Checkland, 1981, 1990) and research teams at Lancaster University during 1970s. The purpose was to deal with the complex social realities and different perspectives of participants in the real world situation. In this context, a real world problem situation is perceived to exist. SSM is designed to be an issue-based way of seeing things. As such, it is intended to figure out involvement in the problematic situation or human activities which exist that require making sense of any reality where there is no easy way out. Hence, it is appropriate for modelling and formulating work of all types to find potential solutions. The stages classified by this method are involved with defining the real problematic situation and expressing it in a conceptual model.

In most citations (Checkland, 1981, 1990, 1999), SSM is widely described as a seven-stage process as follows:

i. Identifying the problem situation that is considered problematic, for intervention is desired.

ii. Researching the problematic situation and constructing a “rich picture” (interpretive representation).

iii. Selecting perspectives and formulating “root definitions” (key processes that need to be implemented).

iv. Developing a conceptual model of the change systems.

v. Comparing the model with the real-world situation.

vi. Defining the changes to be implemented.

vii. Taking action to improve the problem situation.

The ”Root Definitions” stage of SSM (Checkland, 1981) is applied as an important technique adapted as part of the analysis methodology in this research. This stage is adopted as it involves primarily the key processes that need to be focused on. It is used to identify the sustainability factors that occurred within the processes during the intervention. As it is an approach of a problem structuring method for understanding the real-world situation, therefore the analysis process that involved with the systems thinking about the actual event is perceived to fulfil the purpose of finding out the real phenomenon that existed in the case study.

Besides, the root definitions stage is used to identify the intention of the processes and who the interested parties are, by identifying certain elements within it such as crucial details activity. It is decided that the attitude of finding the right answer will not be adopted, however, as the reality is one of subjective beings through different world views arriving at different interpretations of the perceived realities. Therefore, the intention is to support the process of formulating models of different interpretations and different point of views (Checkland and Scholes, 1990: p. 27) of what the process is there to do. From this perspective, the real situation is perceived from different points

of views. Hence, there are possibly several views of similar situations which can be derived. Different world-views lead to different understandings and evaluations, which could possibly generate different ideas for positive actions.

The steps involved are adapted as shown in Figure 3.4. which is briefed as follows:

Step 1: Appreciation of the problem situation.

Step 2: Expression of the problem situation.

Step 3: Formulation of root definitions.

Step 4: Developing analysis findings.

Step 5: Recommending actions to improve the situation.

The list of activities which is undertaken during the intervention process will comprise of a wider activity than shown in the root definition steps. The steps involved allow for a rigorous data mining process.

In conducting the analysis, the process is adapted into three chronological categories;

i. Input - Available resources and action.
ii. Process - Transformation of what the event may achieve.
iii. Output – Results.

In the "input" process, analysis was conducted to identify issues and to understand the phenomenon of the real world situation. In complying with these criteria, the available resources and action of the real event were considered. For instance; influencing factors (e.g. enablers or barriers) will be analysed accordingly based on the developed theme and coding. It is important to understand and express the real issues

correctly as the complexity of the situation reflexes the real event observation. Next, the input will be scrutinized for the transformation process.

The analysis moved to the next step known as “process” transformation. In this step the input is processed to develop the research findings, formulating system thinking about the real issues interpretation. Therefore, the analysis was conducted to transform the input to develop findings. This step is a transformation process of what the event may achieve as a result.

The final step “output” is the proposed outcome of the analysis findings of the process transformation. This step recommends action to improve the situation, in this case the results of analysis findings. The results will subsequently be used as a reference to develop a proposed framework.

In conducting the analysis, two stages were carried out. First, the analysis focused on the individual case. The purpose is to ensure that thorough data mining done to ensure consistency and detailed exploration in each case. The second stage was conducting the cross case analysis for identifying the pattern. Thus, comparison between cases can be carried out to ascertain the identified pattern which will then be used in developing a proposed framework.

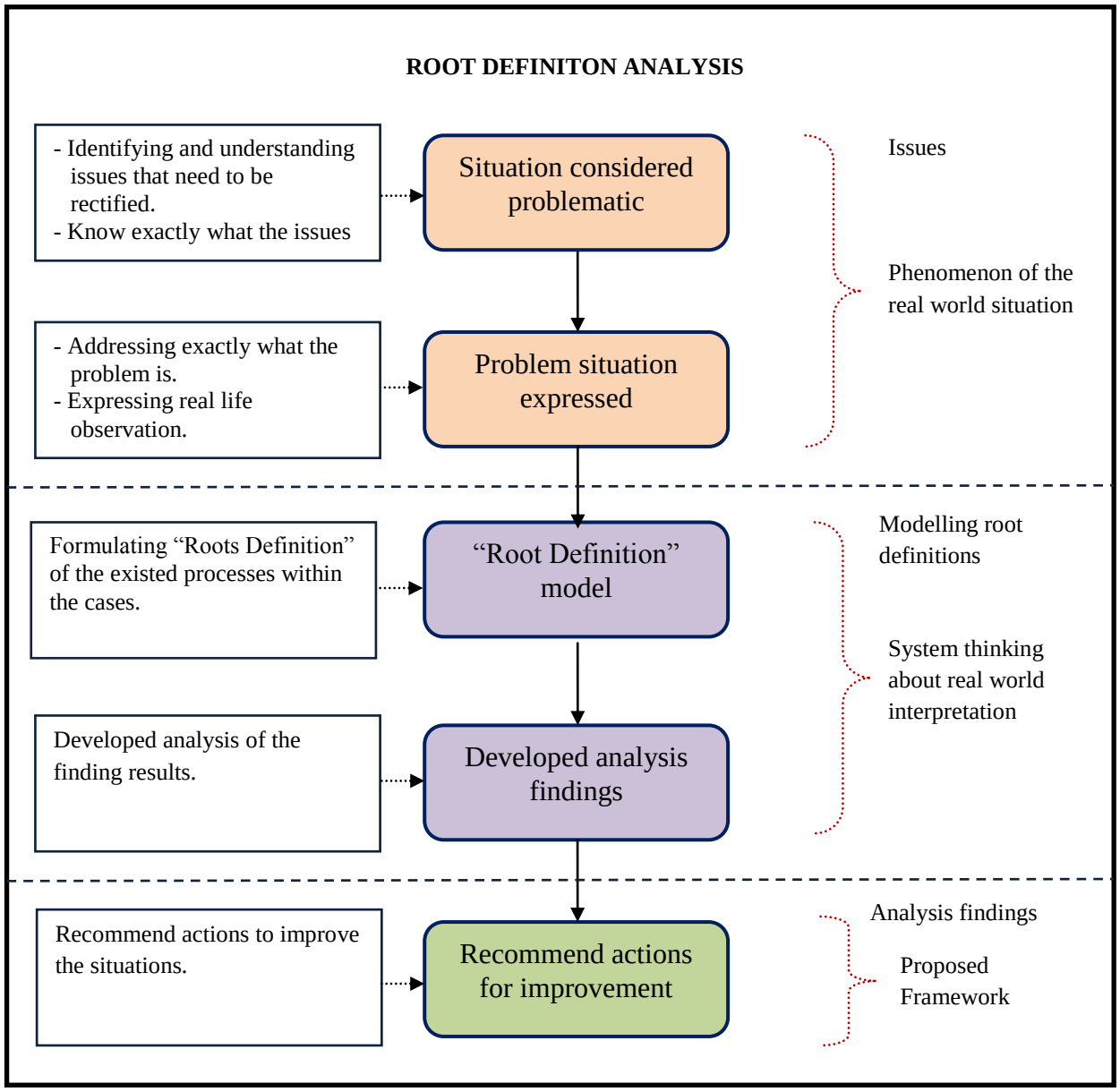


Figure 3.4: Adapted from Checkland P. (1981), Systems Thinking, Systems Practice

3.6.2. Data Validity and Bias.

The typical criticisms of case study research which have always been raised are data validity, not biased and how to testify it (Benbasat, et al, 1987; Flyvbjerg, B. 2006). In considering answers to the issue of bias and lack of rigour of the case study, Dubois and Gadde, (2002) support the argument that there is a necessity for pure induction and that it is almost impossible for the result to lead to bias. This is supported by Sayer (2000) who agrees that bias happens in quantitative research, for instance in the terminology used. Therefore, bias is unlikely a distinct metaphor for the case study research design. It is nevertheless to be accepted that all research methodologies contain bias (Araujo, 2007; Dubois and Easton, 1998; Dubois and Gadde, 2002; Yin, 2009).

To help with the issues of bias, Patton (1990) suggested that research strategy needs credibility to be useful. Thus, to minimise bias in this study, the element of data collection process was used. For instance, the use of structured interviews for the standardization of data collection process was adopted. Therefore the collected data was considered to be consistent throughout all cases, since the questionnaire was homogeneous.

Besides, the selection criteria of the participations were based on the closest involvement with the project. Apart from direct involvement, these participants witnessed the entire process throughout the intervention which is believed that they had personal meanings they attached to what they did. Furthermore the use of the final KTP reports as documents, which were officially reporting the outcomes and results approved by the academic and funding bodies, strengthened the evidence. Therefore,

these sources of information offered rich explanation of the data whilst minimising bias.

Most significantly, case study facilitates a thorough investigation which uses the richness of data (Easton, 2000) to conduct an in-depth study of the case, to understand it thoroughly and derive lessons that can be learnt from it. As such, the knowledge contribution derived from the practical experience of the particular case can be transformed to generate a theory (Mitchell, 1983; Yin, 2003). The significance of the case study is that, the detailed investigation or open-ended questions can even lead to "surprises" that the researcher never thinks of. Unexpected responses contribute to the new findings when something new suddenly emerges. Events from the case study will then become evident as the literature suggests (Mitchell, 1983; Yin, 2003).

It is summarised that the case study research design with an analytical approach adopted in this thesis should assist in obtaining rich and empirical accounts of how the sustainability of the impact of an intervention in SMEs is achieved and is explored profoundly.

3.7. The Knowing- Doing Map

From the review of literature integrated with a construct of conceptual theory, a framework development which is called "Knowing- Doing Map" (KDM); (as shown in Figure 3.5. below) emerges. It is a tool with the purpose to assist the company to map their current position or thought "state" in which that they were on at any moment, and to offer a guidance if they have an opportunity to sustain and grow. The map is divided

into two dimensions which is “Knowing” and “Doing”. The Knowing dimension is about the capacity of knowledge absorption of training and skills which are categorised into four groups expanding on the work of Bessant et al, (2005); Unaware, Aware, Knowledge and Expertise. The other dimension, the Doing is the implemented action categorised into five stages which are; No Action: Knowing-Doing Gap (Pfeffer and Sutton, 2000, 2013), Ad-hoc actions, Implement, Sustain and Innovate.

On top of the above, this map tool is designed to have a “stage” and a “state” situation to facilitate the movement activities from a lower to a higher level which can be recognised. The stage is where the progress from one level to another is performed. Whereas the state is a position over which a road map of sustainability can be overlaid. Simply put, by understanding the current state, it helps the company to move from a position of even having nothing to exceptional innovation. It is believed that with the help of intervention, the company are always have opportunities to progress for improvement.

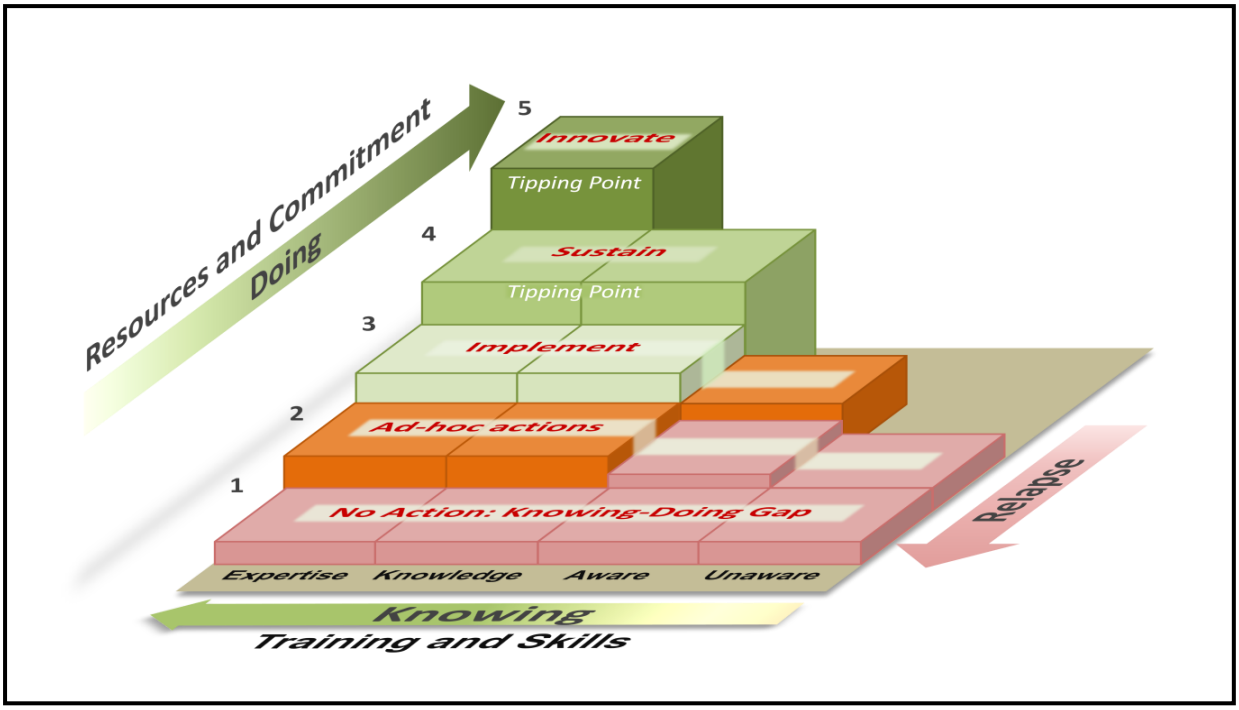


Figure 3.5: The Knowing-Doing Map

The stages of the mapping tool represent the current situation or "state" and characteristics of the company which consists of two dimensions; The Knowing Dimension and The Doing Dimension. In the Knowing Dimension, there are four stages representing the level of knowledge absorbed; Unaware, Aware, Knowledge and Expertise. In contrast, in the Doing Dimension, there are five actions represented as; No-Action, Ad-hoc Action, Implement, Sustain and Innovate. It is believed that the matrix of these two dimensions if implemented correctly will bring an improvement to a company. Importantly, this tool is perceived to enable the company to assess their current position and how they can progress to the higher stage for better. Each of the stage is illustrated as below.

Stage 1: Unaware, Aware, Knowledge, Expertise vs. No Action;

At this stage, it is assumed that the company is at a state that regardless of whether they lack of knowledge or expert, no action is taken for improvement. For the company to take any action, it is assumed that they do not know what to do, how to start with and where to begin with their inability. Even if they have the knowledge of the situation they have no capacity to take any action, whether they are incapable or for whatever reason otherwise. It is also assumed that they are not aware of what is the best approach to consider in addressing the company's weaknesses. Nevertheless, they are sometimes unaware that they have a deficiency. Cases could turn out to be worse if the company does not even realise that they are incapacitated by their weaknesses.

Their characteristics are assumed in a perpetual fire fighting and reactive mode. They are unaware of the problem and therefore deem no action is necessary. Even if they are aware of that problem, they are unaware of how to solve it. Because of the degree of scepticism of any new approach or external advice with a "not invented here" attitude that they practiced, it leads to lack of confidence and low drive for change. They may have attempted some change by a trial and error but with limited success. Inevitably, they resist accepting new change or the situation is limited resources for change. The inertia to take any action attitude and also the little emphasis on training or learning, have made them to survive in a secure niche, but not aware for how long.

Stage 2: Knowledge, Expertise vs. Ad-hoc Actions;

At this level, the position is better than the first stage where a company realised and understood that they have identified issues and possible solutions out there that they can apply. This awareness may result from not growing or from awareness of the external environment such as competitors, networking or events. However, the company still does not learn due to whatever reasons such as excuses that their company, product or market are unique and such generic tools or approaches could not be applied to their particular case.

At this point, the company already has knowledge and attempts to apply that knowledge to whatever effort possible to make changes. At a certain level, it may work even though they have not received much support or commitment. However, in the long term, the continuity of the changes might not be achieved.

The characteristics at this stage are assumed as, they know that they need to change but do nothing about it that may be caused by no resources to implement. They have some knowledgeable staff but have not put this knowledge into practice. Also it can be staff with knowhow but with little say in decision making or in enforcing change. Besides, the situation is a blame culture where no one wishes to take the initiative in fear of failing. They also are risk averse and not used to change. They use poorly planned initiatives that have little impact and also have a "too busy to be efficient" attitude.

Stage 3: Knowledge, Expertise vs. Implement;

At this level, the position of the company is assumed as knowledgeable or expert in which a company has acquired some degree or a certain understanding of the tools and approaches used to address their issues or areas of concern. This is practically attained through formal training, practice or by working closely with external sources of support. Contrary, from the Doing Dimension, this is the point where the company really takes action to apply new approaches to resolve its weaknesses. This action reflects the structured approach to improvement activities that the results or returns can be seen from the short term during or immediately after the implementation finished to long term in the few years after the intervention completed.

The characteristics at this level are assumed to be the company having committed resources and developed a plan for change as they have embarked on a training programme for staff or have engaged with external consultants or bodies for mentoring and support. This level of knowledge have driven them a competitive pressure to optimise. However, they view the knowledge programme as a one-off exercise. As

such, they have often not fully embedded the new knowledge and hence risk a relapse when faced with unexpected turbulence. Therefore, they still require external support when new circumstances emerge, as they are vulnerable to sudden changes in the business environment. However, on the positive side, they have possibly generated some internal localised expertise as a result of successive implementations.

State 4: Knowledge, Expertise vs. Sustain;

At this level, knowledge and expertise is the highest level of knowledge absorption out of these four categories. It is a position where the company has reached a level of proficiency that it can address its own weaknesses or problems as they emerge. At this stage, the company has become independent as they are able to learn new skills from the absorbed knowledge or from mistakes. Therefore, it developed a "know-how" attitude that enables them to progress quicker.

Viewing from the Doing Dimension, at this level the company is assumed to be sustaining in that the company has not only implemented the required knowledge, but applies and fully deploys it in daily use. In addition, it manages to introduce mechanisms to safeguard against a relapse to a pre-implementation state. As such, it is asserted that the company has reached a sufficient level of responsiveness to its environment so that the business turbulence does not put it off. The state reflects a structured approach to introducing improvement and its continuity with certain goals followed by responding to the business environment.

Their characteristics at this level are assumed to be more optimistic. They have implemented and developed enough knowledge to sustain and build on any

improvement. Therefore it is fair to say that they reached a Tipping Point level, as they already have built in fool proofing mechanisms for sustainability and avoiding relapse. It is assumed that they disseminated knowledge into practical use. As they have built a knowledge driven culture, it results in a culture of continuous improvement. Consequently, they are agile and more responsive to new scenarios and opportunities.

State 5: Expertise vs. Innovate

At this level, as they have become expert, they have attempted a new innovation or looking for something new. Thus at this stage the company does not only apply the tools but is also adapting these tools for new situations, or to explore new areas and opportunities for new transformation. An improvement here becomes a part of the organisation's culture and innovation in both product and organisation which then becomes the goals of the firm.

Unlike other stages, at this level their characteristics are assumed to be more independent and optimistic. As they have built enough expertise to respond to new opportunities, therefore, it enables them to customise their approach to apply it to different circumstances. It is accepted that improvement and change is the norm. Besides, they are proactively thinking of new ways of working, ideas for new product and markets. They also encourage and empower their staff to explore new knowledge, diversifying into new areas and share a common vision for future.

3.8. Summary

This chapter outlines the overall plan and methodology adopted to conduct the research. It is here that the detailed research method is presented. A qualitative approach was identified as the methodology needed to deliver the results for the current investigation. Case studies and interviews were chosen to assess the intervention process. Methods for data collection and data analysis process were also established. Consideration of all the methods conducted in this study was resulted in new value that creates opportunities in terms of business sustainability for SMEs.

Chapter 4

CASE STUDY

Learn from yesterday, live for today, hope for tomorrow. The important thing is not to stop questioning.
(Albert Einstein)

CHAPTER 4 CASE STUDIES

4. Introduction

This chapter introduces the case studies conducted for the research. Seven case studies are presented. Each case study is presented to identify the exploratory investigation of different journey of the implemented intervention through observing actual practice. The complexity of intervention processes in each case is believed will provide a high impact on the results of the study which generates phenomenon evidence. This study observes the occurrence of event existed in the company throughout the intervention process. For the purpose of this research, the intervention strategy on how it was planned and run in the company was never implemented by the study. It means that the strategy follows the KTP well-structured approach that ran for the past thirty years developed by the Technology Strategy Board (TSB). SMEs were invited to take part in the intervention project conducted by the TSB with the HEI collaboration. For all cases, the companies were ready for change when they agreed to take part and engaged with the external intervention for full support. For all cases, the companies were ready for change when they agreed to take part and engage with the external intervention for full support. This can be seen when they realised that they had issues which needed to be fixed, however, they did not have an expertise to do so. Therefore it is perceived that they required an external support to deal with the issues. The KPI for change was then set in the KTP proposal before the KTP started as part of the target set.

Qualitative data research were applied to all cases, therefore quantitative data were not obtained in the study. However, a small number of quantitative comparisons across cases are illustrated in Table 4.1 that might be useful.

Table 4.1: A Quantitave Comparison of All Cases

Case Description	Before	After
Case Study 1 (C1)		
Order process	6 weeks	1 week
Delivery time	8 weeks	2 weeks
Quotation for Tender Process	No fix time frame	1 day
Target	No achieved target	90% achieved
Case Study 2 (C2)		
Lead time	2 months	14 days
Productivity	Not recorded	40%
Capacity	Not recorded	50%
Waste reduction	Not recorded	11%
Absenteeism reduction	Not recorded	18%
Reduction in rejects and returns	Not recorded	8%
New export products	36%	70%
Case Study 3 (C3)		
Lead time	9 months	2 months
Case Study 4 (C4)		
Delivery performance	Not recorded	90%
Case Study 5 (C5)		
No available data	No available data	No available data
Case Study 6 (C6)		
Production lines	8 lines	6 lines
Increase in output	Not recorded	50%
Case Study 7 (C7)		
No available data	No available data	No available data

4.1. Case Study 1

4.1.1. Company Background

The case study concerned a manufacturing company whose core business was to manufacture and supply cable ladder products e.g. channel, tray, ladder, trunking, basket and bracket components. It was an internationally renowned manufacturer of extreme cable management solutions and associated support systems. The company was aiming to continuously strive to achieve excellent services, quality and innovation

to deliver excellent cable management solutions to customers worldwide. With their huge efforts and continual investment in research and development, the company became an international brand with factories and depots spanning the UK and Ireland. Their exports were throughout the world. They were not limited to production only, they also provided support for operators, engineers and design houses as they contended with the challenge of operating in a global marketplace.

4.1.2. Issues

Several issues were identified in the company, both internally and externally, which noticeably needed external support to resolve, namely; issues in information system, quotation, shop floor, people and management.

Issues in information system were indicated very poor, unstructured and obsolete system resulted in information being inaccurate, scattered everywhere and difficult to access. Furthermore, as the system was not user friendly it was not known to the staff. The customisation on the information changed all the time as there were no fixed amendment procedures. It was identified that too much of deciphering involved which delayed the overall process such as quoted *"... there were too many deciphers, could not get data, data were not available..."*. Staff were required to capture information manually and passed it on to the rest of other departments to complete the tender proposal process. As such, the process was inefficient when transferring the tender quotation to other department. The data input was a waste of time because it was not fully utilised. Besidses, it caused information delay and in practice time was already passed when the information was made available. As a consequence, too much of time were wasted to get access to the required information in completing the tender process.

Other issue which was quotation occurred when they could not prepare effectively for the quotation to bid for tender projects. Due to the inaccurate information, they were unable to estimate an accurate costing for tender bidding. The situation worsens when it took few weeks to complete the quotation.

In shopfloor area issues were identified such as machinery problems and outdated that led to bottlenecks and always malfunctioned. This might have happened because of no production manager to control work smoothly. Besides, the order processing was carried out manually which wasted of time. As there was no fixed time frame, the delivery time was so long which took from 1 to 8 weeks. Consequently it created excessive stocks which affected the financial flow.

Viewing the people issues, there were related to lack of required knowledge. Staff were low level skilled with lack of right training. Other people issues were identified such as discipline, morale, attendance and teamwork.

In management, issues were related to resources and business processes. The processes were inefficient with lack of right management. Too many decisions were made which were confusing to pursue of the right one. Besides, the available resources were not well managed that led to underutilised resources. There were also competing resources for the company between the general sales and projects.

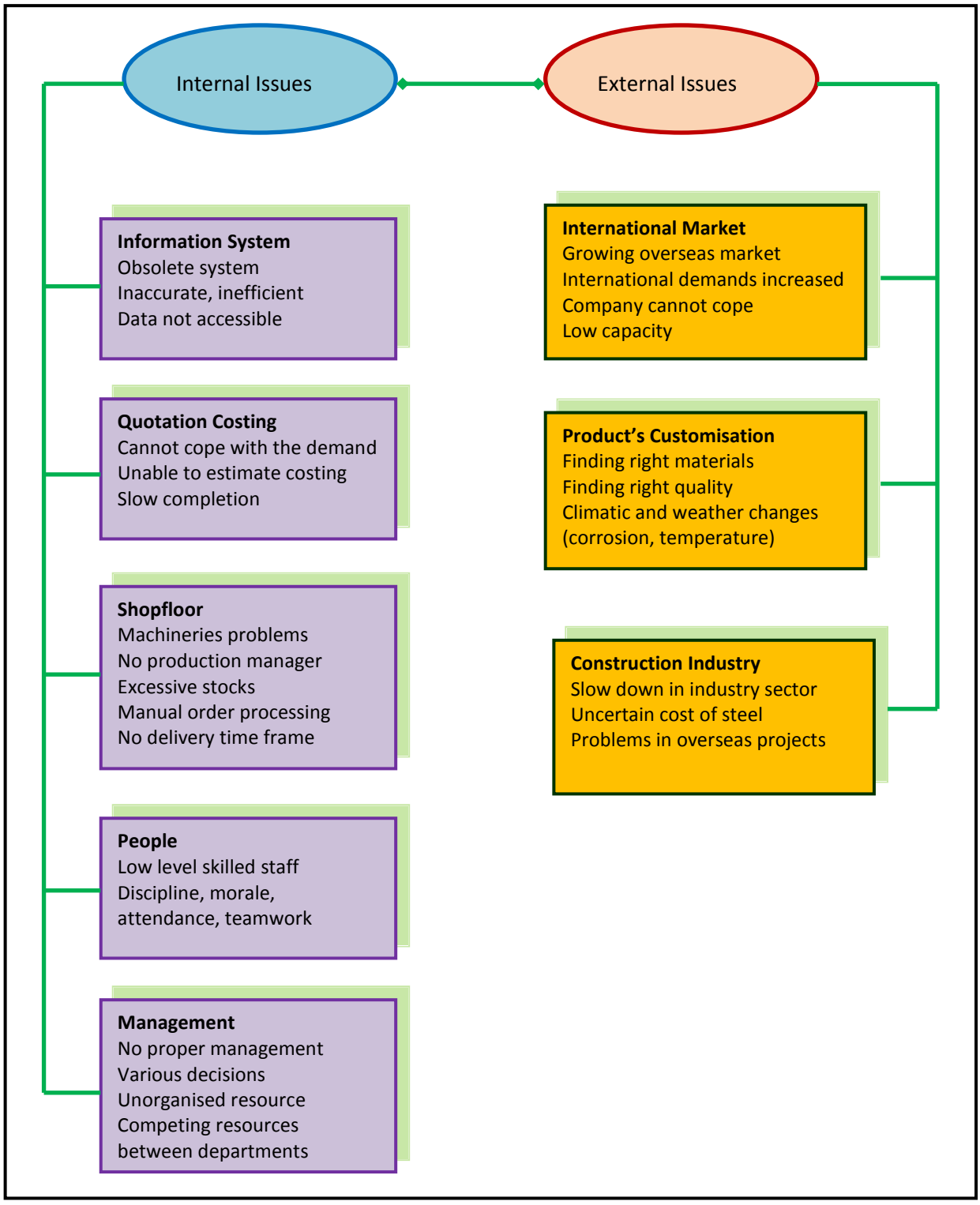
In contrary issues, the external problem was identified as unexpected market demands where the project markets were growing at the overseas level. As the international demands increased, it created problems not able to fulfil that demands due to low in capacity. Besides, the slow growing of the construction industry combined with uncertain costs of steel due to global economic crisis had created problems in project costing overseas. The problem was also emerged from finding the right quality

of the product materials and design (e.g. customisation to stand up to a variety of extreme natural climatic and environmental conditions affecting corrosion, temperature variation and seismic elements).

Out of all the issues, the utmost apparent cause appeared from there were no clear objectives and goals of the company. The direction was vague and not clear with what the company wanted to achieve. Also it appeared that there were so many problems everywhere. In fact, they were not sure with what and where exactly the problems were, or what needed urgent attention. Simply put, the real problems were abundant. The overall issues both internally and externally of the company are depicted in Figure 4.1: Issues in C1.

Figure 4.1. illustrated issues both internally and externally that occurred in the case.

Figure 4.1: Issues in C1



4.1.3. Recognition of Needs

From the strategic point of view, the company significantly needed help especially in improving the business processes, which caused delays to the overall business performance. The company recognised that they were lacking knowledge on how to push the company forward. Not only that, they realised that they needed to act to acquire that knowledge. Realising this shortfall with awareness that they needed experts to solve the issues, positively the company engaged with the external intervention believing that they could convey new improvements. The company identified that KTP was a good solution to deal with the issues they faced. The company engaged with an academic in local university and who was considered to be an expert on the subject and know how to resolve the issues. Later, a KTP Associate was recruited for the project who had a mix of IT and manufacturing systems skills. The company worked very closely with the Academic and Associate since the program commenced. They set the main objective of the intervention, which were detailed in the KTP proposal, to implement new agile manufacturing practices supported by an integral business system.

In the project, two affected areas of business processes that critically needed changes were identified as business management information systems and shopfloor production management. The nature of intervention was targeted at IT development. As stated in the initial proposal, the target was set as to implement a new database system to support the new business processes. These would standardise the information flow processes and significantly cut the administration and planning hours. It was perceived that implementation of a new in-house database system to support business activities could

improve the operation of the business. As a consequence, it was believed that the shopfloor production benefited a significant impact on this implementation.

4.1.4. Implementation

The company engaged with a two year intervention project through a company supervisor who had the day to day management of the Associate and the managing director who was involved in the frequent project reviews. The idea was that the Associate was not only helping out but when things went wrong he knew how to rectify it. The Associate identified what the problems were, the nature of it, how to deal with it and finally find solutions on how to resolve it with the help of the academic and company supervisors.

The project was well-planned and focused. Three targets were set as; accuracy of the new systems, best approach to respond quickly to new tender and an accurate costing to tender proposal. As stated in the initial proposals, the plan comprised of: review the company's products and market; identify product grouping and standardise components, review business processes, implement new business processes, develop and implement database system and designing training on lean manufacturing.

In the first year, the focus was on the IT development planned as the Associate helped the company to manage the existing systems. To make things right, work was concentrated on building the information systems to work efficiently. Thorough work was done on systems analysis, on how to make full use of data input accurately, and most importantly, on how to use the system correctly, as quoted "..... *we have done everything to make things work, especially to make data become available, so that we*

can easily process the quotation and tender ..... ". The analysis work was monitored closely against the initial plan that covered; labelling, scheduling for fitting line, stock check and quotation. Whilst in the second year, the focus was on the material flow of the manufacturing processes.

During the implementation, the project was not always worked as planned. Many issues were not being addressed in parallel and in good time, for example, human issues such as morale, discipline, and career opportunity. Machine issues like maintenance, quality and general technical support were also not addressed. This had come to a standstill which severely affected the progress of the project. The case became even worse when the software development work stopped as the software developer was no longer seen as the right supplier. There was no plan to migrate to a new system within the project period. Also, there was a huge change of personnel. Along with the project, the company had gone through a restructuring, followed by replacement of a new production manager, a design engineer and a production engineer. A lot of knowledge was lost due to these changes that disrupted the efficiency of the overall plan.

On the positive side, the project was progressing as it received very strong support from the committed and driven manager. With full commitment and participations from individuals, the new Enterprise Resource Planning (ERP) system was successfully developed and implemented. The staff were trained in new procedures and use of the system. Also, lean training was introduced and it was widely accepted and well adopted by the operators. Selected modules were developed such as attendance record, ISO quality control, production planning, stock check record, stock movement, performance analysis, label printing, quotation, etc. As a whole, the project brought new changes

which replaced a new system and efficient business process. As a result, the company was able to use, manage and share the information effectively.

Out of all, the key triumph of the intervention was the involvement from each of the team members and that it was not solely on an individual's work as a candidate or consultant. It was achieved as a result of commitment to teamwork as pointed in the quote; "..... *it was a teamwork achievement* ....". The key point was that the unconditional commitment and effort of individual members who played an important role to disseminate the embedded knowledge into practise contributed to the effective project.

4.1.5. Impact

The KTP project helped the company to improve revenue because of the business process improvement that developed and changed the way it was run. As a result, the new overall improvement process allows easy access to the required information that made big changes in time for improvement. Also, a new introduction of techniques and thinking in two vital areas; business database system and shopfloor production management drove the company to perform effective improvements.

As reported in the final progress report, the new system resulted in that the whole process of customer's order was completed in 1 week, down from the initial 6 weeks and the delivery time was cut from 8 to 2 weeks only, which drastically reduced the cost. A better way to manage stock was introduced that kept stock variation to a minimum. The most impacted part of the processes was the quotation system which allowed the quotation for tender bidding to be completed within less than a day as demonstrated by this quote; *".... after the project data were available, easy to retrieve*

and quotation for tender process can be finished in a day..... ". Overall, approximately 90% of targets were achieved (based on the company's report). It was by far a huge progress that took place in the overall business process which solved most of the major issues.

The key metric of the entire implementation process of the project considering the the period; before, during and after is depicted in Table 4.2.

Table 4.2: Key Metric of the Implementation Process

Before	During	After
Issues: Human (attendance, morale, discipline, career) Malfunction Software Personnel mobility Order process 6 weeks Delivery time 8 weeks Excessive stocks	**Implementation process:** Personnel attendance record Personnel restructuring Implementation of new ERP Staff training on ERP system Introduction on managing stock inventory on shop floor	**New Improvement:** Personnel and teamwork commitment Developed new ERP system Accessible data System accuracy and efficiency Efficient business process Order process in 1 week Delivery time 2 weeks Minimum stock variation

4.1.6. Sustainability

After the project was completed, the company kept progressing. The invested in intervention created a competitive advantage that gave new value to the company respectively. The embedded knowledge was disseminated and applied in practice. During the process, the shopfloor staff were trained and developed into process experts. The improvement was created where the company managed to increase its capacity for new projects as it opened an opportunity to win a big value project in bidding the tender. Even so, the potential to get bigger projects overseas were growing, i.e. indication of growth. The intervention was considered successful in terms of business

information flow because it has delivered more benefits than the original set targets. The consistency, quality and integrity of the data were significantly improved. This was an exemplary of a move sustainability which pushed the company to the next level. Simply put, the investment in training had benefited the company.

4.1.7. Summary

This case demonstrated a satisfying example of achieved intervention project. Realising the deficiency of lacking in external knowledge and awareness to acquire the necessary skills with believing that it could bring improvement, the company took an initiative to engage with external intervention. With the help from the KTP Associate and academic insitution who rectified issues and introduced new solutions, the company successfully developed tremendous changes and kept moving forward. From this case example, it is suggested that a well-planned intervention was seen could transformed the company to achieve sustainability that finally embarked them to innovate by approaching untapped market overseas which was unexpected result.

4.2. Case Study 2

4.2.1. Company Background

The selected company was an SME that specialises in the manufacture of moulded mattresses and accessories for operating tables. The company was owned by two business partners, run with less than fifteen employees which generated approximately a million pounds turnover a year. Established for more than 50 years, the company has a wide range of products to suit every cushioning need. As such, they were experts to advise table manufactures on mattress options. Their main customers were operating table manufacturers.

The company has stringent quality control policy on all of its product ranges. This means that every item was inspected before leaving the premises. Each of the operating table mattresses was tested for its conductivity, fluid resistance and aesthetic qualities; equal to other products which have to undergo the similar testing specific to their use in the field, before it was delivered to customers.

The uniqueness of the products has given the company a clear competitive gain resulting in an expanding market, not only in the UK but also in Europe. However this unexpected growth has put the company under pressure that they needed to increase capacity and to become more agile in meeting customers demand.

The company believed that business was a means of living, and had no huge desire to take excessive risk. However, they also believed in continuous development which was illustrated by this quote, *"…. the company's motto was "go on to develop and seek..."*. Believing this slogan, the company strived to improve, constantly looking for new innovation and improvement of their product manufacturing and services.

Realising that the company needed external help with an awareness that KTP was a good way to obtain this, therfore they approached the intervention with the notion that it will bring good value to the company.

4.2.2. Issues

The company was struggling with the main processing procedures in which the entire process needed immediate improvement. It included removing waste, reducing lead time and aligning quality and inspection procedures. This concerned the quality issues of mattress production in addition to the unclear operation process. These problems emerged from lack of staff training and professional development.

Besides, the company was also faced with delivery issues as it was unable to meet customers' demand of new requirements. In fact, the company avoided meetings with new customers as they had no capacity to meet that demand. Evidence shows as quoted; *"....we were always running away from our customers, we avoided meeting new customers because we did not have the capacity to fulfil their demands, but after the project, not only we have new customers, we also attracted customers from other suppliers... we have never expected that..... "*. This situation meant that the company was risking to limit their growth potential. Consequently, customers have no choice but to approach other suppliers who can fulfil their demands and requirements.

Other issues were occurred at the shopfloor and organisation which was a formless workplace environment. Not only that, people issues also existed, such as discipline issues where often key personnel were absent at critical moments. The scenario became worse when there was no suitably skilled supervisor to maintain production and quality

issues at the same time. Due to these situations, the company was alerted that they needed external help to certainly address those problems.

4.2.3. Recognition of Needs

Before the intervention the situation of the company was unorganised and unstructured. Among the staff there was a fire-fighting process. The operation was run with the formless quality procedure in an unorganised workplace environment. The staff was working with an attitude of no ownership of the shopfloor processes. There was also lacking in right planning and time management. Thus no new value was added to the company. These problems probably emerged from the staff receiving little training which only encouraged little action to be taken. As such, this condition restrained the company from growing as they had no proactive thinking in entering new markets. Realising the situation that they needed new knowledge for improvement which did not exist yet, they took action to engage with external intervention through a KTP with a local university.

The main objective of the intervention as set in the proposal was to transform the company from low capacity and low volume based SME to a highly responsive company. This goal was set due to the unexpected business growth beyond its capability whilst the company was not able to fulfil the forecasted increase in demand. However, due to the resource constraints, the company preferred to retain the minimum investment, while maintaining the flexibility of manufacturing small batches.

Whilst engaging with external intervention, the company believed that the required new knowledge could bring improvement to the company and created expertise. This can be seen from the quote "*... I don't know everything, no background in engineering*

knowledge. It is sensible to have someone who has the knowledge to be brought into the company aiming to have sensible engineering expertise and backgrounds ...". Principally, the company aspired to improve from no knowledge to become knowledgeable with the target to improve the productivity and to change their business operation.

The lack of formal procedure was an evidence that the company needed business process improvement. They acquired the external help with the purpose of creating an awareness to change, and to resolve quality and delivery issues in order to create greater production quality. Thus, it was believed to give an advantage to enable the company in improving its efficiency, staff utilisation and to create a new product in the market.

4.2.4. Implementation

A KTP Associate was recruited with a manufacturing engineering degree. Production operations were divided into manually moulding stages, post moulding manual finishing and inspection stages. Thorough analysis of moulding operation was investigated through value stream maps, videoing and computer based simulation models. This process was run to identify and simplify the rules for the optimum operating procedures. Effectively, a few changes in the moulding area layout, work practices, mould flow and a balancing of the moulding line were proposed and implemented. As a result an immediate increase of above 40% in productivity was achieved as stated in the company's report. However, the cultural issues that suddenly arose on the shopfloor and the lack of skilled supervisory has caused this performance

to decline. One of the key operators objected to the new practices and attempted to sabotage the process by asking for sick leave. The Associate carried on the improvements with the rest of the shopfloor team and when the employee returned the moulding section was operating more efficiently without him. To resolve the issue of lack of proper supervision, the Associate was appointed as the Production and Operations Manager with responsibility for the day to day management of the manufacturing operations.

For further development, a structured training program package was introduced to almost all staff in the health and safety topics that comprised; Bespoke game-based training packages for the operating procedures; Preventative maintenance training, General training on health and safety; Health and safety through assessment; documentation and external training; and External NVQ training programs for staff motivation and improvements.

The technical and operational aspects of the entire process turned out to be the main focus for improvement. Process improvement teams were introduced to carry out a detailed analysis of each stage to remove waste, reduce setup times, rework and rejects. Also, a preventative maintenance programme was initiated. At this point, the output was very successful in reducing waste and lead-time. The number of returns was nearly eliminated by aligning the quality and inspection procedures to the main customers. Hence, the initial target was almost achieved.

Towards the end of the project, the implementation was successful in creating very impressive changes. Not only were the processing procedures significantly improved, a flexibility in the processes was also created. Importantly, the quality has improved and as an outcome it enhanced the productivity dramatically. Staff were all trained in each

individual specific focus in which they were assigned on a regular basis. The project managed to change the attitude of the employees. The opportunity was also given to the key operator staff to be promoted to a supervisory role. Health and safety procedures were imposed. A healthier organisation and workplace environment was formed. Fire-fighting was eliminated. General reporting of routine processes was assigned. New IT was developed which includes network, database, email and MIS systems for order processing and scheduling.

However, sometimes things did not always work as planned. Human problems, such as an unsupportive operator that did not believe in the process and staff attitude who resisted to change, to some extent, difficult. Above all, lack of staff training in early stage resulted in lack of knowledge in delivering tasks that became ineffective.

Even so, the advantageous factor was that the team involved throughout the project was strictly adhered to the plan. Each engaged party was fully committed, and thus contributed to the smooth-running implementation towards the end. Besides, the absolute trust given to the Associate to perform the right thing was the main point that made in-depth intervention possible.

Overall, the intervention resulted in a great success. The set objective was achieved as well as the target implemented. The intervention has transformed a low-volume based industry to became a responsive company with well managed production.

4.2.5. Impact

Without doubt the intervention created an obvious impact on staff started to think differently. Their new way of thinking has totally changed from unresponsive to be more receptive to new ideas. As such, it developed an openness of a new paradigm to be more constructive and responsive. Unlike before the intervention, they were not aware of their problem, consequently did not know how to tackle that problem. As admitted by the staff prior to the intervention, "*the main problem was that they could not see the obvious problem in front of them*". However, the intervention project could rectify very quickly what was needed to be fixed and knew precisely the solutions to it. It can be said that the company had made the right choice.

Based on the company's report, the clear impact was demonstrated through new strong signals of their performance which were indicated as follows:

- Improvements in productivity by 40% through a new layout and new processing operating practices increased in 1 month immediately after the changed of new layout.
- Increase in capacity by 50% took place after completion of a new additional second line to end of the project which ready with systems and managed by the unsupportive employee who embraced the changes fully,
- Reduction in lead time by 14 days after the completion of the implementation of visual management of the material flow and storage occurred.
- Reduction in material waste by 11% through detailed inspection and monitoring process by the end of the project completion.

- Reduction in rejects and returns by 8% from improved materials and processes and immaculate online product inspections by the end of the project completion.
- Reduction in absenteeism 18% through a change of work culture and new workplace layout throughout by the end of the project completion.

It is evident that the company has made vast improvements. Without help from the intervention, the company would have never been in the position it achieved which opened limitless future potential. This included regaining old customers which they had lost earlier due to incapacity and the potential to explore new overseas market. In fact, the company was now in a better position to handle the expansion market forecasted by customers as a result of a better understanding and collaboration with their key customers.

4.2.6. Sustainability

Throughout the intervention process, the spirit of the project was firmly embedded within the company. Even after it was finished, the spirit remains alive, encouraging them to continually move forward which can be seen as quoted "..... *even though the project has finished, and the people have gone, the spirit of the project is still alive, that kept us moving*....". Therefore relapse would never occur. As planned, the company was always moving ahead and in fact far better. For instance, the new expansion in export successfully generated 70% of the overall turnover as stated in the company's report.

After the implementation, the absorbed knowledge was disseminated into full practice and applied for business development. It was believed that the new level of knowledge was the main force for the operation to improve drastically with new capability to run the operation smoothly. At this level, it was recognised that the company has reached a tipping point where improvement was developed that encouraged the company to move to the next level to grow. Thus, the company benefited from the project to be more sustainable in their business.

4.2.7. Reflection

From the strategic view, the intervention was a smart way to support the company in improving their business operation. The investment was a wise choice as it was successfully implemented and the initial goal was reached. Staff were more involved in decision making processes and were much happier as a result. The product has improved, both in terms of quality and delivery times, benefiting customers. Not only was the company able to meet the existing customer's requirements, the company was also able to market the products to new potential customers and develop variations on the product. In this case, the intervention has given the company the ability to increase the capacity with no additional human or economic resources. In return, the intervention reflected a bright future to the company and in reality carried more professional image.

4.2.8. Innovation

The project not only carried out new improvement and new development, in fact it created a new notion in the company as a whole. More importantly, the improved processing procedure has created a new innovation in the company. Through the introduction of the new product lines and expansion in the plant, building and machineries, the project has enabled the company to further demonstrate their ability to innovate in this sector. The new growth allowed the company to embark on new projects, penetrate new markets overseas, which was entirely a new evolution. In fact, the company was now embracing a very open thinking about new opportunities that they never came across in their business plans before.

4.2.9. Summary

In this case study, intervention turned out to be very successful. Not only was the initial target achieved, but the company was transformed operationally and with new innovation whilst maintaining the available resources. It demontsrated that when the required knowledge was disseminated correctly and wisely applied, it led to a tipping point, sustained and innovated further.

4.3. Case Study 3

4.3.1. Company Background

This case study was a manufacturing company producing shower enclosures whose main concern was to prioritise product quality. Managing about 140 employees, the company yields an annual turnover of approximately £15 millions.

There were three main categories of customers with different needs and requirements. Firstly, customers who were dealing with construction of new housing projects that required standard sets of shower enclosures. Secondly, were architects and interior designers who designed new bathrooms and water delivery system. And finally, a number of small specialist retailers who worked closely with company to define customisation requirements.

The company differentiated their products in three main areas; product quality, novelty of the design and customisation. However, in focusing on these areas the company found it increasingly difficult to maintain operational efficiencies and service levels. That was where the starting point began for the company to engage with the external support to intervene.

4.3.2. Issues

Like any other company, this company was facing current issues both internally and externally which required expertise for solutions. The main problem was identified as the top level products in which they were having problems with the supplier. These

were classified as issues with supplying the aluminium frame and assembling the products.

Suppliers often supplied material of low quality. Besides, the company faced difficulties in getting the right suppliers for special and variation of glasses required. The problem was that the company encountered a gradually longer lead time in which the delivery took from 2 weeks up to 3 months on average. The situation worsens when the lead time sometimes increased up to nine months, in which case created problem of excessive stocks.

Other internal issues were identified as quality issues in which the quality of each product was inconsistent. Besides, there were excessive stocks on both components and products. The management of planning was also observed as not well controlled. And the critical part was perceived as staff were receiving low level of external training for their self development and operation improvement.

4.3.3. Recognition of Needs

The company was particularly skilled in designing and building spa and pool products which can be seen from the awards they won over the years. However, what was lacking was knowledge that can be used to significantly improve the way the company operates and organises processes internally and externally. At a manufacturing level, the company lacked of knowledge in manufacturing process improvement through lean and agile techniques (as stated in the initial plan; visual management, waste reduction, total productive maintenance, TQM systems, value stream mapping, benchmarking and supply chain management). Realising that

deficiency, the company engaged in intervention with believing that it could help to transform improvement in quality particularly. Also, all efforts were put into maintaining the quality of the products for customer satisfaction.

The company was in a situation where the staff were depending profoundly on the managing director of a financial background with lacking knowledge of operational production. Decision for improvements were often delayed by the managing director. The production manager did not have full control of the company resources and found it difficult to push his ideas forward. The staff were also lacked of training in efficient production techniques which can be seen from the way they managed the product portfolio. New designs were introduced without consideration for product and component proliferation. The case worsened when there was no driver or support from the owner or one with stronger power to make decision. Without involvement from top management or a key driver to push forward, therefore staff had no drive to improve performance. Overall the company was not managed effectively.

Problems were occurred in daily operations. Everything was not working in the right order. Recognising these issues with awareness for improvement, the company took a positive action by implementing a KTP intervention for two years, believing that the company could develop a new transformation.

4.3.4. Implementation

The nature of intervention was identified as a normal processing procedure in production operation in which the area that needed to be focused was manufacturing processes. Specific output requirements were set to clear processes using lean and

visual management of manufacturing and developing fewer families of products but with a higher degree of variability. The visual management was put in place as they aimed not to purely depend on computers. And the family of products was the main concern as their objective was to improve the quality and reduce the lead time of these products. As stated in the proposal, three targets were set as; improving quality, reducing the lead time and reducing the excessive stocks.

In order to achieve these targets, performance measurement of the output of stock level and lead time were used. Besides, a good plan was developed in order to improve the quality issues, to increase the degree of flexibility and to empower people on the shopfloor.

During the implementation, right training and supervising was delivered to the shopfloor staff. As a result, the shopfloor staff gained new knowledge in products and later became experts. The understanding of the processes became better and clearer. Overall, without the strong driving force from the project manager and design manager, it was likely that the entire implementation would have been unsuccessful. However, the strong push has championed these managers to make it all through as quoted *"....we have champion in our group that made us to continue our success ....."*.

Overall, the intervention took place successfully which finally brought new changes and improvements to the company. The implementation has transformed the company from having an unorganised work environment into a very beneficial condition to everyone.

From the report, the issues of lead time were reduced from 9 months to 4 months. The working place was reorganised with more space capacity. The existing system,

MRP was replaced with Excel. Issues in quality were resolved. The end result, new product designs were developed.

4.3.5. Impact

Entirely, the intervention resulted in a positive impact to the company. As planned, the main objectives of their target were achieved. According to the company's report, the critical impacts were seen in improved quality, reduction in excessive stocks and improved in lead time from 9 months to 4 months.

The investment in training the staff was rewarding. Not only did they become experts, but the embedded knowledge was absorbed and was fully deployed in running the daily practice. The derived lesson from this situation was that, they took knowledge for further action and using that knowledge to improve and grow.

4.3.6. Sustainability

The company would be acknowledged as sustainable as they were able to hold on to the new improvement and to keep growing. With the new changes, they not only managed to develop new products for themselves, but also built products for other company as well as for new low end customers. This was a new capacity which was beyond their previous capability. Clearly, continuous improvement was happening in the company that made them keep moving.

4.3.7. Reflection and Innovation

The general consensus in the company was that the intervention had made significant changes that led to new improvements. A new creativity was also developed. A new innovation had emerged. The main issues either internally or externally were resolved. Products were manufactured based on quality which was well maintained to customers' satisfaction. New design and style was invented an indication of a clever innovation in design such as new shower design and style. As a consequence of all these positive growth, the owner made a new investment to the business.

4.3.8. Summary

From this case, it demonstrated that the well-planned intervention has helped the company sustained itself and kept moving to innovate. Initially, this company was facing various issues with no expertise. However, with the help and support from external intervention the company managed to transform from an unorganised work environment into a valuable business. This case established that intervention played its role in assisting the company to move on to the next level. The result was that the absorbed knowledge was well implemented to a new transformation.

4.4. Case Study 4

4.4.1. Company Background

This case study was about a high precision manufacturing company which supplied the aerospace and pharmaceutical industry. The company had 25 employees. Usually the company received CAD drawings from customers and carried with detail specifications. There were two key customers identified as; manufacturers of jet engines and suppliers of pharmaceutical equipment for handling of powders. The company had to comply with stringent regulations in both sectors. Better still, the company possessed loyal workforce. This motivated the company to move on. However, to keep moving it was perceived that the company needed an external help from experts.

In viewing for the improvement, the company identified two key highlights. Firstly, they dealt with pressures from aerospace customers who changed specifications and delivery times regularly. Secondly, they required new IT systems to respond better to the changing market.

4.4.2. Issues

Like any other cases, the company was surrounded by issues that required intensive attention. As the available system was inefficient, there was lack of accurate costing information to bid for contract tender. The available information were not updated. Therefore they faced difficulties in issuing the quotation even though the existing MRP systems helped in quoting the bid for new business.

In terms of operational processes, they were running on obsolete and outdated machineries which were always busy and needed to rework. This condition has put the operation to work with low volume. Thus, it created inefficient operation which led to long lead times in terms of delivery to customers. In addition, the company also faced with the packaging and quality issues where customers were more particular about it, however, received less satisfaction. As such, this created an external pressure from customers. Due to this situation, the unsatisfied customers moved to other companies.

Realising their incapacity combined with lacked of confidence to grow; it discouraged them to have no desire in seeking new business. This meant that they just had to continue with the existing business with no means to expand. As such, there was no focus on a new market or getting new customers as the company was busy with managing the existing processes rather than improvement.

4.4.3. Recognition of Needs

In the initial stage, the company received no support from external sources. The only program that existed was apprenticeship managing the warehouse and stock management internally. The company was aware of their current situation which required new knowledge however; there was no push to move forward. There was no motivation or reasons given as to why they should grow and move ahead. Besides they did not have any previous experience or pertinent knowledge to resolve the issues.

Apart from their issues, the company possessed less in-house skills staff so they needed to bring in the external expertise. Also, there were fire-fighting processes going on. Understanding these various issues and due to the unorganised situation that needed

to be fixed, the company took an initiative to seek an external support for new change. They engaged with the intervention for two year project with the belief that they would formulate a new transformation.

The nature of intervention was identified as operational improvement which focused on these tasks; to improve stock management and lead time, to implement the ERP system to manage better processes and to run agility project of visual management.

4.4.4. Implementation

In implementing intervention, a clear target was set for improvement in lead time which aimed to introduce a lean program supported by an ERP system as the specific output. The main area to be focused on being the production department.

Behind the success of the project, the key driver was the managing director who possessed a very strong motivation that made things happen together with the loyal workforce. One advantage was that the company rarely lost people. However, there was a minor difficulty during the implementation in which two quality staff were unsupportive and reluctant to give their full commitment to the project.

The improved process changed the way they run their daily operation. As a result, their initial target to reduce lead time was then reached. The main point was that, their main objective to acquire new knowledge was accomplished when all staff were trained in lean and agile techniques to become experts.

4.4.5. Impact

After the implementation, the intervention gave a direct impact to the company in creating new changes. The end result was a new improvement which was in line with their aim earlier. The critical impacts were appearing on the operational improvement which can be seen in lead time and better resources utilisation. Based on the company's report they improved the delivery performance in logistics of almost 90%. More importantly, the set target was achieved. The supply and lead time issues were resolved which resulted in them to be chosen as a preferred suppliers.

As the operations became better and growing with the systems, it had a clear impact on the growth strategy. Their performance demonstrated that the company was able to grow as well as getting new customers. Also, they managed to produce the best business plan which enabled them to secure grants to relocate and acquire new equipment. Their effort rewarded them in the form of success in securing new funding three times which included winning a bidding contract for the company and entire sub assembly of parts. The willingness to invest has successfully motivated them to generate opportunities in a new sector in the nuclear industries. Simply put, the intervention has brought the company into a new transformation.

4.4.6. Sustainability

The continuous improvement that the staff practiced has enabled them to develop their skills in new ERP and using IT in general to support the business. Thus the transferred knowledge with new experience encouraged them to easily predict market and demand to be more accurate. This proved to be a new achievement in solving their

main issues. Unlike before, when they were lacking in confidence, the company managed to move on their own to do something new. The new created value motivated the company to gain back their confidence in the business. In fact, the company did not show any indication to relapse but continuously moving forward which suggests that a tipping point was reached. Hence, the case demonstrated that the successful implementation benefited the company to achieve sustainability.

4.4.7. Reflection and Innovation

The finding shows that the implementation has successfully transformed the company. The high absorption of knowledge process has resulted in significant changes both strategically and operationally. New skills and expertise were created in consequence of the embedded new knowledge.

A new emerged innovation was that the project has enabled the company to secure winning quotations which was a new challenge. The outstanding innovation was that they built a new partnership with other companies in the sector to form a consortium to bid for larger projects. They now had a high potential of creating new customer in the pharmaceutical partners. This proves that the initial lack of confidence did not prevent the company from moving to the next level if they were willing to learn and accept changes for new improvement. Overall, the created innovation has made the company not only be in a better position but also generated new opportunities.

4.4.8. Summary

This case was a good example of how intervention has helped the company from a vulnerable position into a winning situation. Initially, the company was incapable to take any action for improvement, however with the support from an external intervention, the company eventually moved forward in stages to reach the tipping point, sustainability and finally up to the next level. Overall, this case demonstrated strong exemplary that intervention benefited SMEs in achieving sustainability in their business.

4.5. Case Study 5

4.5.1. Company Background

The fifth case study was a manufacturing company. The key product was garden playground for children such as swings, slides, etc. Usually the products were very seasonal and highly in demand in spring and summer. Their specialised products were customised to their customers' needs. The person in charge of the business was the director and major shareholder who owns many different businesses. Their customers were categorised into three groups which were identified as; early learning centre, companies such as Littlewoods, Argos, etc. and other smaller retailers.

4.5.2. Issues

The company encountered with both internal and external issues. The internal issues were unorganised and unsettled workplace. Things were not running quickly and smoothly. The way things were run had always created an ongoing battle in the business processes. Issues were also raised as to how to streamline the processes. There were also issues on what was the best way to diversify design forces. The other problems were the wide variations of components and products. The use of resources was always inconsistent, such as consistently changing colours in painting.

The other big issues were that their customers were uncommitted. The problem with customers were that they would normally walk away without being committed to their order, but later the company would received orders from them again. Besides, customers often returned the products under the retail returns policy where no fault was present which then created excessive stocks.

On the other hand, the external problem was the dynamic nature of the market which were very highly seasonal products and beyond of their control. They were not certain on how to forecast accurately when the market demanded especially during the season. In terms of market demand, there were issues in vulnerability of the market forecast. Looking at the suppliers' side, they were not happy to deliver a small quantity of orders. Their preferences were to deliver a large quantity of orders. This added to the excessive stocks issues.

Understanding these problems with no knowledgeable people about lean and agile manufacturing, the company employed a production manager who has knowledge about the practice of solving these issues and engaged in a KTP project.

4.5.3. Recognition of Needs

Looking at the company scenario, it was viewed that the company required external support to improve the situation. However, even though they were aware of the required knowledge and knowing that they needed help, they took quite a long time to engage with the experts. The company executed ad-hoc activities in running their daily operations. They received very little support internally. Nonetheless, with all the odds against them, they took the challenge to initiate an intervention to fix the issues.

4.5.4. Implementation

While implementing the intervention, a very well planned project was developed in the project proposal. A consultant was appointed to supervise the project and

operational processes. The nature of intervention was defined as normal processing procedures. The targets were set as to reduce the lead time and better utilisation of resources. As stated in the initial plan, there were three areas that needed to be focused on; how to simplify the product design, the operational processes required running on proper planning and support, and the people management that required the degree of skilling for supervisor.

On the other hand, the specific output requirements were set to clear processes such as; how to fulfil demand for the highly seasonal markets (e.g. Easter season), getting alert for product returns (e.g. from Argos) and to introduce lean and agile approaches. The marketing campaign in new market was also initiated.

During the implementation, the project was adapted for lean and agile practise. Throughout the implementation the managing director was the driving force for the project. Unexpectedly the company stopped the intervention before the end and therefore did not complete the project. The project was terminated early after eight months instead of 24 months like other cases. For that reason no clear outcomes can be seen yet. The overall plan throughout the duration of 24 months could not be executed within the 8 months. Therefore the implementation did not really succeed as it was incomplete which can be seen from this quote "..... nothing much that we can see as the project was terminated early, however, the improvement was significant..... "

The main challenges during the implementation were problems with suppliers and no commitment from customers. It was assumed that the company had no confidence of the support from external intervention. Instead the company appointed another external consultant to fix the issues and to straighten the position.

4.5.5. Impact

Within a short period of implementation the intervention has brought changes to the company which impacted the company to gain significant improvement. Some training was delivered but no embedded knowledge was absorbed.

The implementation resulted in high impact on the operation. As targeted in the initial plan, the design has changed to enable the product to be assembled quicker than before. As a positive impact, the lead time was reduced. The change has also developed matrix to define product's families. Unlike before, the components can be reused. The right visual management system was also developed. Issues of suppliers were improved in a way that better interaction and relationship was built.

4.5.6. Sustainability

Since the intervention discontinued early before the end of the project, not many improvement can be delivered. Even though the impact was significant, there was no indication that the company has reached the tipping point level or became sustainable. The target was not achieved and no sustainability was gained. Therefore the next level achievement was unreachable for this case. A year after the end of the intervention the company seized trading.

4.5.7. Summary

Based on the performances of other cases, this case was less successful with the external intervention. It was assumed that if the company could complete the entire

intervention project as planned, it might be successful as shown by other cases. Lacking confidence towards the implementation can be dealt with as proven in case study 4 (C4). In the beginning, the company faced a confidence issue, however, it became very successful towards the end. One of the functions of intervention is to help a company in various situation such as lack of confidence or other issues. This case proves that in order to see the overall outcomes, the entire plan of the implementation should be completed. Only then changes will prevail.

4.6. Case Study 6

4.6.1. Company Background

The case was an SME company with 155 employees. The company designed and manufactured standard and customised stationery box files, lever arch files, folders and hand made envelopes. Out of those products, box files were predominantly a UK market that the company has helped to expand by driving the costs down through innovation in product design and new materials.

The box file remains a niche product in the filing products sector, at a time when the development of high speed automation is driving the growth of lever arch files, ring binders and suspension files. The ability of the company to increase market penetration in the volume product sectors is dependent upon holding a strong position with regard to major niche areas in filing, namely box files and expanding home files. Box files represent the key turnover to the company.

4.6.2. Issues

The main issues that the company faced was the complexity of the box file system design. The intention was to simplify the design complexity in order to restrain with the market demand. For instance, in order to protect its share in a market that is estimated to increase by 100% over the next 5 years, the company will need to increase its production of box files. The company has, therefore, allocated approximately £400k to invest in restructuring its current production lines through automation and introducing

new work practices. The size of the box file market was relatively small and therefore was not well served by equipment manufacturers.

The company operated seven box file production lines over two shifts, which employed relatively modest levels of automation, and hence were labour intensive and were inefficient due to unscheduled downtimes and waste. The processes were a mix of manual and semi-automatic. The company employed 44 workers on the day shift on seven box file production lines (an eigth line was permanently held in reserve for maintenance purposes), and 19 workers on the evening shift. An additional seven staff were involved in directly related preparatory operations, giving a total staffing level of 70, which represents 45% of the total direct labour force.

The company therefore needed to develop its own bespoke automated production system, incorporating a degree of flexibility to meet varying market demand. The new system will be a modular to replace 6 of the existing box file lines and release resources for customised product lines. The new system was designed to be flexible that was easy to maintain, upgrade and rapidly switch to new products.

4.6.3. Recognition of Needs

The needs of intervention emerged to reduce the complexity of product design of the box files. The company's traditional process was a mix of manual and mechanical operations running on 8 lines employing a total of 44 operators. Therefore, the aim of the intervention project was to assist the company in the design of a new automated manufacturing system for "box files" that was easy to maintain, upgrade and rapidly switch to different product colours, materials and sizes. The new line was to replace six

of its existing lines resulting in substantial cost reduction. The main target was to implement a new approach to box file manufacturing, introducing agile manufacturing principles that can be applied in simplifying the complex process of producing the box files.

4.6.4. Implementation

The project implemented was to develop an automated new system of product design of the box files. It started with analysing the operation details which includes product structure, materials flow to and through the existing lines, processes involved and demand profile for the product. Surprisingly, the analysis resulted in cost savings at an early stage such as favourable discounts from suppliers. Also, the project offered a solution to the existing problems through changes to materials used that resulted in another cost savings in material costs, reduction in rejects and downtime due to replenishment of components. Throughout the intervention process, the set target to automate the box file manufacturing process and to reduce the lines from eight to six was achieved. Various steps and processes were involved, however, all were implemented successfully. The implemented new system was operational which enhanced the company's capability to meet an increasing market demand.

The intervention project was specialised on assisting the company in developing a new modular "box file" manufacturing system combining automation with the flexibility of replacing six of the existing lines. According to the company's report, after the implementation the new system has reduced the overall product costs,

increased in output by 50% and released existing labour resources to focus on highly customised product lines.

The company has also identified a potential saving by bringing in-house the manufacture of key wood components that also provided the advantage of flexibility, offered better management of materials to support new product ranges and sizes. The management and installation of the necessary equipment for the wood components will be the first stage of the implementation process to feed the existing lines. New work practices in terms of flow of information and materials were also introduced to guarantee the efficient operation of the system and supporting activities.

The project has benefited the company to acquire new embedded knowledge as well as created new capabilities throughout the implementation (as produced in the progress report of the company). A modified box file design was implemented with new principles of design for manufacture and assembly. An optimised new bespoke automated line built with visual management and "5S" procedures was in place.

Thus the project demonstrated that their investment in people culture resulted positive outcomes in the management of process improvement teams. Overall, many areas were improved as knowledge were increased in many processes of production line which included; set-up and operation of visual management procedures to improve material flow, new materials through the new product, setting up quality systems that capture and rectify causes of process failures and rejects, how to schedule and plan production to effectively meet delivery due dates, and assessing and maintaining health and safety procedures.

As a result, the operation was run better and improved in many areas as staff became experts. All staff were knowledgeable in production line mainly lean and agile

manufacturing principles. Unlike before, staff knew how to optimise resources and reduce waste as well as understand how the appropriate KPI's were used to monitor and improve operations. Besides, the created flexible multi-skilled work force enabled the company to respond more effectively. Another improvement was that they worked closely with suppliers and customers.

4.6.5. Impact

As stated in the company's report, the company made changes which had resulted in improvement in the key areas of the operation. The outcome impacted on improvement in productivity through a new layout and new operating practices for existing box file lines. Due to this new change, it led to an increase in capacity with the introduction of the new automated line. As the products at every stage were inspected online, therefore the number of rejects and returns were reduced from improved materials and processes. As a consequence, it reduced in lead time through visual management of the material flow and storage and also reduced material waste through detailed process inspection and monitoring.

The intervention has introduced both new levels of automation and new work practices on the shopfloor. The expertise gained through the implementation was disseminated throughout the company and created an awareness of the importance of reducing non-value added operations and waste.

4.6.6. Sustainability

The box file market was highly competitive and key to surviving in this market was the ability to effectively meet the demand from the large retailers and supermarkets both in terms of volume and responsiveness. The new line has given the company a clear competitive edge enabling it to both cut the costs of box files due to reduced labour and material costs and increase the available capacity. The new line has also demonstrated to customers that the company is committed to improving performance and service levels.

4.6.7. Innovation

As a result from the new improvement, resources released by automating the box file line provided the company with the opportunity to expand the product areas. The new line offers the company the opportunity to expand into other non-UK markets with the possibility of licensing the technology. Thus the implemented intervention enabled the company to progress by creating new capability that was unfeasible before.

4.6.8. Summary

The case study shows an exemplary of successful intervention besides the complexity challenge of the system design. The impact of implementation had created a new invention of a new system of product design of box files in the UK particularly. In fact it was the first product of its kind in the world. Moreover the new system design product offered immense potential in return through sales and the licensing of the

technology. As a result, it is viewed that intervention has generated new value which benefited commercial gain to the company and created a new history of achievement.

4.7. Case Study 7

4.7.1. Company Background

The case study involved with a manufacturing company whose main business was to design and manufacture spas, swimming pools, saunas, mud baths, igloos and meditation rooms. The company also designed a range of luxury spa furniture that it outsources from the Far East. There were two parts to the business. The first was the design and manufacture of standalone standard and bespoke spa's for sales through distributors in continental Europe. The second part dealt with on-site projects that involve working with architects in designing and constructing complete bespoke wellness environment.

The company was particularly skilled in designing and building innovative spa and pool products. This was well-recognised in the industry through the awards they have won over the years. However, despite their achievement there has been no change to the company business which kept performing inefficiently for years.

4.7.2. Issues

The company operates in markets with good potential for growth. Whilst there were a variety of competitors in the marketplace, the company reputation for good product design affords it clear competitive edge. The company was known in the sector for being innovative and responsive to customer specific needs both technically and aesthetically.

However, the company has reached a stage in its growth where existing business processes cannot cope with the varied or customised nature of the products and the pressure to continually innovate.

The “problem” as such, was that the company has grown by “fits-and-starts”, adding new resources and processes as and where necessary. As a result, unnecessary waste has developed in operations, materials and resources. Time to completion of projects was also poor. Whilst product build quality was excellent, the system of managing projects and ensuring customer focus was below that expected for the product type.

In effect, current processes restrict the ability of the company to expand into new markets and develop new products while retaining profitability. Hence, a step change was required in the way the company operates across its various functions from customer facing activities, through product development to manufacturing and building and managing installations. The company’s products were largely bespoke which results in a high degree of waste and inefficiency due to the current way operations are organised. There was a good deal of scope for reducing the costs of operations across the company functions and so improving throughput.

Although there was a system in place for managing projects, problems often arise with managing customer information, suppliers and contractors. As a result of which, customer feedback was below than expected. There was good scope for improving the system for managing and monitoring projects. The existing IT systems were not flexible enough to support existing business processes and there was a need for a common platform for managing market, project and product knowledge.

The company has also recognised that to meet anticipated growth in market share, a new manufacturing facility was required, strategic to sustainable growth, facilitating higher degrees of efficiency and flexibility.

4.7.3. Recognition of Needs

The slowdown in the economy has affected sales, specifically in the spa area as orders from continental Europe decreased considerably. This provided an opportunity for pushing forward the changes in the manufacturing side without affecting output and sales. The cancellation of several public funding projects which was a target for the company was also critical in changing the focus of the marketing strategy.

However there was an unexpected surge in the project contracts that has managed to improve the company's financial position and offset the temporary decline in the spa market. The spa market has improved more recently and new opportunities to work with UK key distributors have emerged.

The company reached a size whereby existing processes were inefficient with an impact on customer satisfaction and the ability to innovate and introduce new products. The company was lacking of knowledge in lean and agile techniques and operations. There were also costly quality issues that required rework and had a disruptive impact on lead time and performance. They also required support to improve the new product and project introduction process, strategic marketing and business process integration. In summary the aim of intervention was to assist the company to grow by introducing business processes that are more customer centric.

Opportunities for growth existed by expanding into other geographical markets with the current product range. This required a detailed analysis of potential markets to identify needs, assess threats and opportunities and understand any new technologies that may constitute essential requirements in which case all emerging scenarios would need to be evaluated by external experts.

4.7.4. Implementation

The company was lacking in knowledge that can be used to significantly improve the way the company operates and organises processes internally and externally. This can be seen in how they managed suppliers and contractors as well as how they interfaced with the market and customers. There was also a lack of knowledge of the appropriate level of ICT tools required to support and sustain the improvements introduced. The blaming culture with no initiative from anyone to pursue something new has made the situation static without further action for improvement.

As initiated in the initial plan, at the manufacturing level the company lacked knowledge in: manufacturing process improvement through lean and agile techniques (for example, visual management, waste reduction, total productive maintenance, Total Quality Management (TQM) systems, value stream mapping, benchmarking, and supply chain management).

On the New Product Development (NPD) and marketing side, the company needed support in implementing new product improvement methodologies, NPD management systems, sales and customer experience mapping, branding strategies and public relations, strategic marketing planning and implementation and business process

integration. The intervention implementation was carried out with proper planning to fill this knowledge deficiency.

The KTP intervention in this case was intermittent. The KTP project was planned for three year. An Associate was appointed with experience in manufacturing systems. She left the project after six months and replaced after a gap of six months with a second Associate with experience in project and process management.

The project first focused on the manufacturing by introducing new shopfloor practices based on lean and agile techniques. A full analysis of the internal processes, was carried out resulting in a complete redesign of the layout and processes. This activity included introducing the quality concept of "5S", Kanban, cellular based operations and complete reorganisation of workforce responsibilities. Problems with warehouse management, layout and distribution were addressed and new methods for releasing materials to the workshops were designed and implemented. Overall stock was significantly reduced and a new stock management IT system was implemented to minimise errors. The overall impact has been a step change in how the manufacturing side operates. It has enabled the second Associate to successfully took the company through ISO2008 accreditation and thus attracted a major UK distributor to reach an agreement to distribute the company's products.

However, the above activities were disrupted by the change of Associates and the 6 month gap to the appointment of the second Associate and accordingly took longer than anticipated to embed. The company Associate assisted in the launch of a new product, a spa with an integrated treadmill, by contacting researchers at the university physiotherapy department to assist in assessing the prototype and identify key performance issues as well as potential markets. The product was formally launched in

a 2012 exhibition. The project also addressed the company's image by carrying out internal and external satisfaction surveys and as a result a new branding initiative resulting in a new logo, brochures and revised exhibition material in addition to changes in the customer interface.

The main difficulties with the project emerged from the company culture and style of management. Most of the delays in implementation were down to delays in making the important decisions by the Managing Director (MD). When decisions were made these were not followed through by action. For example, if a new layout was proposed and approved, staff did not act until endorsed by the MD which in some cases took months to authorise. The Associate was left in a position where she was trying to coax staff to carry out the necessary tasks for improvement with little support. The staff response to this has been that if they ignored the task for long enough it will dissapear. This was exactly what happened on the projects side of the business where activities were less transparent.

The new procedures for shopfloor and warehouse operations were designed and introduced and the Associate was persistent in getting these through. The Associate visited the shopfloor daily pushing staff to follow procedures and making sure all documentations were in place. This carried on until the procedures became embedded and staff started to contribute and implement new ideas. Their commitement has resulted the company to be awarded with the ISO accreditation for the manufacturing side of the business with minor non-conformities.

The Associate carried out a full assessment of the processes for on-site projects and initiated new procedures for reducing the costly risk of project mistakes. This involved with getting key staff to collaborate and change work practices with clearly defined

responsibilities. This was very challenging due to the resistance from key staff to change and insufficient support from management. The necessary analysis was carried out and proposed process improvements were documented but not fully implemented as the project was terminated 10 months early by the company.

4.7.5. Impact

The intervention project helped the company to improve the operation and as a result it developed and changed the way it was run. The project has helped embed a culture of continuous improvement on the shopfloor. The shopfloor staff were contributing more to find solution to problems and improving overall performance. The successful award of ISO9001:2008 has helped embed some of these procedures.

The implementation has also produced full documentation for procedures on the project contracts side of the business. There has been an improvement in this area with more staff collaborating and sharing information which has resulted in fewer mistakes. Upon implementation, the company has been able to embed knowledge in both areas of manufacturing and project contracts.

Prior to the implementation of intervention project, the KTP proposal has highlighted the knowledge deficiencies which were required in the company as agreed by all the parties involved. Therefore, it was clearly stated in the proposal of what were the areas that needed an improvement and the predicted outcomes which were monitored during the implementation. At the end of the project, the new outcome was then produced in the final progress report. However, for the purpose of this study some

of the new outcomes of this case were remained anonymous due to the company's policy of confidentiality.

On the manufacturing side of the business, improvements were seen in many areas of the operation which were shown in the final progress report. The operation was run more systematically and structured. Knowledge on lean and agile manufacturing, visual management and 5S were practiced in daily processes. They applied the use of Kanban in materials handling. The planning and control of the operation was in placed. Issues in quality were solved by the implementation of ISO 2008 quality systems. And finally, the staff were managed to work in teams collaboratively.

On the project contracts side, improvements were seen as indicated in the report. Project management and progress monitoring were in place. Besides, they also implemented project risk assessment. The quality systems were practiced in compliance with the ISO certification. Similarly at the manufacturing side, working collaborative teams were also built. And finally, in order to upgrade customer satisfaction, an assessment through a survey was developed.

4.7.6. Sustainability

There was certainly a different culture on the shopfloor specifically with the award of the ISO accreditation as there was now more of an emphasis on retaining it. There was also an improvement with the contracts side with staff working in teams and better reporting of project progress. Therefore the company has created capability for sustainable growth through the effective management of business processes and the successful introduction of new products.

4.7.7. Summary

The case study demonstrated a good exemplary of the impact of the implemented intervention throughout the company as a whole, apart from the unsupportive challenge of the key person. Overall, the impact affects positive outcomes that created wide ranging improvement to the company from manufacturing productivity and efficiency, through the cycle of new product introduction to growth in market share and a radically enhanced customer satisfaction. Therefore, this case demonstrated that intervention has embedded the required knowledge which brought noteworthy improvement to the entire company.

Chapter 5

ANALYSIS

We cannot solve our problems with the same thinking we used when we created them.
(Albert Einstein)

CHAPTER 5 ANALYSIS

5.1. Introduction

Based on the developed conceptual framework (Figure 2.5. of chapter 2), this chapter will continue with the analysis of the case studies. This involves the investigation of the intervention processes existing in the company. In the analysis, in-depth investigation is carried out to reveal how the intervention can embed knowledge as a platform to develop sustainability in business performance. The purpose is to find out why knowledge is needed by practitioners and how intervention can be incorporated to develop sustainability into growth strategy. In-depth analysis of the case studies is presented by first looking at the individual cases. This is then followed by a cross sectional comparison between the cases to consider the similarities in pattern between them. The improvement tools to match the problems were selected based on an assessment of company needs prior to the KTP project by a company and supervisor. This was then set in the initial proposal before the project was implemented.

5.2. Company's Profile

Detailed interviews were conducted with seven companies. The companies (or SMEs) are also referred in shorthand notation as C1, C2, C3, C4, C5, C6 and C7. In terms of this research, Knowledge Transfer Partnerships (KTPs) is the medium of intervention as it provide a good example of an in-depth intervention process. For the purpose of this study in producing the consistency, all the KTPs were selected based on the two year project. All of the selected companies were new to the KTP experience

and for each of them it would be the first time they would engage in a KTP project. As such, all cases were considered as never had any experience before. This provides the researcher with an ideal opportunity to analyse (theoretical) ideas in action. Simply put, it allows us to see how well the theory works in practice. More importantly, it allows us to concentrate on the areas that this research is focusing on.

It is believed that companies requiring external support have been pressurised by a combination of internal and external (business) issues. As they lacked expertise in being able to deal with these themselves they looked for it elsewhere. Such intervention would deliver improvements. Most of the companies (C1, C2, C3, C4, C6 and C7) analysed here faced critical internal issues which needed to be solved urgently. They had insufficient resources and received very little support to gain improvement. Outside of their control, they became overwhelmed with issues which remained unsolved. As the pressure intensified, they inevitably required external support to survive.

In the initial state, it was found that most of the companies were unaware of how they could acquire new knowledge. Not only that, but many were confronted with the disorganisation caused from "fire fighting". This resulted in firms reacting to post events and not being proactive, looking into the future. It saw the creation of ad-hoc activities and disorganised working environments. Eventually it would, if left untreated, prevent the company from moving ahead. Not only would it put the company at risk, but it would severely reduce its growth potential. Therefore, it suggested that support was needed.

As soon as the companies realised that they needed external support to improve, they took action to engage with the external agencies. From the case studies, the areas of the intervention could be identified. These include processing procedures, IT systems

and resource utilisation. The suggestive that these were deficient was indicative that the companies were in need of business process development. The reality that these companies required external intervention for improvement was undeniable.

The approaches from the higher education (HE) in bringing new knowledge to the company so called “HE-industry” linkage via intervention is extremely important and often a catalyst to instigate new changes which may generate significant impacts in return. In this respect, the role of HE in transferring knowledge resources is crucial to deliver the “know-how” into valuable economic activity which will then has become a high priority to a company. On the other hand, a company that requires new knowledge for new changes and improvement holds technical resources that are empirically useful to develop theory. New knowledge has to be gained by the company as to how “effective” improvement can be fostered through this linkage mechanism which is also an ideal opportunity to bring new transformation in SMEs. Ismail et al (2011) suggest that this approach benefits all parties involved in the long term to build the “Continuous Improvement” (CI) with a win-win situation. SMEs are supported over the extended period of the project and the continual change of improvement significantly improves their performance. Nonetheless, the built experience can also develop a relationship between SMEs and HE.

The companies chosen for case study analysis were manufacturing companies producing a range of products, components and subassemblies for industry. The companies were selected on the basis that they were SMEs and had experienced of intervention. Table 5.1. below provides a profile of each company and includes information on the number of employees; years in business establishment; type of

customers, products and process complexity; duration of intervention in months (planned and actual duration); and product descriptions.

Table 5.1: Case Study Sample Profile

Case Study	No of Employees	Years in Business	End Customer	Product Complexity	Process Complexity	Planned Duration (Months)	Actual Duration (Months)	PRODUCTS
C1	50	50	B	M	M	24	24	Industrial electrical laddering and ducting
C2	22	>50	B	L	M	24	24	Healthcare, pressure relief operating table mattresses
C3	130	42	C	M	H	24	24	Luxury & bespoke shower enclosures, water delivery & accessories
C4	29	20	B	H	H	24	24	Precision manufacturing, aerospace & pharmaceutical
C5	50	15	C	M	M	24	12	Playground furniture
C6	120	35	C	H	H	24	24	Lever arch files and stationeries
C7	26	50	C	H	H	36	2	Spa and pool furniture and related products

Table 5.2. represents the six dimensions applied in the cases. The acronyms used in Table 5.2. are explained as follows;

END CUSTOMER:	
B	Business customer (B2B)
C	Retail/End customer
PRODUCT COMPLEXITY:	
H	High – a very complicated product that involves a lot of processes to make it. It also requires high levels of Total Quality Management (TQM)
M	Medium complexity product
L	Simple product without complexity
PROCESS COMPLEXITY:	
H	Highly complicated process that requires highly skilled staff, high levels of technology and possibly used of complicated (“space age”) materials
M	Medium with reasonable process involved
L	Low and simple process

Bessant's (2005) framework was applied in each case to analyse the nature of intervention.

The level of intervention, as depicted in Table 5.2. is defined as follows:

H (high)	Critical intervention with core objective and high impact
M (medium)	Intervention is not very important. However, it is still needed as it has a medium impact
L (low)	Partial involvement with low impact.

Table 5.2: Framework application of the nature of intervention

Company	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**
Strategy			M				M
Formal Systems	H	H	H	H	H	H	H
Operational Improvements	H	H	H	H	H	H	H
People Management	M	M	M				
Obtaining Finance				H		M	
Market Entry	L	L	M	H	H		M

Out of these seven cases, the similarity impact was high on operational improvement followed by formal systems. This means that these companies attempted to make an improvement on the operational ground as the nature of intervention seems to be on the normal processing procedures which led to the core function of the manufacturing process. The secondary nature of the intervention was on formal systems as this may

appears as an important element to maintain running the operation that could accelerate growth.

From the study, it is perceived that the significant impact should be targeted at the changes of the operational improvement and formal systems as these were identified as crucial for the company to be focused on. Results demonstrated just that. Evidence shows that from the successful cases (C1, C2, C3, C4, C6 and C7), both the operation and formal systems were performed better with new changes as an impact of the applied knowledge. As an implication, the role of operation and formal systems to determine the success of the company (Roth, 1991) applied. The framework (ACAP, KDG and TP) application can be said as valid in transferring knowledge to new transformation.

Table 5.3: Detailed Bessant (2005) Framework Application

Company		**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**
Strategy			M					M
	Initial State		3					2
	Final State		4					4
Formal Systems		M	H	H	H	H	H	H
	Initial State	2	2	2	1	1	1	
	Final State	5	5	5	5	2	5	
Operational Improvements		H	M	H	H	H	H	H
	Initial State	2	2	2	2	2	2	2
	Final State	5	5	5	5	2	5	4
People Management		M	M	M				
	Initial State	2	2	2				
	Final State	4	4	3				
Obtaining Finance					H		M	
	Initial State				1		1	
	Final State				4		3	
Market Entry		L	L	M	H	H		M
	Initial State	2	3	2	1	2		1
	Final State	3	5	3	3	2		3
Overall Implementation		H	H	H	H	L	H	H
	Initial State	2	2	2	1	1	1	1
	Final State	5	5	5	5	2	5	4

Table 5.3. details the changes for each case company. For each the author report the initial state. Intervention then takes place and change takes place. The final stage is then achieved. As a reminder the author also indicate the level of intervention (H=high, M=medium and L=low). Each state is also graded on a scale of 1 to 5. The higher the grade, the higher the level of resources and commitment. These are explained in the "Knowing-Doing Map" (see Figure 3.4. of Chapter 3). The results show that in six cases (C1, C2, C3, C4, C6 and C7) where intervention was completed each company saw improvement. Only C5 failed to improve significantly and this was due to its early termination of the project.

The manufacturing performance was assessed by achievementa as shown in the final progress reports of the projects, which produced different indications for each company. These comprised increase in plant effective capacity, sales, reduce lead-time, inventory, productivity and new products. The results demonstrated various indications of performance in the cases. For instance, it can be seen such as follows. C1 has reduced the delivery time from 8 to 2 weeks and reduced the completion of tender bid process from 6 to 1 week. C2 has built a new plant as a business expansion. C3 has reduced lead time from 9 to 4 months. C4 has improved the logistic delivery by 90% and also invested in new sector in nuclear industries. Performance in C5 cannot really be seen. C6 has reduced from 8 to 6 machines line.

From the cases, four cases (C1, C2, C3 and C6) were successful as planned and brought significant impact to the company. The new improvement of the operation has totally changed the company. The application of the new knowledge has improved the operations which are the core of the business, enabling it to run better. As a result it created a positive outcome for the company. One case, C7, demonstrated its success in a different way by changing the original plan into diversification which resulted in ISO9001 certification award. This was not planned before. This is a good example that success can happen in many ways. However, only one case (C5) was not successful as the company decided to finish the project early; resulting in no indication of improvement. Findings demonstrated that the right intervention implementation with correct guidance and monitoring not only enables the company to fix the deficiencies, rather motivates to progress further or effort to diversify.

Results revealed the critical factors of enablers and barriers that have a high influence on the success of the intervention process. This consequently establishes a

positive or negative impact to the overall performance. The enabling factors lead the company to progress. On the other hand, the barrier factors hamper the company from moving forward or relapsing.

As demonstrated by the cases, one example of the enabler factors is identified as empowerment of staff, motivation of staff to become independent in solving issues. Also, it inspired staff to perform at their best in dealing with daily task after new skills were built out of the absorbed knowledge. As a result, operations become quicker in which case saves cost and time.

On the negative impact, illustration of the barriers factors for instance lack of support from the top management in delaying the decision making or taking no action after decision was made will result in delay or interruption progress. Besides, it will discourage staff from performing better in daily tasks. Hence, new achievement may be delayed or unachievable. Thus , the enablers and barriers factors play significant roles in determining why some results are different from others.

Table 5.4: Intervention Implementation

Case	Issues	Nature of Intervention	Target	Training Delivered	Impact	Result Indication
C1	Dysfunctional IT system -No Data available -Slow tender response -No estimated costing Shop floor production Human issues	IT and database (H) Operation process (H) People management (H)	Systems accuracy Quick tender proposal Smooth shop floor operation Reduce absenteeism	Lean manufacturing	New IBS system Quicker processing of tenders Reduced delivery times Motivated staff	Tender for large project Enlarged overseas market Increased revenue New promotion
C2	Normal processing procedures Quality and delivery Human isseus	Operation (H) People management(M) MIS system (M)	Improved productivity Better staff utilisation New system in place	NVQ training program Health & safety program	Productivity increased by 40% Lead time reduced by 50% Increased capacity Improved productivity New employment	Increased profits New investment in plant expansion
C3	Quality issues Excessive stock Poor planning and management	Operation process (H) Strategy (L) Formal systems (H)	Reducing lead times Reduce excessive stock levels Improve quality	Training for shopfloor staff on 5S ad lean	New ERP system	New products New innovation design
C4	Data not available Inefficient process No capacity Quality issues	Formal Systems (H) Operation (H) Market Entry (H)	Reduce lead times	Lean & agile manufacturing ERP training	New ERP systems Increased revenue	New market forecast and demand New investment
C5	Processing procedures Cannot fulfil seasonal product demand Product design	Operation (H) Market Entry (H) Formal Systems MIS (H)	Improve the operation process Reduce lead times	Lean & agile manufacturing	MIS not fully implemented Duplication of effort	Target could not be achieved
C6	System efficiency issues Changing the way the product is designed issue	Formal Systems (H) Operation (H)	Improve system efficiency Simplify the design process	Lean manufacturing	New design system	Could not be ascertained as there was no continuity
C7	Quality issues	Operation (H)	Improve quality and production	Lean & agile manufacturing practices	Continuous improvement on the shop floor	Awarded ISO9001 status

Table 5.4. summarised the analysis findings throughout the intervention project. In this analysis, important factors related to the intervention process and activities were identified such as issues, nature of intervention, targets set, type of training delivered, impact and result.

The analysis revealed the critical issues faced in each case. These issues prevented the company from progressing. As such, immediate attention needed to be taken to

solve these issues. Also it is critical to identify and understand these issues as it determined what type of intervention and knowledge were required to be implemented.

The nature of intervention was identified as the targeted dimension (Bessant et al 2005) that required improvement. In this study, two dimensions were identified as critical; Operational Improvement (OI) and Formal Systems (FS). However, throughout the project there were also other dimensions that were affected such as People Management (PM), Strategy (Sg) and Market Entry (ME). The level of impact of each dimension that affected by the intervention project was classified as High (H), Medium (M) and Low (L). For example, in C1 the Operation Improvement (OI) and Formal System (FS) dimension was each considered as High which significantly affected critical impact to the company.

Target was identified as the goals that the company needs to achieve and ultimately the areas to improve. These targets were set earlier in the proposal prior to the intervention project as agreed by the company and the provider. As the cases were focusing on the OI and FS, therefore most of the targets were aimed at achieving improvement in the operation area such as reducing lead time, improving the operation process, systems accuracy, etc. The analysis findings demonstrated that the targets were mainly focused on improving the operational process and systems as were planned earlier in the proposal.

Out of all, the delivered training was the core activity of the intervention project. This was considered as the main platform that knowledge was transferred to the company and utilised by the staff for the best practice. Analysis showed that most of the delivered training was focused on the manufacturing lean and agile concepts to improve the shop floor operation. It is believed that the successful knowledge transfer

presented high impact to the company to a new transformation, as it can be seen from the findings such as the reduction of lead time by 50% in C2, etc. The impact of the developed systems and improved operation as the cause of knowledge deployment then resulted in new indication of changes. Analysis demonstrated that positive indications such as built new investment in plant expansion in C2 or created new product in C3, etc. Thus, this summary is evidence that changes and improvements occurred after the intervention project.

Table 5.5: Sustainability Factors

Case	Enabler	Barrier	Risk	Innovation
C1	Good candidate Well-planned project Teamwork Individual commitment Driven manager	No objective No goals No clear direction The problems were not identified clearly Staff mobility	Relying on only one developer (contingency plan should be in place) Unreliable vendor	Created expertise Lead time reduction Cost reduction Potential for bigger project Reliable developed systems
C2	In-depth intervention Adherence to plan Assigned staff on regular basis Delivered manager Well-planned training	Lacking in knowledge and not properly trained No staff rotation Human problem of resistance to change Destructive attitudes	Staff mobilisation Loss of new market demand	New customers Explore new market overseas Business expansion; new plant, machinery and building Developed new system
C3	Proper training and supervision on the shopfloor Strong driven manager Convincing the top management	Staff lack training Very little knowledge Processes not managed properly	No support from top management	New product innovation New investment
C4	Very strong motivation from managing director Very loyal workforce	Unsupportive staff	Internal apprenticeship on managing the stocks	New customers New investment New partnerships
C5	Strong support from the managing director	No commitment from customers Problems with suppliers	No confidence on intervention	Target not achieved
C6	Strong support from the managing director Clear target and plan	No dedication to the implementation Lack of knowledge	Did not really develop expertise, no continuity of application when intervention finished	Developed new equipment and design systems
C7	Culture of continuous improvement More staff collaboration Sharing of information	Unsupportive director Resistance from staff No proactive action No expert Lack of knowledge	Relying on only one person decision	Accredited with an ISO9001 award Reduce stock, lean operations

The analysis deals with the identification of the main factors from each case during the intervention which determines the success or failure of the projects. Table 5.5 summarised the analysis findings of the main factors that are believed to have high

influences to the sustainability. The analysis was focused on the four factors identified as; enablers, barriers, risks and innovation that were identified in each case.

Enablers were the driving factors that push the company to move forwards. Findings from analysis demonstrated factors which were believed to be the activities involved, consisting of the drivers and forces that motivated the company to keep progressing. On the other hand, the barrier factors were the constraints that the company faced that prevented it from growing. Thus, the findings revealed what were the causes that impeded the company from moving forward. Other factor such as risk analysed the activities involved that were critical for the company to avoid when implementing the intervention. Alternatively, when these activities were identified, the company can then consider a contingency plan as an option in reducing the risk. And finally, the innovation factors were viewed as the point of achievement of sustainability. Upon completion of intervention, the analysis demonstrated whether the embedded knowledge has created skills which enabled the company to create new opportunity for innovation. Findings from analysis supported these criteria which enhanced the company to create something unique and different in embarking new opportunity.

5.3. Factors Influencing Sustainability

In the analysis, the main factors which are believed to influence sustainability and demonstrate high impacts to the improvement were chosen based on the movement processes within the implementation. The argument remains whether the conceptual theory (ACAP, TP, KDG) as literature suggests actually exist in the real world. Investigation of what was happening during the intervention process included factors such as what driving forces were involved, what were the impediments that stopped the

firms from progressing, what were the motivations, and what made them not practicing new knowledge with no new changes and factors that generated innovation. These factors were classified into four categories; tipping point and sustainability, enablers or barriers to change, relapse and innovation which are elaborated further as below.

i. Factors Influencing Tipping Point and Sustainability

In these factors, the concern remains on how a company reaches a tipping point and subsequently what will happen next, such as how the company is able to keep progressing. The ACAP theoretical concept (Cohen and Levinthal, 1990; Zahra and George, 2002; Lane et al, 2006; Todorova and Durisin's, 2007) on knowledge deployment that literature suggests which was identified as; exploration, transformation and exploitation should be occurred. Further it will find out whether the tipping point has been reached which further leads to sustainability. The processes involved will then be identified. Even though there is no exact measure on how to assess that tipping point and sustainability is occurred can be found in the literature, however, Bessant et al, (2005); Ismail et al, (2011) suggest that it can be seen from the growth indication of the company, or as long as the company is growing.

Therefore the investigation will focus on new growth indication such as increase in revenue, opening new plant, new business venture or any other form of positive indicator in which TP is considered as happened. Consequently, the investigation will continue to find out the progress or achievement that has resulted significant impact to the new transformation. These are all the things that needed to be explored in the analysis.

ii. Factors Enabling and Acting as Barriers to Change

These factors were identified as a core issue. The investigation circles around what makes a company progress and be sustainable in the long term, and what factors that encourage progress identified as enablers as suggested in the literature (Aladwani, 2002; Burns, 2009; Caloghirou et al, 2004; Corso et al, 2006; Dominique, 2007; David, 2009; Henk et al, 2009). The investigation continues on what are the challenges that hinder the company from progressing known as barriers in the literature (Aladwani, 2002; Caloghirou, et al, 2004; David, 2009 Dominique, 2007; Henk et al, 2009; Lagerstrom et al, 2003). Also, the KDG concept by Pfeffer et al, (2000) is investigated on how it impacts the improvement on performance. The investigation follows on how the company performs and overcomes barriers which are already in existence or resulting from the intervention. These are the main areas that need to be investigated in the analysis.

iii. Factors Leading to Relapse

These factors were identified as the possible causes that make a company relapse, preventing it from moving forward or making it stop growing. Studies demonstrated very limited findings on why the companies are still practicing the old routine rather than the new ways implemented. Hence, the search concerns why a company fails to progress and otherwise returns to the initial stage like before.

iv. Factors Leading to Innovation

At this stage, the intriguing exploration becomes apparent. It is suggested that this is the success story behind the intervention. The findings should reveal whether is it true that the power of the implemented knowledge generates a desire for the company to innovate which leads them to become more independent. The question remains as to whether the company has the capability to move to the next level on its own to create new opportunity as suggested by literature to create innovation (Birch, 1987; Mulhearn, 1995; Rothwell and Zegveld, 1981).

In conducting the analysis the author relate these four factors to the six dimensions of Bessant (2005). In doing so, an analysis was constructed by the use of Checkland's (1981, 1990) theoretical methodology of soft system as depicted in Table 5.6. Input, Process, Output Analysis. This table was used to represent the analysis findings of the individual case. The first column; input, indicated the resources and actions available within the case. The second column; process, was where the input of first column was processed into a target, which was a new transformation. Finally the last column, output showed the outcome of the process which was the final achievement.

Table 5.6: Input Output Analysis

Input	**Process**	**Output**
Available resources & action.	Transformation into a target; What the event may achieve.	Achievement and Results.

In the analysis the author will use a shorthand notation. The acronym used for each of Bessant's (2005) criteria are:

Sg - Strategy

FS - Formal Systems

OI - Operational Improvements

PM - People Management

OF - Obtaining Finance

ME - Market Entry

In Table 5.7. below the author analyse for each case study company the factors influencing tipping point intervention and long term sustainability.

Table 5.7: Tipping Point Intervention and Sustainability Factors.

C1 (Tipping Point Intervention and Sustainability Factors)			
Key	**Intervention Process**	**Target**	**Achievement**
OI	Set targets for implementation of the new system: - System accuracy, - Accurate costing, - Quicker response in tendering new bids.	Implementation.	New database, cut the hour spent on manual searching. Accurate system standardises the information flow process. Can easily retrieve the required information. No additional costs, by utilising the available resources. Time saving.
FS	Introduce a new system; Integrated Business System (IBS) in manufacturing and material.	Accurate systems implemented.	Vital data and information are made available and easy to retrieve. Quick tender response. Accuracy of information flow. Big changes in time improvement.
PM	Introduce new techniques and thinking: - new database system - shop floor production management	Upgrade system reliability Raise understanding on lean thinking	Significantly improved reliability of data; consistency, quality and integrity. Improved level of knowledge in lean thinking. Lean thinking is no longer an alien concept.

C1 (Tipping Point Intervention and Sustainability Factors) cont.			
Key	**Intervention Process**	**Target**	**Achievement**
FS **OI**	Develop a new business process. - Labelling; scheduling & fitting; checking stock inventory levels. - Introduce new order systems and performance measures into shopfloor operations.	To smoothen running speed and the flow of the processes.	Shopfloor operations more efficient. Processing time reduced from 8 weeks to 1 week. Delivery time cut from 2 weeks to 1 day.
OI	Introduce training on: - Lean Manufacturing. - New procedures in operation. - The use of IBS.	New knowledge absorbed.	(Daily) operating processes faster and more efficient.
PM	Investing in people and knowledge.	To upgrade the level of knowledge and skills.	Created expertise. Specialist in the area, expert knowledge day in day out.

C2 (Tipping Point Intervention and Sustainability Factors)			
Key	**Intervention Process**	**Target**	**Achievement**
Sg	Lack of expertise (knowledge). Engaged with expert to transfer relevant knowledge.	Aim to equip the company with the required knowledge (engineering background).	Embedded the required knowledge which is useful to the company. Created engineering experts and background.
PM	Set target for improvement;	Ensure target is achieved.	Target achieved.
OI	- To improve quality issues. - To improve efficiency. - Staff utilisation. - Introduce new product to market. - Reduce waste and costs.		The improvement process leads to achievement of set target.
OI	Introduce training to all staff on bespoke game-based packages for operation procedures.	Process improvement.	Process flexibility. Forecasted increase in turnover of 50%. The company has become very successful.
OI	Change in layout.	New layout implemented.	Increase in productivity of 47%.
PM	Investing in people and training.	Knowledgeable staff.	Staff become experts in running daily operations.

C3 (Tipping Point Intervention and Sustainability Factors)			
Key	**Intervention Process**	**Target**	**Achievement**
FS	Set target; - To reduce lead time. - To improve quality. - To be able to use the latest technology.	Aimed to achieve target.	Target achieved; - Reduced lead time (from 9 months to 4 months). - Improved quality. - Implemented latest technology.
OI	Trained shopfloor staff.	Better operation processes.	Continuous improvement in operation. Improvement in quality. Reduced excessive stock.
PM	Investing in knowledge.	Increase staff knowledge levels.	Trained staff who are more knowledgeable. Better understanding of the operating process.
OI	Continuous knowledge application in practice.	Application of the absorbed knowledge.	Dissemination of new knowledge.

C4 (Tipping Point Intervention and Sustainability Factors)			
Key	**Intervention Process**	**Target**	**Achievement**
FS	Implemented new ERP system.	ERP system in place.	Effective systems to provide quotes for new business and place tender bids.
PM	Delivered required training in agile and lean techniques.	New knowledge embedded.	Rich-based knowledge within the company.
		New skills and expertise.	Created expertise.
OI	Implemented ERP system.	Improve process and delivery performance.	Reduced lead time.
OF	Successful implementation demonstrated improvement and increased performance.	Obtaining new finance.	Managed to receive new funding for new plant and production machines.
	Established process performance.		
	Planning for business expansion.		

C5 (Tipping Point Intervention and Sustainability Factors)			
Key	**Intervention Process**	**Target**	**Achievement**
OI	Set target; - To reduce lead time, - Better utilisation of resources.	Aimed to achieve target.	Could not achieve its targets due to incomplete intervention.
PM **OI**	Delivered some training on lean manufacturing, design assembly and changing operation.	Reduce the level of embedded knowledge.	Not achieved due to the intervention not fully being completed.
PM	Building relationship with suppliers. Improve collaboration in the supply chain.	Developed supplier relationship.	Better interaction and relationship with suppliers.
Sg	Engaged with external consultant for intervention implementation.	Intervention implementation.	Sustainability could not be achieved.

C6 (Tipping Point Intervention and Sustainability Factors)			
Key	**Intervention Process**	**Target**	**Achievement**
OI	Set target. Target is to simplify the process of producing box files. To develop a more efficient process by implementing the design of a new system.	Aimed to achieve the target.	Development of a new design system for manufacture of box files. Reduction in cost. (The old system was too labour intensive). Reduction in waste. Cost savings using new system.
FS	Introduce and develop a new design system in manufacturing. Reduce the complexity of the process and make it more efficient.	Implemented a new design system. To simplify the complexity of the process. Allow it to run more efficiently.	Developed new design system. Reduction in process complexity. Created efficiency in the production process. Running an efficient line process on the shop floor. Production line reduced from 6 lines to 1 line. Delivery time cut. Operational costs cut.
PM	Introduce new techniques and thinking: - new design system. - improvements to shopfloor operation.	To upgrade system efficiency and reduce process complexity.	Improvements in efficiency. Reduced complexity. Improved level of knowledge on lean thinking.
OI	Introduce training on: - How to use the new design system and the new machine. - How to reduce waste. - Lean thinking.	New knowledge absorbed.	Changes in running daily operational processes. They are now more efficient and quicker. Simplify the production process.
PM	Investing in people and knowledge.	To upgrade the level of knowledge and skills.	Created expertise. Specialist in the area, expert knowledge day in day out.

C7 (Tipping Point Intervention and Sustainability Factors)			
Key	**Intervention Process**	**Target**	**Achievement**
OI	Set target. The target was to improve the production site. This would increase productivity and solve quality issues. To speed up the negotiation process and delivery of project management. To introduce a number of new products.	Achieve target.	Improved efficiency in production manufacturing. Reduction in lead times.
PM	Send staff for training on lean production techniques.	To increase productivity and improve quality.	Improved efficiency and quality. Improved level of knowledge in lean production techniques.
OI	Introduce training on lean thinking.	Absorption of new knowledge.	Knowledge was not really used in daily operational processes.

2. Factors that either motivating or hampering the company to change. This factors scrutinized on how do companies move from one stage to another level, and the enablers (yes factors) and barriers (no factors) were analysed.

Table 5.8: Enablers and Barriers Factors.

C1 (Enabler Factors)			
Key	**Process**	**Transformation**	**Enablers**
OI	Understand the issues: - Identify what went wrong, - Define the real problem, - How to deal with the nature of the problem.	Find out what solutions will resolve the issue.	An expert who really knows exactly what is going on and how to resolve it. Take responsibility when it all goes wrong.
PM	Apply trained knowledge of lean manufacturing into daily work practices.	People start to eat-sleep-talk lean manufacturing.	People accept the need for knowledge. People use knowledge in their daily work.
PM	Right teamwork involved. Full commitment from everyone. Not solely depend on one individual. Some have to rely on others in order to complete their work.	Working in a team. Responsible and committed teamwork.	Achieved teamwork. Very committed and driven manager.

C2 (Enabler Factors)			
Key	**Process**	**Transformation**	**Enablers**
PM	Promote staff to a supervisory role.	Staff empowerment.	Delegate and trust staff through empowerment and motivation.
PM	Encourage a change in attitude of employees.	Changes in the way of thinking.	Created new way of thinking.
OI	Continuous practicing what was implemented. "The spirit of the project was embedded in the company".	Spirit motivates to continuously perform tasks of the implemented intervention.	Distinct spirit and motivation. The spirit of the project is still alive within the company. The project brought in new changes spiritually and physically. The "stickiness" factor of the implemented processes during the intervention.
PM **OI**	Ensure full commitment from all the parties involved. Ensure that they play their part.	Fully committed to their roles.	Commitment leads to success of the implementation.
OI **PM**	Fully utilise manpower rather than letting staff wander around. Assign staff on regular basis through job rotation.	Reshuffling job rotation on a regular basis.	Staff rotation creates new motivation, opportunities and efficiency in manpower utilisation. Effective human resource planning and utilisation.

C3 (Enabler Factors)			
Key	**Process**	**Transformation**	**Enablers**
OI	Further knowledge application.	Implement the absorbed knowledge.	Take knowledge further, use the new knowledge to grow.
OI	In-depth intervention project.	Well-planned intervention.	Adhere to project plan and implementation.

C4 (EnablerFactors)			
Key	**Process**	**Transformation**	**Enablers**
PM	Workforce resources.	Loyal staffs.	The company rarely lost loyal staff.
Sg	Support of the managing director.	Received strong support from top management.	Strong main driver from top management made things happen and meant that intervention succeeded.

C5 (Enabler Factors)			
Key	**Process**	**Transformation**	**Enablers**
PM	Top management involvement and responsibility.	Support from top management.	Strong support from the managing director.
OI	Incomplete implementation.	Unidentified enablers.	Could not be identified.

C6 (Enabler Factors)			
Key	**Process**	**Transformation**	**Enablers**
Sg **PM**	Understand the issues raised; - Identify current issues affecting efficiency of the system. - Defining the real problem. Simplifying process complexity and changing the way the product is designed. - How to deal with the nature of the problem.	Investigate the solutions needed to resolve the problem. Reduce production lines from 6 to 1.	An expert who really knows exactly what is going on and how to resolve it.
Sg	Staff were sent for training	Embedded knowledge	Knowledgeable staff
PM	Apply trained knowledge of the new machine into daily use.	People accepted new changes.	People accept the need for new knowledge. People use knowledge in their daily work. Daily practice becomes more efficient.
Sg	Clear project plan	Delivered intervention	Achieved implementation
Sg	Understand the current issues that need to be resolved.	Engagement with intervention.	Belief that improved processes will rectify the issues. The believing process that intervention engagement will address the issues and resolved them.

C7 (Enabler Factors)			
Key	**Process**	**Transformation**	**Enablers**
OI	Understand the issues raised; - Ability to identify current issues and key problems affecting efficiency of the system.	Offer solutions to resolve issues and key problems.	An expert who really knows exactly what is going on and how to resolve it.
PM	Staff were sent for training.	Embedded knowledge.	Knowledgeable staff.
Sg	Clear target plan.	Delivered intervention.	Achieved target.
Fc	Sufficient budget.	Completed implementation.	Achieved implementation.

C1 (Barrier Factors)			
Key	**Process**	**Transformation**	**Barriers**
Sg	Company restructuring and changes in management.	Changes in personnel.	Loss of knowledge due to people moving. A waste of effort. Need to train new personnel.
Sg **OI**	Unidentified needs. - Not sure what the company really wants. - Unawareness of the obvious problem.	To set the goal of the company.	Goals and objectives were not set. Not clear with the direction.
PM	Relying on to one person to act as systems expert. The company will be in jeopardy if the person left or falls ill.	To employ more backup staffs.	No contingency or backup plan for key personnel.

C2 (Barrier Factors)			
Key	**Process**	**Transformation**	**Barriers**
Sg	Unidentified issues. The company did not see the obvious problems.	Awareness of the current issues.	No ability to identify the current issues that need to be rectified. Not clear what the company needed.
PM	Absence of middle management to supervise daily operations.	Anticipate absenteeism of a key personnel.	No backup plan for immediate people replacement.
PM	Fire-fighting. No awareness of the available opportunity.	Anticipate new market potential.	No proactive thinking of entering new markets.
Sg	Understand the current issues that need to be resolved.	Engagement with intervention.	Belief that the improved processes will rectify the issues. The believing process that intervention engagement will address the issues and resolve them.

C3 (Barrier Factors)			
Key	**Process**	**Transformation**	**Barriers**
PM	Lack of motivation and courage.	No motivation.	No drivers to push forward.
Sg	Lack of support from top management.	Top management support.	Convincing the top management into believing that intervention could result in beneficial changes to the company.

C4 (Barrier Factors)			
Key	**Process**	**Transformation**	**Barriers**
PM	Lack of involvement from staff.	Obstructive staff.	Resistance to change and no commitment and involvement from staff.

C5 (Barrier Factors)			
Key	**Process**	**Transformation**	**Barriers**
PM	Lack of good rapport with customers. No commitment from customers.	No customer relationship.	No commitment from customers.
PM	Lack of collaboration with suppliers.	Supplier relationship lacking.	Problems with suppliers.

C6 (Barrier Factors)			
Key	**Process**	**Transformation**	**Barriers**
PM	No expert in the field.	Knowledgeable staff	Struggle delivery
	Absence of middle management to supervise daily operations.	Anticipate the absenteeism of a key personnel.	No backup plan for personnel replacement.
	Fire-fighting. No awareness of the available opportunity.	Anticipate new market potential.	No proactive thinking of entering new markets.

C7 (Barrier Factors)			
Key	**Process**	**Transformation**	**Barriers**
PM	No expert in the field.	Knowledgeable staff	Challenges implementation.
Sg	No or delay in decision making.	Important decision.	No decision.
Sg	Difficult and untrusted management.	Clear direction.	Lack of trust; lacking direction.
OI	No empowerment.	New enforcement.	Unsolved issues, no movement, no productivity.
PM	No action upon decision.	Nothing happens.	No improvement or new changes.

3. Factors leading to relapse were analysed; examinging on what were the causes and what had happened that made the company relapsed.

Table 5.9: Relapse Factors.

(Relapse Factors)			
Key	**Process**	**Transformation** **C1, C2, C3, C4, C6, C7**	**Relapse**
	No factors can be identified.	Never relapsed.	Keep moving forward.
Sg **OI**	Management decided to stop the intervention early, before the end.	**C5** Incomplete intervention. Action was half completed.	The entire intervention process could not be achieved. No output can be delivered. No changes can be seen yet. Embedded knowledge could not be applied.

4. Innovation factors; exploring on how did the company innovate.

Table 5.10: Innovation Factors.

C1 (Factors Promoting Innovation)			
Key	**Practice**	**Target**	**New Innovation**
ME	Increased capacity and readiness to undertake new projects.	To increase capacity and capability needed to win large value tender bids.	New large market potential. Accepted large value project in the tender bids. The overseas project market was growing.

C2 (Factors Promoting Innovation)			
Key	**Practice**	**Target**	**New Innovation**
OI **ME**	Improved processes in effect of the implemented new operating procedures.	The implemented projects improved the company process.	Improved process has created new development in new market entry internationally in which 70% of the turnover generated from export oriented. New product introduced onto the market.
OI **PM**	Implemented manufacturing processes.	Smoother daily operation with reduced waste and improved quality.	Become very successful manufacturing company. Created awareness of the manufacturing processes. Developed the "know-how" principal, expert day in day out.
OI	Increased efficiency and improved process.	New opportunity.	New business expansion by opening new plant.

C3 (Factors Promoting Innovation)			
Key	**Practice**	**Target**	**New Innovation**
ME	Innovate to design a new product.	New product design and style.	Clever innovation in new product design. New creativity.
ME	To expand new product to other company.	Product expansion.	Developed new product for other company.
Sg	Exploring new business investment.	New business venture.	New business investment.

C4 (Factors Promoting Innovation)			
Key	**Practise**	**Target**	**New innovation**
OI	Knowledge that enables it to implement action.	Create new invention.	New changes take effect on operational area.
Sg	Become Independent. Managed to move on their own.	Ability of decision making.	The ability to influence on the decision making process.
Sg	Willingness to make new investments.	Improve as best business plan.	New investment for business expansion to other company.
Sg	Exploring new business investment and partnerships.	Plan to venture into new business.	Established best business plan. Built new pharmaceutical partnership. Opening a new sector in nuclear power.

C5 (Factors Promoting Innovation)			
Key	**Practice**	**Target**	**New innovation**
OI	Incomplete implementation (only half way through).	The intervention was less than successful.	Innovation could not be achieved.

C6 (Factors Promoting Innovation)			
Key	**Practice**	**Target**	**New innovation**
OI	Create a new design system.	New design system.	Innovation in new design system and equipments.

C7 (Factors Promoting Innovation)			
Key	**Practice**	**Target**	**New innovation**
Sg	Innovate to diversify project plan.	Implemented new project plan.	Achieved ISO accreditation.

Table 5.7, 5.8, 5.9 and 5.10 summarised the analysis findings throughout the intervention project in each case (C1, C2, C3, C4, C5, C6 and C7). Critical factors that influenced sustainability were identified in four categories as below.

i. Table 5.7. Tipping Point (TP) and Sustainability Factors

In this table, the findings revealed the factors or activities involved that motivated the company to reach the TP and Sustainability level.

ii. Table 5.8. Enablers and Barriers Factors

Cases demonstrated the enabler factors that motivated a company to move forward. The drivers, forces or activities which contributed to the positive growth indicators were identified in this analysis. On the other hand, factors that impeded the company from moving were also identified such as constraints, difficulties or challenges.

iii. Table 5.9. Relapse Factors

This analysis finding showed the factors that prevented the company from growing such as the causes or challenges.

iv. Table 5.10. Innovation Factors

Finally, the finding indicated the factors that promote the firm to innovation state.

The analysis was conducted by applying the "Input, Process, Output" method adapted from SSM (Checkland, 1981, 1990). Each individual case was scrutinized by applying the theme of the similarity in pattern on each of the 6 dimensions (Strategy (Sg), Formal Systems (FS), Operational Improvement (OI), People Management (PM), Obtaining Finance (OF) and Market Entry (ME)) of Bessant's framework wherever it was applicable. Even though there were no accurate measure on how the TP and Sustainability can be determined (Bessant, et al, 2005; Ismail and Poolton, 2011), the analysis was conducted by exploring the factors that encouraged the company to keep progressing.

The example of the findings from analysis can be comprehended as: in Table 5.7 in case C1, theme of "Tipping Point and Sustainability Factors", the applied dimension was "Operational Improvement" (OI). The findings from the analysis which was using the "Input Process Output" indicated that the "Intervention Process" (Input) was identified as "Set targets for implementation of new system". The "Target" (Process) was then transformed to "Implementation", and finally the "Achievement" (Output) of the transformation was "Accurate System, etc.".

In this finding, the input was set to implement the new system and the process was implementation of the new system. The output of the finding was identified as achievement of the implemented new system such as accurate system, time saving, etc.

5.4. The Knowing-Doing Map

In this analysis, the Knowing-doing Map (Figure 5.1. below) is used to assess the state of the company. It is envisaged that intervention could result in high impact to the company. The purpose is to evaluate movement between the stages in the development of the company. Either the company moves forward from initial stage (Stage 1) towards the highest level (Stage 5), or the company moves forward only to relapse back to a lower level.

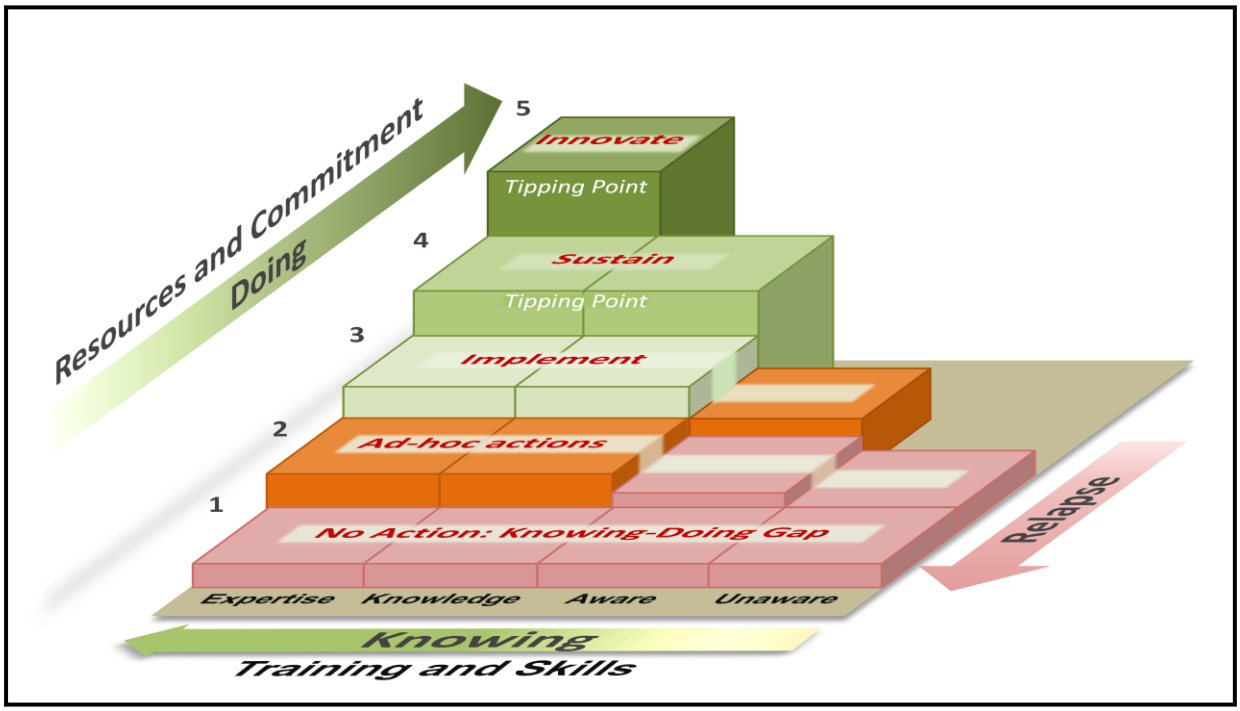


Figure 5.1: The Proposed Model of Knowing-Doing Map

5.5. Movement Process within the Stages

The position of a company within the stages is assessed based on the Knowing-Doing Map tool (Figure 5.1. above). The movement process is defined by the relationship between the "Knowing" dimension (training and skills) against the "Doing" dimension (resources and commitment).

Table 5.11. shows the overall achievement of the implemented intervention assessed using the Knowing-Doing Map and shows the end result which is the highest stage reached.

Table 5.11: Case Study Achievement Levels.

Case Study	Achievement	State	End Result
C1	Success	1,2,3,4,5	Innovate
C2	Success	2,3,4,5	Innovate
C3	Success	2,3,4,5	Innovate
C4	Success	2,3,4,5	Innovate
C5	Less Success	2,3	Relapse
C6	Success	2,3,4,5	Innovate
C7	Success	2,3,4	Sustain

During the process of implementation, three stages were categorised as pre intervention (state 1), mid intervention (states 2 and 3) and post intervention (states 4 and 5) of the Knowing-Doing Map. Pre intervention is the stage before the implementation takes place. It concerns with the identification of the needs and requirements, and planning on how to carry out the implementation. The mid intervention stage is where the implementation takes place. This is the core process that

makes the changes happen. At this point the transformation process of learning and transferring new knowledge becomes viable. The final stage is post intervention in which knowledge is applied and utilised. At this stage, the impact of the intervention becomes apparent. The changes will either have a positive impact that moves the company forward or a negative impact whether it stagnant or relapses.

From the analysis, the finding shows that in six out of seven cases (C1, C2, C3, C4, C6 and C7) the intervention revealed a significant impact which totally transformed the company. Only in one case (C5) was the intervention less successful. The only minor difference of those experiencing success was that the first case (C1) started with lack of knowledge and little awareness, whilst the other five cases (C2, C3, C4, C6 and C7) started from varying levels of knowledge awareness. These companies were motivated to seek for the external help due to that they realised that they required new knowledge for improvement.

C1 moved from State 1, whereas the other six cases moved from States 2, 3, 4 and 5. C1 moved from low to the top level of the stage which in "Knowing" (training and skills) dimension was from unaware, aware, knowledge and expertise. In terms of the "Doing" (resource and commitment) dimension, C1 started from no action, ad-hoc, implement, sustain and innovate. The other five cases (C2, C3, C4, C6 and C7) started with awareness of knowledge but unsure with what to do next and how to begin. They moved from aware, knowledge and expertise integrated with no action, ad-hoc, implement, sustain and finally innovate. Finally C5 moved from State 2 and 3, but then relapsed due to an incomplete implementation.

The cases revealed that the needs for external help were critical which can be seen from the very interesting quotes of the interviewees who were confident that knowledge will add value to transform into new changes.

"*... I don't know everything, no background in engineering knowledge. It is sensible to have someone who has the knowledge to be brought into the company aiming to have sensible engineering expertise and backgrounds ...*"

Another quote that demonstrated the company needed intervention is shown below.

"... there were too many deciphers, could not get data, data were not available, quotation process was very slow, tender bid difficult to process, there was system but not used properly....."

These quotes provide clear evidence that the firms realised they required new knowledge that was lacking in the company. In fact, they had a very strong belief that knowledge implementation through intervention could deliver improvement, as proven by the successful cases.

The next stage in the analysis is to investigate similarities between the companies. To do this use is made of Soft System Methodology method (Checkland, 1981, 1990). The analysis considers three main elements; input, process and output.

Table 5.12: Input, Process and Output Analysis.

Stage and Action
Dimension (Sg, FS, OI, PM, OF, ME)
Input
Process (similar pattern)
Case 1 C1
Case 2 C2
Case 3 C3
Case 4 C4
Case 5 C5
Case 6 C6
Case 7 C7
Output

Table 5.12 shows how the findings of the analysis for the similarity pattern between cases are presented; Input, process and output analysis. The "Input" represents the similarity pattern of activities involved or existed in the case. "Process" corresponds to how or what are the findings of the similarity pattern is developed across the cases. Finally, the "Output" developed the outcome of the findings of the similarity pattern across cases.

Table 5.13. shows the similarities pattern of activities emerging from the case studies.

Table 5.13: Similarity Pattern of the Case Studies in The Knowing-Doing Map

State 1- Unaware, Aware, Knowledge vs. No Action
Sg, OI, FS Ability to identify a problem and rectify it. C1 – Not clear of the existed current problem, no goals or objectives. C2 – Did not see the obvious problem. C3 – Was not working in the right way, no decision (dependent on the managing director). C4 – No drive to push forward, no support to improve current problems. C5 – Did not believe that intervention could solve issues. C6 – Fire fighting attitude meant that problems were neglected. C7 – Very unsupportive director that made problems difficult to spo.t Were not aware of the current issues and existing problems
Sg, OI Nature of intervention C1 – Normal operational process, ERP system. C2 – Normal processing procedure in engineering and manufacturing processes. C3 – Normal processing procedure, manufacturing processes. C4 – ERP system, manufacturing process of visual management systems. C5 – Operational processing procedures of visual management systems. C6 – Normal processing procedure in the manufacturing area. C7 - Normal operation process of complex design process. Normal operational process

State 2 – Knowledge, Expertise vs. Ad-hoc Action
OI, PM Acquire new knowledge, training C1 – Lean manufacturing. C2 – NVQ, Health & safety program training. C3 – Shop floor processing training. C4 – ERP and lean and agile manufacturing training. C5 – Lean and agile manufacturing training. C6 – Lean and agile manufacturing practices. C7 - Lean manufacturing principles. Delivered the required training based on its needs and suitability.

State 3- Knowledge, Expertise vs. Implement
Sg, OI, FS Setting target and achievement. C1 – Set a target, aimed to achieve it, worked it out, targets achieved, further improvement. C2 – Set a new target, aimed to achieve it, worked as planned, target achieved 300%, further improvement. C3 – Set a target, aimed to achieve it, target achieved. C4 – Set a target, worked out as planned, target achieved. C5 – Set a target, could not achieve it due to incomplete implementation. C6 – Set target, aimed to achieve it, target achieved. C7 - Set target, worked out as planned, target achieved. Set target, aimed to achieve and delivered.

Sg

Project planning, adhere to plan for the entire implementation period of 2 years.

C1 – Adhered to the entire plan from beginning to end.

C2 – Adhered to plan and never deviated from the original plan.

C3 – Followed the overall plan.

C4 – Managed to follow the entire plan, well-planned project.

C5 – Abandoned the plan, stopped half way.

C6 – Clear project plan, adhered to plan, worked it out to end.

C7 – Followed the project plan.

Adhere to the entire plan throughout the project.

PM

Commitment role from the team involved.

C1 – Full commitment from everyone involved.

C2 – Very committed from each role player.

C3 – Committed to change and did so from the team involved.

C4 – Very committed and very loyal workforce.

C5 – Good commitment from the project team.

C6 – Good commitment from the team involved.

C7 – Full commitment from the project manager and team involved.

Received a full commitment from everyone involved to deliver the project.

Sg, PM

A group of people who play an important role to make an intervention succeed.

C1 – Manager (very committed and driven).

C2 – Two managers (marketing and technical) who own the company as partnership.

C3 – Two managers; production and design were driving the intervention project.

C4 – The managing director.

C5 – The managing director who owns the company.

C6 – The CEO or the company owner.

C7 - The managing director who owns the company.

People who have control of the business and can make a decision (usually the owner or top level management who have power).

OI

Successful implementation leads to time reduction and costs saving.

Target achieved. Reduced lead or processing time.

C1 – Reduced processing time from 8 weeks to 1 week. Delivery time cut from 2 weeks to 1 day.

C2 – Reduced waste, reduced costs of production.

C3 – Reduced lead time from 9 months to 4 months.

C4 – Improvement in lead time.

C5 – Reduced lead time, reduced costs.

C6 – Reduced lead time, reduced costs for machinery, reduced waste.

C7 - Reduced lead time and cost savings.

The output arising from successful implementation is time reduction including reduced lead time and faster delivery, reduced waste and reduced costs.

State 4 – Knowledge, Expertise vs. Sustain

PM

Changed attitudes and the way of thinking.

C1 – Accepted change, understand lean thinking, accepted new IT systems.

C2 – Accepted new changes, changed in attitude, started to "think differently".

C3 – Accepted new changes, applied new practices.

C4 – Accepted new changes, eliminated fire fighting process.

C5 – Changes could not be defined, incomplete implementation.

C6 – Accepted new changes, applied new processes.

C7 - Accepted changes, changed the way of thinking to a different culture.

Accepted new changes, take changes as a new paradigm.

OI

Achieved new improvement and what happened subsequently.

C1 – New improvement to IT systems. New systems more accurate.

C2 – Improvement in productivity (quality and delivery).

C3 – Continuous improvement in quality.

C4 – Improvement in lead time and better utilisation of resources.

C5 – Improvement in production performance, more efficient, faster.

C6 – Continuous improvement in operational processes.

C7 – Improvement in quality and production site.

Improvement of the target area has increased performance.

OI, FS

Continuous application (consistency in knowledge exploitation, and dissemination).

C1 – Daily use of the new IT systems.

C2 – Continuous application in daily practice.

C3 – Consistency in application and dissemination of new knowledge.

C4 – High absorption of knowledge enables it to implement actions.

C5 – Application could not be achieved.

C6 – Continue application of knowledge absorption

C7 – Developed a new culture of continuous improvement of the impact of knowledge absorption in the shopfloor, however, lack of continuous application in the propjects side of the business.

Continuous application of the new knowledge in daily practice.

OI

New changes in running daily operations or normal processing procedures.

C1 – Running new changes in the daily operation process.

C2 – Applying new changes in running the daily operation process.

C3 – Practising new changes in running the latest technology in daily processes.

C4 – New changes in running the daily operation with effective new systems.

C5 – The changes could not be implemented.

C6 – Changes in new design systems.

C7 – New changes in running daily operation by emphasising quality.

Applying new changes on improvement in daily operation make things work.

OI, FS

Embedding useful knowledge leads to improvement in the manufacturing process.

C1 – Significantly improved systems.

C2 – Improved operational process.

C3 – Improvement in quality.

C4 – Effectively improved systems.

C5 – Could not achieve the target as there was no embedded knowledge.

C6 – Improvement in efficiency and simplicity of the process.

C7 – Improved quality, accredited ISO9001

Processes were improved significantly and effectively.

PM, OI

The "know-how" ability, better understanding skills,

C1 – Better understanding of how to use new systems; more efficient and accurate; better way of managing stocks; shop floor run better.

C2 – Better understanding of the correct way to run processes.

C3 – Better understanding of the way things were previously run.

C4 – High absorption of knowledge enables to implement action.

C5 – Better understanding in utilising resources.

C6 – Skills and knowledgeable in development of new equipments and design.

C7 – Better understanding of project diversification.

When staff understand how processes run they will become easier to manage and utilise.

OI

Evidence that the tipping point for intervention has been reached.

C1 – Feedback for improvement was above average showed indication of growth path.

C2 – Internal champion to embed knowledge in getting the operational process right.

C3 – Ability to build products for other people.

C4 – Became independent and managed to move on their own.

C5 – Could not be reached due to incomplete implementation.

C6 – Developed new equipments and design.

C7 – Tipping point not fully achieved across the company but in pockets.

When the tipping point occurs, it encourages the company to go the extra mile to create new possibilities.

State 5 – Expertise vs. Innovate
Sg Innovation and expanding the business. C1 – New business investment. C2 – New business expansion. C3 – New business investment. C4 – New investment in another company. C5 – Target not achieved. C6 – New business opportunity to non-UK market. C7 – Introduction of several new products. Open to new investment opportunity either to the existing company or other company.
OF Ability to secure new funding. C1 – Managed to secure funding by winning large project value bids. C2 – Managed to get new funding on three separate occasions. C3 – Internal funds were used. C4 – Managed to get new funding in the form of grants. C5 – Could not be ascertained (incomplete implementation). C6 – Secured funding from the external body. C7 - Could not be ascertained as data not available.

Once the company becomes established, it has the opportunity to secure new funding.

ME

Opportunities to explore something new.

C1 – Creative innovation, new project value.

C2 – Opened new plant, developed a new overseas market.

C3 – Produced a new product design.

C4 – New customers.

C5 – Target not yet achieved.

C6 – Produced a new system design.

C7 – New innovation awarded ISO9001 accreditation.

Created new innovation and new beyond opportunities.

Sg, PM

Drive and motivation.

C1 – Strong driving power.

C2 – Distinct "spirit".

C3 – Strong believes.

C4 – Confidence in the process of delivery and output.

C5 – No confidence.

C6 – Strong confidence in the implementation process.

C7 – Believed the intervention could be achieved.

Possessed very strong belief that intervention could succeed.

5.5.1. State 1: Unaware, Aware, Knowledge, Expertise vs. No Action

At this stage, the ability of knowing exactly what the current problem is and the need for knowledge are very important. As this is the starting point of the project where an ability to spot problems is crucial. From this point onwards the problem can be rectified. However, it was not always the case that it was possible to react to it. For instance, C1 was not sure on how to deal with their problem. It had no goals and no objective. C2 was facing a similar situation in which it could not see the obvious problem. C3 was not working in effectively. Decision making depended on the managing director. If no decision was made no action could be taken. C4 had no drive to push forward as there was often little support from top management to improve. C5 did not believe that intervention could solve the issues that they were facing. In C6, the fire fighting situation superseded causing other issues to be neglected. Finally for C7 the scenario was a very unsupportive director that made problems difficult to spot.

From the analysis, the cases demonstrate that most of the companies were not aware of the problems they were facing. This occurred because they had no ability to spot the problems or were not able to see what was going on in front of them. Evidence showed in one case example as such quote; "*the main problem was that they could not see the obvious problem in front of them*". It meant that they were not aware of current issues. Besides, there were no clear objectives or goals and drive to push forward, as quoted by one of the cases; "*..... there was no goal, no direction, everything was unclear, we were not sure with what we do....* ". Having not had exposure to external support they did not understand that they were actually having problems. However, when it was suggested that external providers could help "troubleshoot" support, things started to change. Most of them were passionate to undertake the challenge. By working closely with a

provider of external support, each company saw intervention as an improvement process that could bring good value in assisting them solve their problems and become more successful.

For most cases, intervention was targeted at processing procedures as it was here that most improvement was needed. C1 and C4 were specialising the ERP system in the implementation of improving their operational process. Hence, by adapting Bessant's (2005) model, it indicated that operational improvement is the key focus with a minor blend of formal systems. Formal systems are an important element as it produces information accuracy to the processes. Thus, it supports literature (Gurbaxani and Whang, 1991; Rockart, 1982; Roth, 1991) that these two dimensions i.e. operational improvement and formal systems are interrelated and support processes in their important role which determines the success of the company.

5.5.2. State 2: Knowledge, Expertise vs. Ad-hoc Actions

At this stage it is assumed that the employee has the ability to spot problems that need to be rectified. As such, the need for intervention to acquire knowledge becomes apparent. The process will involve with provides training to employee which is believed that the knowledge will then be absorbed to develops skills and become experts.

From the analysis, the implementation had delivered the required training to all the cases based on its need. Therefore, each case can be said to have absorbed the new knowledge that they needed. The training delivered was tailored to the needs of each case based on their requirements.

At this point, the cases showed no evidence of ad-hoc action as each of them adhered to the implementation plan. Therefore no ad-hoc action was available at this time.

5.5.3. State 3: Knowledge, Expertise vs. Implement

The implementation process is at the core of the intervention as it often determines the success or failure of the overall project.

Activities that can be identified at this stage are as follows:

- Set target, aim to achieve it, see if it works out as planned, check if target achieved.
- Well-planned implementation, monitored and supervised.
- Adhere to the plan, make an effort not to deviate from the original plan.
- Undivided commitment from the team or individual(s) involved.
- Achieved new improvement.
- Time savings (e.g. reduction in lead time).
- Cost savings (e.g. reduction in excessive inventory, reduction of waste).

In terms of the framework, obtaining financing dimension was less used. The other five dimensions comprising strategy, system formalisation, operational improvement, people management, and market entry were highly used in most processes and activities.

All of the cases delivered the same pattern in setting their targets. Each case managed to set their own target, aimed to achieve it, check if it worked out as planned, and finally achieved it. These were set by the fact that KTP projects required a very detailed level of project planning. The output resulted in improvement particularly on the operational processing side. For instance case C2 target was achieved at 300% as stated in the company's report which was an evidence of a massive impact.

From the perspective of strategy, it is worthwhile to take time developing the project plan and then adhere to it consistently. This will allow changes to be made from the beginning and will reduce wasted effort. All of the cases demonstrated a similar pattern which was to adhere to the entire plan throughout implementation. However, C5 abandoned its plan only half way through.

The cases proved very strong evidences that trailing the entire plan is an important factor to make a success implementation. Otherwise, abandoning the project plan as showed in case C5 made the implementation incomplete or maybe relapse.

Looking from the perspective of people management, the commitment of everyone involved in delivering a project plays a crucial role. The six cases (C1, C2, C3, C4, C6 and C7) demonstrated that they received full commitment from each of the parties involved. C5 on the other hand demonstrated lack of commitment from the project team.

Another aspect of strategy and people management concerns the role of those having influence on the decision over identifying the need for an intervention and acting on it. If the decision is made by someone who has control of the business and can make the decision; usually the owner or top level management; then the likelihood of a successful implementation rises. For instance, in C2 the top level management was

committed to monitoring the project closely; to ensure that it was implemented as planned. Similarly, in the same case, the Associate KTP was very committed to deliver the knowledge transfer throughout the implementation. Cases showed that the highest position level of the company; such as owner or decision maker established a strong relationship to the success of the intervention.

The key focus of intervention area which was an operational improvement proved assuring good results. It can be seen from the cases that the output of the successful implementation contributed to a huge time reduction and cost saving. It can be seen that when the target is achieved, new changes and improvements prevailed.

5.5.4. State 4: Knowledge, Expertise vs. Sustain

One of the major elements of the implementation was training delivered to staff. This is a significant way of conveying embedded knowledge. The main objective was to invest in people and to provide training to become experts; as theory suggests (Clarke et al, 2006; Smith, 2001; Szulanski, 2000; Zack, 1999) that embedded knowledge with practical hands on often leads to process improvement.

The assumption is that once the useful knowledge is absorbed, it helps to improve the process. The continuous application of knowledge; and its exploitation and dissemination stimulate changes to operational procedures. Only then, will new improvement be achieved. The “know-how” with “understanding better” skills encourages people to run things better. In this sense, it encourages companies to become flexible, with a readiness to explore new possibilities and move to the next level.

It is believed that if the company has reached the tipping point (Bessant et al, 2005; Ismail, 2011); it is unlikely that they will relapse as they have already become "established". This can be seen from the means of changing their way of thinking and attitude into a new paradigm as demonstrated in C1 based on quote "*.... surprisingly this project has changed the way people think....*". Staff started to apply the new changes so that they have become part and parcel of daily routine. Thus the new operation processes can be said as established as knowledge was consistently applied and disseminated. Ultimately, the company has become established.

The analysis explored human behaviour changing attitudes and the way of thinking is difficult as human nature often is resistance to change. C1, C2, C3, C4, C6 and C7 had already accepted the new changes embedded in the implementation; had already incorporated them into a new paradigm of working and had started to think differently as quoted by one of the cases; *".... before the project, there was fire-fighting, people were blaming each other.... surprisingly this project has changed the way people think... they started to think differently.... ".*

As people started to embrace change and run things differently in their daily practice, better results became apparent. For instance, the new way of thinking motivated them to improve in their daily operational process based on the new implemented changes as showed by the seven cases.

The main purpose of training is to invest in people to become experts. The seven cases showed the same pattern that the delivered training created expertise; built knowledge along with new in-house skills in the area.

Once staff become experts, things become easier to run. The "know-how" ability comes with better understanding skills empowered staff to run operational and

processing procedures efficiently. This was clearly demonstrated from the cases when they performed better upon the high absorption of knowledge after intervention was implemented.

Upon the delivered training, the embedded useful knowledge led to process improvement. It was true, when analysis revealed the operational processes were run significantly and effectively way better than before. C1 and C4 significantly improved their system performance effectively. C3 improved in quality which achieved its main target. C4, C6 and C7 achieved improvement in their distinctive way. C5 could not be achieved as there was no embedded knowledge could be seen.

Cases showed that when performance was improved changes then emerged. The way they run daily operation was different. Normal processing procedures became better. Only then issues can be resolved. These were revealed in those six cases, when they tipped and sustained. Key is also the ability to deal with unexpected events as a better understanding enabled the staff to think of new ideas to solve problem.

Whilst C3 and C4 were practising new changes in running the latest technology in daily processes with effective new systems, C1 and C2 were running new changes in their daily operation process. C6 were running daily changes by implementing new system design, whereas C7 was exploring and applying the new procedures for quality accreditation. However, in C5 the changes could not be implemented. The cases demonstrated that when they were applying new changes of improvement in daily operation, it formulated things to work.

Another important factor for operational improvement is continuous application of the new absorbed knowledge in daily practice. The consistency in knowledge exploitation and dissemination enables frequent implemention. C1 continuously used

the new IT systems daily effectively. C2 performed continuous knowledge application in daily operation. C3 showed consistency in application and disseminate new knowledge daily. C4 used high absorption of knowledge daily enabled them to implement actions. On the other hand, in C5 application could not be achieved as the absorption of knowledge was incomplete.

When new improvement is achieved, the question remains to what will happen next. This is a kind of question that ponders around during the analysis. Continuous application of change results in new achievement in performance. Once target area is improved, it increases performance. That was what happening in the cases. Improvement in target area has increased operational performance. C1 achieved new improvement on IT systems which in return the performance is increased to be more accurate. C2 attained improvement in productivity that increased the quality and delivery performance. C3 performed continuous improvement that increased the quality performance. C4 achieved improvement in lead time therefore performed better utilisation of resources. C6 made achievement by implementing the new system design process. And C7 achieved quality accreditation. C5 made improvement in production performance, efficiency and time even though they achieved only partial implementation. The cases proved that achievement in new improvement led in increased performance in other areas as well. Thus, the improvement in Formal System (FS) demonstrated by the cases showed evidence as suggested in the literature (Gurbaxani and Whang, 1991; Rockart, 1982) that this dimension is a core function to produce quick solutions to problems.

When the core processes were established, evidence shows that the tipping point was occurring and became sustained. The question remains on how did that happened.

From the analysis, the findings showed that the results after the implementation were significant and were unlikely that the companies will revert to the initial state. Results showed that the companies were moving ahead way better than before, *as demonstrated by this quote; ".... after the project data were available, easy to retrieve and quotation for tender process can be finished in a day..... "*. For instance, C1 received high-quality feedback for improvement which is above average as reported by the company, a positive indication of growth path in which TP and sustainability can be said as occurred (Bessant et al, 2005; Ismail, 2011). C2 exhibited extraordinary involvement of internal champion to embed knowledge in getting the operation process right. C3 developed the ability to build products for other people. C4 became independent and managed to move on its own. However, C5 could not be reached since the implementation was incomplete. C6 and C7 did unexpected new achievement when C6 succeeded to build a new design of their complexity process and C7 managed to achieve new ISO accreditation. Cases demonstrated when sustainability happened it encouraged the company to go extra mile to create new possibilities. Evidence shows as quoted; *".... we were always running away from our customers, we avoided from meeting new customers, because we did not have the capacity to fulfil their demands, but after the project, not only we have new customers, we also attracted customers from other suppliers... we have never expected that.."*. This evidence strongly supports the literature suggested by Anderson, et al, (1994) that customer retention will reduce since their demand cannot be fulfilled due to low of capacity.

5.5.5. State 5: Expertise vs. Innovate

This stage is a very constructive movement to the next level throughout the whole process. At this point, it is envisaged that the company is successful in breaking through the sustainability phase as an impact of the intervention. Therefore it creates new innovation and openness to something new which is more challenging. The company becomes independent and more flexible in terms of exploring new opportunity. Flexible criteria such as readiness to accept new possibilities, openness to explore something new will stimulate the company to expand their business and innovate. Similarly, the company may create new ventures or new investment either to the existing companies, other companies or leading to a new business partnership.

Considering the strategy and market entry dimension, four cases (C1, C2, C3, and C4) proved to be innovative in expanding their businesses beyond opportunity. C1 and C3 managed to place a new business investment, C2 invested in new business expansion and C4 and C6 made a new investment with another company. C1 developed creative innovation by engaging with a new and larger value of tender bids. C2 opened a new plant and entered overseas market. C3 created a new product design whereas C4 engaged with new customers. For C5, the innovation could not be observed.

From the ability of obtaining finance, C1 managed to secure new funding by securing a new, big value project in a new untapped market as shown by this quote; *"... amazingly, after the project when everything is in a right order, we won a big tender which was impossible before.... ".*C2 managed to secure new funding three times. C3, C4 and C6 managed to get new funding as well to expand their business. It proves that when the cases showed improvements in certain dimension, other dimensions follow

such as access to finance in this case, which can be seen from this quote "..... the best thing is, when we finished the project, we managed to get funding three times.... ".

Viewing from dimension of strategy and people management, one of the strongest elements that made the intervention a success was high motivation and aspiration. The ability to possess very strong beliefs and high aspiration encouraged the team involved to keep progressing. It was true that most of the cases possessed a very strong belief and high aspiration which drove the successful intervention. For instance, C1 demonstrated very strong driving power from the top management who made wise decision subsequently took action. This kind of motivation kept the intervention progressing healthily and moving ahead. Whereas C2 possessed a very distinct "spirit" after the implementation was completed. A very interesting quote from the director of the case;

> "*... even though the project has finished, and the people have gone, the spirit of the project is still alive, that kept us moving....*".

In this sense, it is believed that the intervention strength derived from the completed project motivated the company to continue moving forward. C3 strongly believed that intervention could change the company into something new and in return will add new values to them. C4 has a very strong confidence in the process of delivery and output. In contrast, C5 has no confidence in intervention and believed it would not bring any good to the company. However, this argument could not be seen as they decided to finish early. From these cases, it can be said that strong evidence to support literature suggested by Caira et al, (2009) that successful intervention offers new value to the company for improvement is seen.

From the analysis, it can be summarised that the stage processes that can be derived from the findings is showed in Figure 5.2. below, of the first level and illustrated further in Figure 5.3.

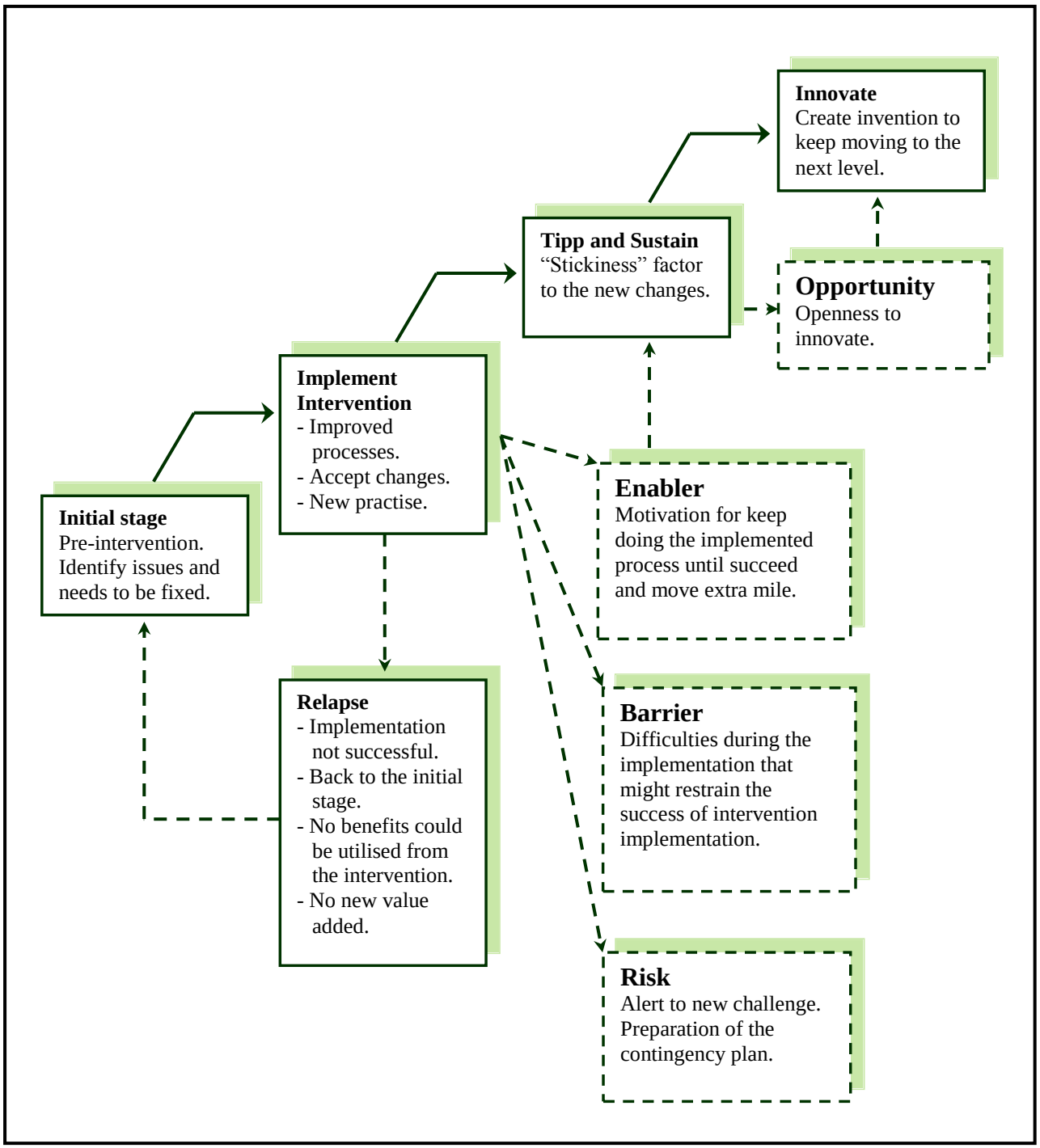


Figure 5.2: Level 1 the finding results of the stage processes derived from the intervention implementation

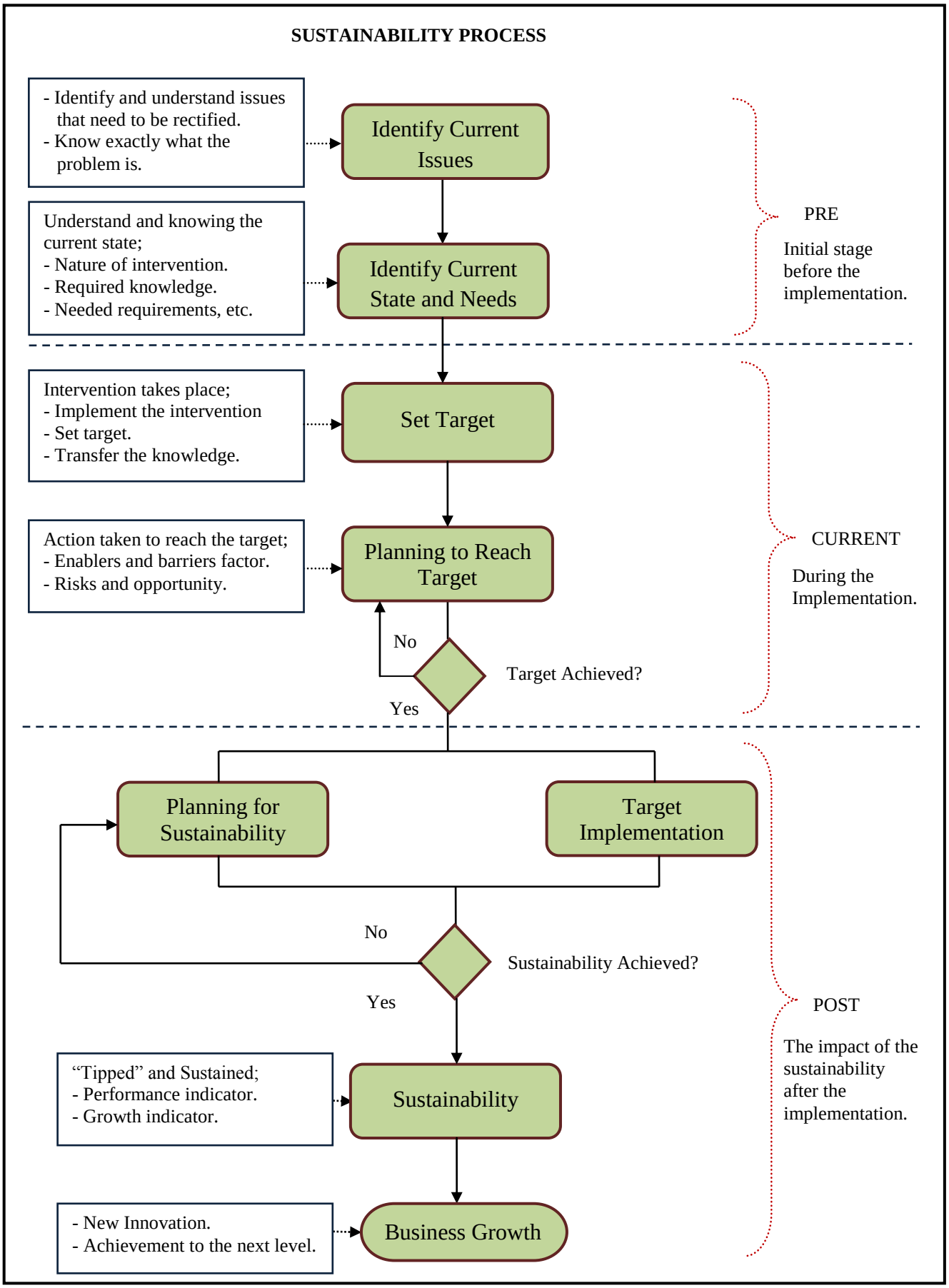


Figure 5.3: Level 2 the finding results of the sustainability process

5.6. Summary

In summary, this chapter discussed the conducted in-depth analysis. The investigation explored variety of unexpected findings. However, the outcomes of seven cases revealed evidence of an assuring result. The analysis exhibited factors that influenced the movement process of the intervention stages. The findings illustrated that the framework development from the literature has shown the fact of the empirical works that the integration of the three conceptual theories; Absorptive Capacity (Cohen and Levinthal, 1990; Zahra & George 2002; Lane et al, 2006; Todorova and Durisin's 2007), Knowing-doing Gap (Pfeifer, 2000) and Tipping Point (Gladwell, 2000) combined with Bessant's (2005) framework adaptation led to the high impact of sustainability which positively ended in an innovation.

Evidence shows that there is a relationship built between theory and empirical work in which it proposed to shape the development framework for the guidance of SMEs in awareness of achieving sustainability in intervention. Therefore, well planned implementation outlines the movement stages from initial without knowledge towards the highest level to innovate.

Chapter 6

DISCUSSION

A person who never made a mistake never tried anything new.
(Albert Einstein)

CHAPTER 6 DISCUSSION

6.1. Introduction

Having discussed literature on the subject (Chapter 2), methodology was discussed (Chapter 3) and followed by a presentation and analyses of the case studies (Chapter 4&5), this chapter considers the design of the framework, and presents a discussion of the research findings. From the views extracted from the literature and case studies, there are lessons that can be learned that can benefit SMEs when implementing intervention.

The empirical work presented in the case studies has provided an insight of the impact on sustainability from intervention. The investigation revealed the entire transformation process involved during implementation. The influencing factors underpinning sustainability - enablers and barriers - are discussed. Others important matters that need to be considered in implementing the intervention are also investigated.

6.2. The Knowing-Doing Map

In applying the knowing-doing map (Figure 5.1. of chapter 5), a comparison was made between a proposed state of evolution and the case study whether the company matched it. The analysis provided a logical explanation of why the case studies found themselves in the positions they did.

6.2.1.

Stage 1- Unaware, Aware, Knowledge, Expertise vs. No Action

This is the initial stage where perhaps they were not aware of the problems and how to solve them, and which is believed more to be a management related problem. They do have, however, insight on how to do or what to do, but were in no position to take any action. The case studies showed that many of them had inadequate resources to move forward. The cases revealed that they were often aware of current issues and even if they knew of them were in no position to take any action to solve them. Even so, if they were equipped with sufficient resources and were aware of them, they were still powerless to take any action as that power only comes from top management who are often resistant to change.

The case studies showed that many felt helpless and had little knowledge. Even so, they were aware that they needed external support. The fact that they were aware of "missing knowledge" made no difference as they could not restore the "missing element" for improvement in order to run the businesses better.

The concern is how the knowledge required can be identified and if they were not having enough knowledge, it is questioned if they have enough capability to obtain it. The case studies showed they did not know what kind of knowledge they required in relation to current issues. Worst still was that some of them did not even know how to spot current problems. Even when the issues became critical they were not aware that they needed to be resolved urgently. Sadly, even if they were alert to the issues that needed to be solved, there was no expertise internally or externally that could be called

into action. Simply put, they were aware of the issues and the fact that they needed to find a way to solve them. However, they had no power to resolve them.

6.2.2. Stage 2 – Knowledge, Expertise vs. Ad-hoc Action

This stage is a progress in the first instance. Staff were known to be knowledgeable. It was certain they knew how to deal with the issues. However, restrictions prevented them from using the newly acquired knowledge. Even if they knew what to do, they seemed loathe taking action. There was a lack of planning, had a shortage of resources and a lack of desire to implement any action. Besides, and similar to the previous situation, they had no clear goals and direction, and lacked the support of top management. Therefore the chance for them to move ahead was almost unachievable.

From the case studies it was clear at this point that staff understood the issues that needed to be rectified. This was a better state of affairs than at the previous stage. Better still, their ability to rectify and spot problems made them realise that they needed to implement new knowledge if they were to improve. The time frame from stage 1 to stage 2 was estimated at between four to six months. Analysis shows that the required knowledge that was suitable for the task was successfully delivered. The staff were well motivated to attend training schemes that provided them with new knowledge. However, it ended there as they did not then put that knowledge into practice. Thus the knowledge was only absorbed. It was not fully utilised for unknown reasons often beyond their control. As a result, no improvement or progress could be seen as developing yet.

6.2.3. Stage 3- Knowledge, Expertise vs. Implement

As assumed, at this stage the company has moved ahead with embedded knowledge and expertise upon successful implementation. However, even though they equipped themselves with the required knowledge and became knowledgeable, there was still a tendency for them to relapse at the first sign of any new problem. As such, it is fair to say that a "tipping point" was not triggered yet. Simultaneously "sustainability" has not yet occurred at this point. Clearly, they still need support.

The cases studies revealed that during implementation, knowledge was disseminated and then practically applied. The key motivating force was found to be the director or owner of the company who generally formulated the operation strategy. This strategy involved development of the action plan setting of targets and designing it needed monitoring systems. In most cases the manager or technical supervisor monitored the progress to ensure they reached the targets set. The important point that made implementation successful was full commitment from the team involved in the project. The team comprised the director or owner, manager and operational staff. It was their commitment that led them to achieve resulted from the effective intervention. The improvement in operational efficiency can be seen from the reductions in waste, reduced lead or delivery time and increased turnover.

6.2.4. Stage 4 – Knowledge, Expertise vs. Sustainability

Tipping point level and sustainability is triggered. It is not only that the company has the knowledge and created expertise, rather it has become sustainable, responsive to new opportunities and challenges. It is the starting point where the company benefits positively from intervention. Unlike the previous stage where the company was still vulnerable, at this level the company is predicted to be more responsive to new opportunities and new challenges.

The analysis revealed far better than the expected results. Major issues were solved. Changes to business processes were developed and improvements established. Operations became more effective and more flexible. The changes improved company performance and finally created value that generated new growth. Overall, successful implementation has transformed company performance and capability. It increased their capability to run larger capacity and bigger operations.

The focus, however, concerns the question of how the company can sustain this. The company has invested in people and training with the belief it can create expertise out of it. The exploitation and daily use of knowledge creates "know-how" ability and better understanding skills. As a result they learn how to run things better and this leads to process improvement. Therefore changes will frequently emerge in the running of daily operations and normal processing procedures. The core point is the consistent continuous application and dissemination of knowledge in daily practice. This can be seen from the evidence of them showing constant progress to move forward. The case studies demonstrated that none of them had reverted to the initial stage. In fact, the power of knowledge had driven them to become more flexible. They were also

attempting to explore future potential – something that was impossible before. This exploration led many to think about innovation in a more proactive way than before.

6.2.5. Stage 5 – Expertise vs. Innovate

As expected, at this stage the company is assumed to innovate common practice by using new ideas and innovation. The challenge is to share a common vision for the future. At this level, it can be said that the company has become intelligent and courageous enough to consider and then undertake new opportunities. The new way of thinking will allow them to take advantage of these opportunities which will benefit them in the long run.

The cases demonstrated that some of the companies became independent as predicted. Staff became very confident, possessed with strong beliefs and high level of aspiration. It provided them with the driving power to progress further. With these characteristics, staff were empowered to explore ideas that were unfeasible before. Evidence shows undertaken business expansion occurred, new business ventures and partnerships were undertaken, new investment made, and entry into new overseas markets achieved. The findings indicated that once a company became established and sustained, anything is possible.

6.3. Impact on the 6 Dimensions of Bessant

Bessant et al, (2005) suggest that using their framework may help to identify the immediate needs of a company particularly in identifying the emerging key issues.

Also, an adaptation of this framework is perceived to be useful in exploring the identified target dimension in finding solutions for improving performance ultimately to increase capacity.

The six dimensions applied to the cases showed that the highest impact was on Operational Improvement (OI) and Formal Systems (FS), as the main focus of the investigation was targeted on these two as critical to business sustainability. The other four dimensions were also showing significant results as an impact on the sustainability of their businesses. Cases (C1, C2, C3, C4, C6 and C7) demonstrated that the application of this framework resulted in improving performance to the targeted dimension.

However, in applying this framework, this raises a fundamental question on how can a company's level of ACAP, KDG and TP be measured upon the implementation of the intervention. As such, it is viewed that the framework highlights a further potential weakness; although it may help identify the immediate needs of a company, it does not specify the assistance that may be appropriate to help a company pass a particular tipping point. Therefore in resolving this conundrum, the consideration is focused on the growth indication as long as the company is growing as suggested by Bessant et al, (2005); Ismail, (2011). From the cases, it is difficult to reject that the changes had not occurred, as most of the cases has totally transformed. Therefore, even though there is no accurate measure on the ACAP, KDG and TP cases a demonstrated improvement after the intervention project completed is seen. Thus, it is fair to accept that ACAP, KDG and TP were occurring.

From the perspective of OI which is the main target dimension, the focus was on the understanding of process capabilities and best practice (Bessant et al, (2005). In such a

case, the processing improvements of the OI needed to be carried out which was identified as the core attention in order to achieve sustainability. Cases (C1, C2, C3, C4, C6 and C7) revealed that this core dimension was improved in which best practice was applied. The improved performance resulted in more efficient and accurate processing procedures. Subsequently, the operation became better and the task became easier to manage. The new changes of lean concept applied on the operation resulted in cost saving on the delivery and lead time. Consequently it increased the turnover.

Thus, the concept of mass production for mass market (Davis, 1987) is applied as the efficiency and capabilities is increased which then enables the company to increase their production or services. As Anderson, et al, 1994 pointed out, customers will switch to different suppliers due to unfulfilled demand and this is prevented in this case. Besides, cases (C2 and C4) demonstrated that they attracted new customers as a consequence of the increase in capacity. As a whole, the increase in turnover indicated a positive signal of growth (Bessant et al, 2005; Ismail, 2011). An example is C2 as stated in the company's report; the productivity was increased by 40% in the first year, with no additional human or other resources and the turnover was increased by 70% in the second year of the project. It is evidence as Roth (1991) suggests in the literature that operation plays as a strategic role in determining the success of the company is applied.

Formal systems subsequently became important as the latest technology cannot be neglected in order to improve performance. Conway et al, 1988 argued that running an operation is an enigma in which things can go wrong at any time. To prevent this, it is viewed that linking the operation and the critical role of systems together is a wise decision in producing best practice for both OI and FS. Rockart, (1982) suggests that

systems conceptualised the changing in job role. Thus, as a precaution, the formal systems needed to work correctly and efficiently to ensure it consistency whilst reducing risks from things going wrong in the operation.

Thus, the accessibility of current information is crucial in systems, as proven by C1, after the implementation of new ERP systems, data were easily and quickly accessible that enables the quotation to be processed within a day compared to a few weeks before the systems were made available. Therefore this is clear evidence that FS improvement results in new performance in the company. Cases revealed the type of improvements that were achieved in FS such as quick retrieval of important data, up-to-date information available, and importantly system accuracy and efficiency.

Reviewing the strategy dimension, the implementation produced better returns in terms of strategic management. Not only did it shape the organisational workspace better, and manage it better, but it also resulted in business expansion. An example can be seen from C2 which had explored new overseas market.

In Obtaining Finance (OF), the case studies demonstrated that as a company becomes more established, it is easier for it to get external funding. Five out of seven cases demonstrated the ability to secure new funding as stated in the company's report. C1 managed to secure funding by winning large project value bids. C2 managed to get new funding on three separate occasions. C3 utilised internal funds. C4 managed to get new funding in the form of grants. Finally C6 secured funding from the external body. Thus, this is evidence that OF became crucial in expanding their business when improvement became visible.

In terms of People Management (PM), the challenge of resistance to change was quite difficult to deal with in the beginning. It is human nature that staff will resist

changes (brought into the company) because they think it will jeopardise their jobs and pay. However, as implementation progressed, staff started to accept change and moved forward positively once they could see it brought improvements to them. This can be seen as quoted; *"... one of our staff was absent for a week trying not to participate, unexpectedly when he went back to work things became better without him. He felt threatened by the new improvement, and started to accept changes..... "* Another good example of PM as shown in C2, based on the company's report that the absenteeism was improved by 18%.

Cases showed that an important action taken to manage staff was to provide good training that improved their skills. The critical view is that successful implementation changes staff perceptions. It gets them to think differently. It changed their way of thinking in handling daily tasks so that they could run better. Evidence from cases revealed that an adaptation of Bessant's framework may be useful in exploring improvement to increase capacity and in providing the most relevant assistance at any stage of a business development.

Table 6.1. illustrates the achievement of 6 dimensions by Bessant (2005) applied in exploring the impact of sustainability.

Table 6.1: The Impact of Sustainability in 6 Dimensions Application (Bessant's 2005)

6 Dimensions	The Impact of Sustainability
Strategy	Business expansion. Organised workplace. Management run better.
Formal Systems	System accuracy, more efficient and effective. Accessible, up-to-date data. Quick information retrieval. Important data become available.
Operational Improvements	Tasks become easier to manage. Continuous application of new knowledge. Operations run smoothly. Efficient and accurate processing procedures. Organised and well-managed work place.
People Management	Change staff attitude towards change. Reduce resistance. Delivered training changes the way staff think. The working perspective is changed.
Obtaining Finance	Established improvement and new changes developed opportunities for the company to secure new funding. Financing agencies are more willing to offer funding.
Market Entry	Opportunity to exploit (local or international) markets. Opportunity to acquire new customers. Potential Partnerships. New investment. New business expansion (e.g. plant, branch offices, etc.).

6.4. Sustainability Framework Development

6.4.1. Knowledge Application Framework

From the literature review, Zahra and George, (2000) proposed the Absorptive Capacity framework with elements of *potential* and *realised* (Figure 2.1. of Chapter 2) capabilities. In this study, the findings developed frameworks which consist of "knowledge application" elements as illustrated in Figure 6.1: Knowledge Application Framework and Figure 6.2: Sustainability Framework.

The first framework (Figure 6.1.) offers significant values identified as; continuity, efficiency, flexibility, independency, innovative and new prospective, whereas the second framework (Figure 6.2.) offers influencing factors identified as enablers and barriers. The second framework, detailed enablers and barriers factors are drawn in Table 6.3: Enablers and Barriers Factors. From these frameworks it is believed that, when new knowledge is applied continuously in the company, it not only brings about continuous improvement, but creates new values as illustrated by the case studies. The underlying basis of these frameworks is the movement process of the impact of sustainability that makes the company able to progress consistently.

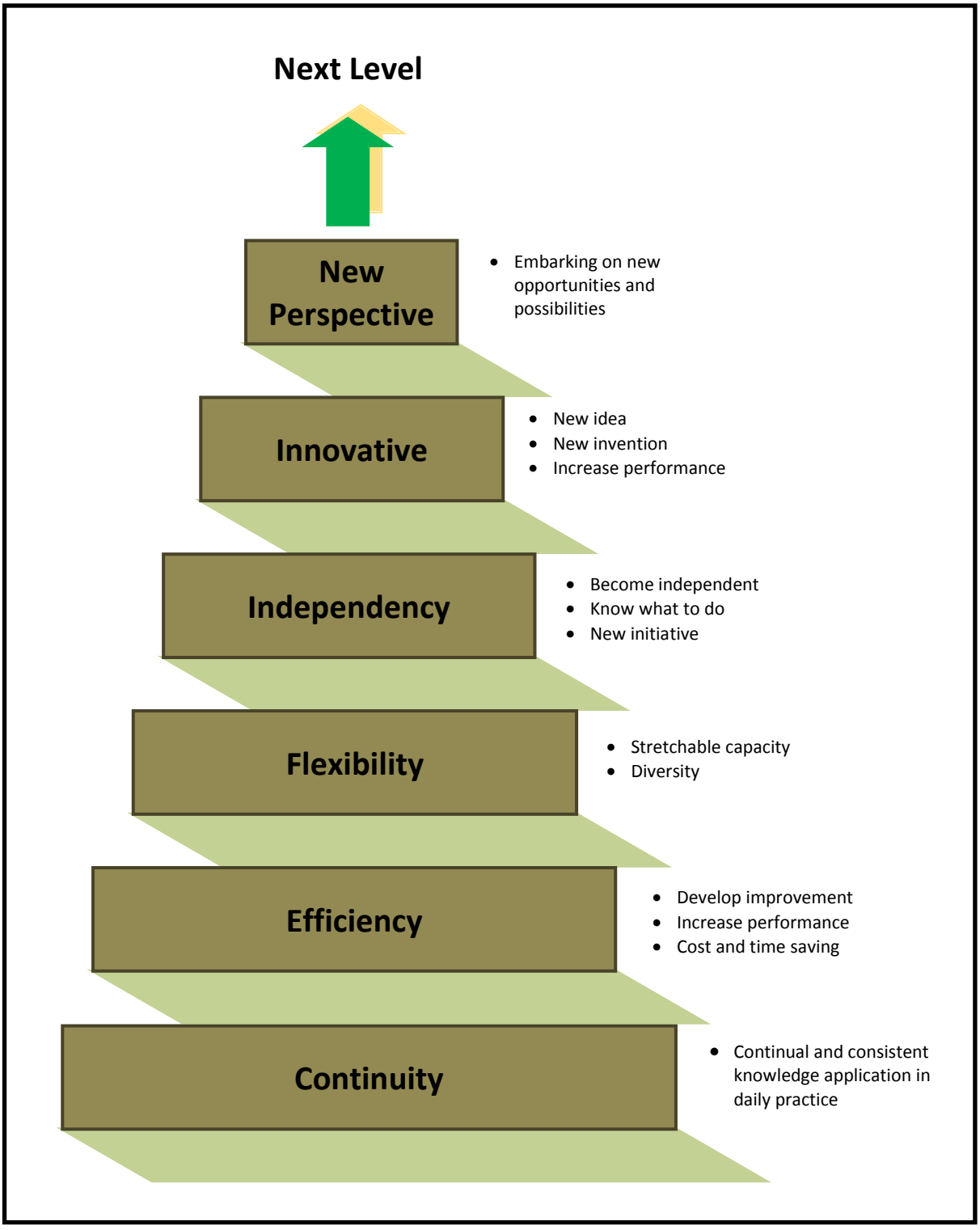


Figure 6.1: Knowledge Application Framework; Next Level Dimension

6.4.1.1. Continuity

Upon implementation, knowledge needs to be fully utilised if we are to see the maximum impact and benefits of the intervention. Inevitably, knowledge has to be disseminated and applied (Zahra and George, 2000; Lane et al, 2006; Todora and Durisin, 2007). By applying the new embedded knowledge into daily operation continuously and consistently, only then will the changes take effect. Without continuity the result will not be seen as it prevents the company from growing.

6.4.1.2. Efficiency

An important consideration of efficiency is knowledge exploitation (Zahra and George, 2000; Lane et al, 2006; Todora and Durisins, 2007). The extent to which knowledge is exploited will determine the success of the implementation; the more the knowledge is exploited, the more the company is likely to succeed. The analogy is that by mapping and assessing the theoretical concepts into the real business world, sustainability can be potentially achieved. For instance, in-depth knowledge is absorbed and applied in the company; it suggests that the company's performance will improve and capacity will increase. Therefore, if the transferred knowledge is fully exploited and utilised, it will allow improvement in current processes to take place which lead to improved company performance. Once improved performance occurs, further efficiency gains should follow. Evident shows that an improvement in lean concept in manufacturing (Dibia, Dhakal, Onuh 2014) saves cost and time.

In addition, staff become experts. They became knowledgeable that created a new specialised ability. It means that they were very skilled in performing a particular task

in the operation. They knew how to operate the machine correctly. Unlike before, they were uncertain how to handle the machine well by which they practised the fire fighting action. Therefore when they became experts, process became efficient and operation became effective. Out-dated processes and procedures are replaced with new more efficient ones. Once a process is improved, it works better, and leads to an increase in performance.

6.4.1.3. Flexibility

Evidence from the case studies shows that incorporating new values allows the company to move with more freedom. It brings flexibility to deal with any circumstances they may face ahead. They are no longer constrained to adhere rigidly to tried and tested methods. In fact, it enables them to act "out of the box" and sharpens their maximum potential. Flexibility encourages the company to move beyond their current capabilities.

6.4.1.4. Independency

Successful application of knowledge resulting from intervention allows a company to become more independent. The case studies demonstrated that it allowed the sampled companies to move forward on their own with minimum support from others. In fact, it provided them with the confidence to act as they then know what they have to do to succeed.

6.4.1.5. Innovative

The important fact of this framework is, if the correct process runs continuously, the next step is commencing sustainability, which is the starting point where sustain begins as shown by the cases. Overall, these processes demonstrated difficulties to reject the fact that the sustainability was not triggered. The new innovations that were created from this point onwards, such as new product designs, new market penetration local or international, opening new plants, increases in turnover etc., as shown by the cases introduces new business opportunities. Therefore, evidence proves that movement to the next level occurred from the impact of sustainability in interventions.

Invent innovation is the final stage of the sustainability process implementation. At this point the company becomes independent to move to the next level that leads to innovate (Utterback, 1994; Tsai, 2001; Vanhaverbeke et al, 2007; Fosfuri, 2008). Such indication can be seen as exploring new things, which were almost impossible before, inventing a new innovation or created a new business venture and generating new ideas to realise it to become apparent.

6.4.1.6. New Perspective

This is the highest level the company aims to achieve. At this level, a company is beginning to embark on investigating new possibilities. If the company is at this stage, it is difficult not to say that growth has not already occurred. As a result, there is no doubt that new ideas and new inventions as a result of innovation cannot be exploited further. The exposure to embarking on new opportunities and possibilities are always wide open.

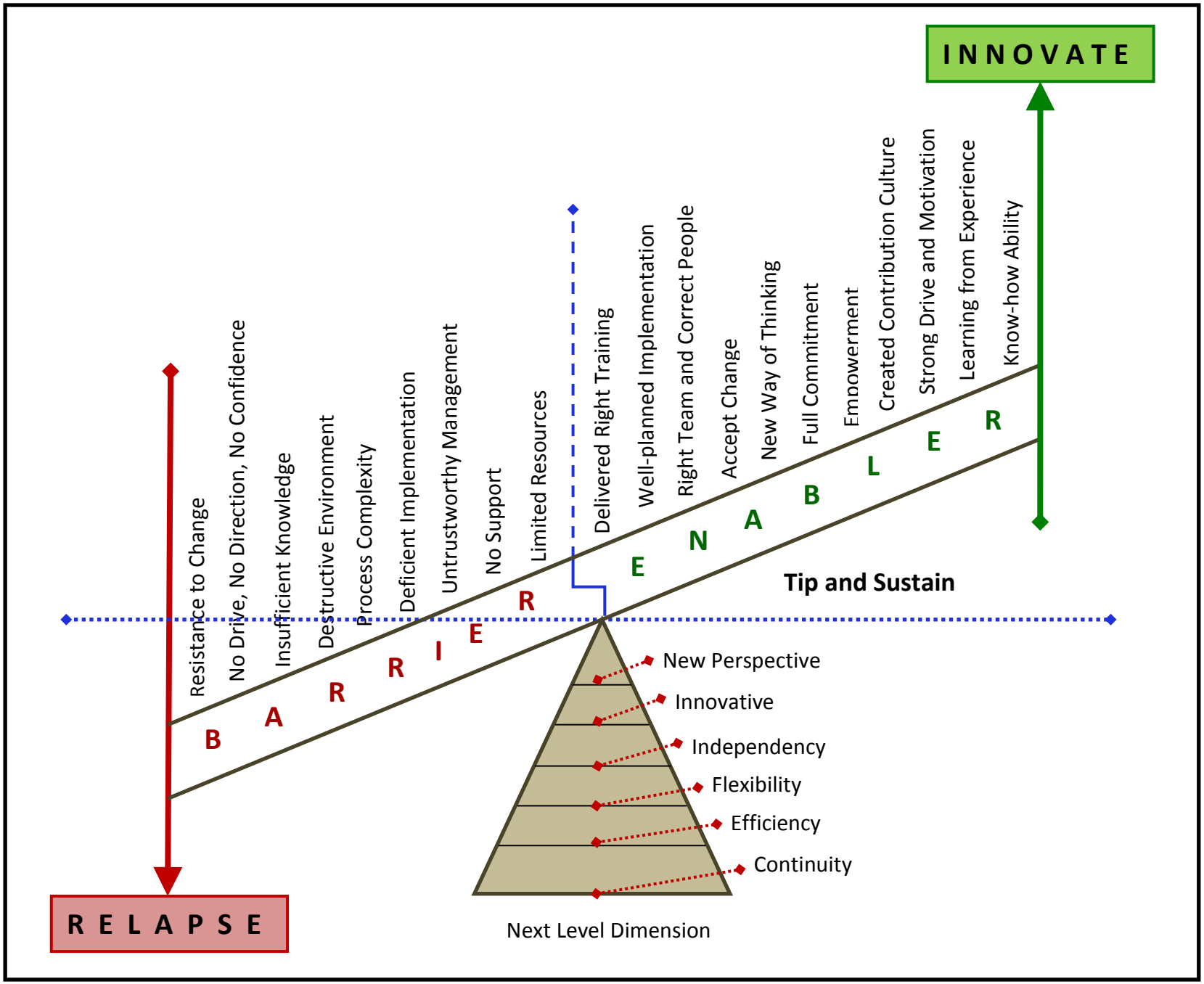


Figure 6.2: Sustainability Framework; Enablers and Barriers Factor (present Author, 2014)

The second developed framework focused on influencing factors identified as enablers and barriers that are believed to have a significant impact on sustainability. The findings are presented in detail in Table 6.2. below. As the name implies, the framework is separated into two sections; enablers and barriers. With continuous application of knowledge, these two factors are perceived to play a significant role in the achievement of sustainability, and are crucial in determining whether the company moves ahead or relapse back.

Table 6.2: Enablers and Barriers Factors (present Author, 2014)

ENABLERS FACTORS				
Deliver Right Training - Acquire correct knowledge - Deliver well planned training	**Well-planned Implementation** - Precise project planning - Set a clear target and aim to achieve it - Adhere to project plan - Well-planned implementation	**Right Team and Correct People** - Strong teamwork ethic - Correct people - Driven manager - Loyal workforce - Right KTP Associate - Appropriate staff rotation	**Accept Change** - Embrace change - Knowledgeable - Knowledge creation	**New Way of Thinking** - Change the way of thinking - New perception - New paradigm
Full Commitment - Full commitment of individual workers - Significant role from key person - Undivided attention - Internal champion - Manpower and rotation utilisation	**Empowerment** - Decisive decision making - Top management or decision maker involvement - Strong support from top management - Delegate authorisation - Trusted management	**Created Contribution Culture** - Achieved new improvement - Continuous application of new knowledge - Continuous improvement - More collaboration - More contributions to find solutions - Sharing of information	**Strong Drive and Motivation** - Strong driver and motivation from the director - Fully supported by the director - Distinct spirit of strong beliefs to succeed - High enthusiasm and aspiration levels - Continuous post-intervention spirit	**Learning from Experience** - Learning from mistakes and experience **Know-how Ability** - Multi-skills
BARRIERS FACTORS				
Resistance to change - Reluctance to change - Hindrance of staff - Staff feel threatened by new knowledge and changes, they may feel unable to cope - Low enthusiasm - No proactive thinking	**No drive, No Direction, No Confidence** - No drive to push forward - No goals to implement the intervention - No clear direction or targets. - No confidence to move forward - Poor recognition of problems - No continuity once the intervention has finished	**Insufficient Knowledge** - Lack of or abandonment of required knowledge - Lack of required training - Lack of technical skills	**Destructive Environment** - Fire fighting process - Obstructive human behaviour - No communication skills, lack of interpersonal skills - Unsatisfied or demoralised staffs - Destructive attitude - Staff mobility - No proper staff rotation	**Process Complexity** - Operational procedures / processes very complex and hard to deal with - Difficult process to implement - Lack of proper procedures
Deficient Implementation - Incomplete implementation - Little or no effort in implementation - No dedication to the project - Abandonment of implementation - Holding back the implementation process - Procrastinating leading to missed opportunity - No expertise	**Untrustworthy Management** - No involvement from director or decision maker - Strange approach or difficult directors - Poor or delayed decision making - No proactive action upon decision - No empowerment	**Untrustworthy Management (cont.)** - Mismanaged organisation - Staff were sent for training but not allowed to practice what they had learnt - No contingency plan	**No Support** - Lack or no support from the director or top management - Knowledgeable but no power to implement - No support to apply the training provided - No commitment from staff, customers or suppliers	**Limited Resources** - Lack of funding / limited resources

6.5. Enabling Factors

6.5.1. Deliver Right Training, Right Knowledge

The key element in implementing intervention is choosing the right knowledge (Bosch et al, 1999; Tsai, 2001; Tranfield, 2003; Schmidt, 2005). After all, knowledge is the answer that shapes the entire success of the intervention. Bringing in the right knowledge is perceived to be the main concern. Knowing exactly the type of knowledge required is vital. In doing so, the company must understand the current issues it has as it is a crucial step in the direction of provisioning improvement. It also has to work out how to deal with different perceptions of internal and external issues. Therefore, the next action is how to best harness and exploit embedded knowledge to create improvements in the operational process. The lesson coming out of it is that provision of the right knowledge will bring value to the company for improvement.

The findings show that intervention works well when it is implemented with the correct team involved with right objectives. It demonstrated that the right intervention choice for the company serves the purpose.

6.5.2. Well-Planned Implementation

If implementation is well planned and the right choices made at the start then the project will be easier to manage. Specific actions needed to achieve anticipated goals will be undertaken from the strategies that are most suited and perceived to be effective will be selected and pursued prior to implementation. For instance, the project schedule

should include the specific activities and duration. Factors such as correct activities timing and specific areas to be improved should be focused on as this is the main target for improvement. Correct training also impacts greatly on overall implementation.

The importance of preparation to a well-planned project is that it provides proper guidance and planning throughout implementation. The main reason in putting a plan in place is to keep track of priority issues and to trace failures. As the critical success factors are always included in the schedule, hence any backlog or if anything goes wrong, it can always be seen and easily be traced to fix it back to the original plan or other options. As such, it is highly recommended to always adhere to the project plan as shown by most of the successful cases. The well-planned project enables activities to be executed as planned in a set time frame. Evidence shows the most effective implementation is when it followed the correct and well planning schedule as outlined earlier.

6.5.3. Right Team and Correct People

In setting up a team, it is important to establish roles and responsibilities (Lagerstrom, 2003). It is necessary to decide not only who should be involved but what they are required to do. Communication is key as commitment comes from it. Once the key personnel have been determined any shortfall in their ability can be addressed. Staff can then receive additional targeted training. It also means that only those who show they are capable of learning new knowledge should be involved (Gibb, 2004; Macpherson, Holt, 2006).

The case studies demonstrated that the teams involved contained highly motivated individuals with very strong drive. They also showed that staff with high motivation and passion made for a very successful implementation. Simply put, an internal champion made the intervention became a champion. As there were so many obstacles during the process, the existence of this individual champ made the entire process became easier. The strong value of that individual made the whole project become a victory as shown in the case.

6.5.4. Accept Change, New Changes Take Effect and Performance Improved

Accepting new changes is critically challenging as most staff are resistant to change (Tichey, 1980; Aislabie, 1992; Jones, 2006). Once staff accept change and see positive results from it they may begin to change their attitudes and their way of thinking. It is important that they apply the new changes on a daily basis and habitual as only then will the production become more efficient and effective.

The underlying principle is that once change takes effect, improvement is achieved and established. As a result the main issues are solved. The case studies demonstrated that once new changes were accepted it improved the way operations were run.

6.5.5. New Way of Thinking

Changing the way of thinking of the individual is a challenging aspect for improvement. It is a very difficult task to achieve a mind shift to a new paradigm. Once

the new mind set is accepted perception changes and thought processes change. Eventually change will be embraced. The case studies revealed that the new way of thinking changed the way staff worked. Logically, if the way of thinking is changed, new changes can more easily be implemented as they no longer appear “alien”.

6.5.6. Full Commitment

This study has identified that companies achieving sustainability were highly committed to the entire intervention process. They accepted changes and adapted themselves to the newly changed circumstances. These resulted in improvements far better than before. The truth was that they embraced the embedded knowledge and applied “best practice” into their normal (daily) routine. The improvement then provided new growth opportunities. This example proves that successful intervention allows them to carry on progressing. The power that made things work was full commitment.

However, one of the case studies, company was unwilling to commit and make the required changes. It was seen that as a result it has less success in achieving sustainability. The company did not fully commit to take part, even before the whole project was completed. No advantage was able to be added into the company. The new changes and improvement could not be observed. Otherwise, it was astonishing that the companies which were actively involved with the intervention, had full commitment and adhered to a well-planned schedule were more successful towards achieving the sustainability compared to the one having less commitment.

6.5.7. Empowerment

Empowerment is associated closely with the top management of a company. Their strong support, leadership and involvement is decisive in gaining success (Mohamad, Dhakal and Bennett, 2012). Trust becomes important. Staff need to be able to trust management and management has to be able to trust its staff when delegating their power. Staff empowered in this way will benefit the smooth running of the operation. When knowledge is embedded, without empowerment operations would not be as smooth and effective as with the empowerment. The case studies showed that with empowerment, operations became more effective and this saved time and costs.

6.5.8. Created New Contribution Culture, No More Blaming Culture

It is undeniable that to create a new culture is not as simple as one might think, particularly if it involves the move from an existing comfort zone to a totally different culture. The case studies revealed that the newly created culture of continuous improvement brought significant gains (as shown in C7). The blaming culture was reduced and fire fighting diminished. When these unhelpful cultures were replaced by a new more constructive culture, things changed and everything started to work. The continuous application of knowledge when mixed together with a new culture and information sharing paradigm changed the entire outlook. The new culture of collaboration and contribution transformed them into find solutions and eliminated the culture of blaming the cause of problems on each other. The case studies demonstrate

that the blaming culture and fire fighting process were replaced by a contribution to solutions culture. The culture changes from blaming to a contribution.

6.5.9. Strong Drive and Motivation

A strong driver and motivation can be considered as a key element and the main point to the success of the intervention. Failure to include these elements means failure to achieve sustainability towards the end as there were no "strong backbones" to push forward. Therefore, achievement of the implementation is unlikely to be reached.

In one case example (as shown in C2), the internal staff championed the intervention that performed extremely well. The staff showed a very high motivation to the success of the implementation. In many cases, the evidence shows that top management is a strong driver and key motivator in achieving implementation. The case studies demonstrated that it is believed if each individual involved committed with the same attitude; it will motivate the company to move faster and keep progressing as a whole.

6.5.10. Learning from Experience

The case studies demonstrated that over time most companies learn from experience. Not only that they learn from mistakes and improve themselves as they become more expert on how to deal with daily operating procedures, rather the action learning (Revans, 1982; Meehan et al, 2009; Trehan, 2009) gains value to them. Their expertise self taught them on how to improve things on their distinctive technique as agreed by Oakeshott (1933) that "experience is always and everywhere significant". The case

studies revealed that learning from experience formed an effective improvement of better solutions.

6.5.11. Know-how Ability

It is believed that once knowledge is sustained, staff increase their skills and become experts. When staff become knowledgeable, operations become easier to run. From the case studies, the “know-how ability” revealed that daily operation improved to become more efficient and effective. They knew exactly what to do, day in and day out. This leads to savings in time and cost and eventually growth. In short it adds value.

6.6. Barriers Factors

The case studies demonstrated that successful intervention helped to motivate companies to sustain. Inevitably, unforeseen barriers arose during the implementation. Somehow rather, alternative options can be sorted out to resolve the odds. By all means barriers (Reed, 1990; Karyn, 1991; Oakey, 1995; Lange, 2000) can be managed wisely in order to trail the intervention successfully. Knowing and understanding what barriers are and attempting to remove or reduce them is a smart way to ensure that changes happen as planned.

6.6.1. Resistance to Change

Resistance to change is a kind of synonym to change for improvement (Tichey, 1980; Aislabie, 1992; Jones, 2006). In attempting change, resistance is the biggest challenge that occurs. The main underlying reason demonstrated from the case studies was reluctant behavior of the individual. An obstructive attitude in addition to low enthusiasm usually holds back change. The case studies revealed this was widespread. Staff felt threatened by the advent new knowledge and new ways of working.

6.6.2. No Drive, No Clear Direction, No Confidence

Other than direct support from top management, clear direction is needed if a company is to achieve its goals and objectives. However, evidence revealed that in some cases, management did not set any goals or objectives. Without clear direction it is likely that little will be achieved and improvement will not take place. This situation usually results from poor or incompetent business and managerial skills. If this scenario is allowed to continue serious issues may never be solved. With clear direction, plans can be made, targets set out and achieved.

The lack of confidence as demonstrated in one case negatively affected the entire intervention implementation process. As a result, the company had to abandon the project half way through. Other case showed lack of confidence in the beginning, however, the strong beliefs with strong drive to succeed has superseded this barrier and eventually achieved a great success.

6.6.3. Insufficient Knowledge

The purpose of the intervention is often to deliver training in an attempt to increase the knowledge and upgrade the skill of staffs. The case studies proved that insufficient knowledge was a barrier preventing the company from moving forward. Poor levels of technical knowledge, low levels of education, skills and experience, little or no training all have an impact. If the required knowledge is provided within the company and applied correctly the company will have solved one of its major problems. Staff will be furnished with the technical knowledge and skill to progress the company to the next level.

The first step in dealing with this barrier is having awareness of the required knowledge (Bessant, 2005). As shown by the case studies it needs companies to be aware that they have a missing knowledge "gap" that needs to be filled. The evidence shows that they were aware that new knowledge was lacking. It was needed to improve business performance. However, they were often in no position on how to proceed on what to do next.

6.6.4. Destructive Environment

From the case studies, one of the obvious barriers was a destructive environment. For instance, instead of focusing on the issues and finding solutions to them, attention focuses solely on fire-fighting. This firefighting may then exacerbate the situation and lead to further destructive episodes occurring.

From a people management perspective, the poorly managed staff and obstructive human behaviour which always complicate matters even further. Besides, saturated job specification without proper job rotation will inevitably lead to demoralisation. Staff rotation is very important and needs to be considered as it has a significant impact on workforce happiness. Unsatisfactory benefits and payment schemes from the employer also have an effect. The worst thing, the case studies showed was that staff could perform better. However, they were not provided with incentives to do so. They were not empowered to discover something new. Skills became obsolete when they were powerless in decision making.

6.6.5. Process Complexity

Difficulties can arise when the manufacturing process is very complex and difficult to deal with. The case studies showed that it was not easy to reduce complexity. Successful intervention as it required detailed task analysis and specific procedures to implement. Also, evidence showed lack of proper guidance and procedures has made the process become more complicated to run.

6.6.6. Deficient Implementation

The case studies demonstrated that incomplete or poor implementation ended with the result that targets were missed. Implementation was discontinued as there was a lack of belief and commitment. It was thought that intervention could not bring value to the company. The company did not trust that training would contribute any success to them. Destructive attitudes and delays in taking decisions meant that opportunities were

missed, which can be seen from this quote; *"…. because of his delaying decision and holding back action, the company was always missed the opportunity….. "*. Another important element that can be identified was that there was no expertise to continue the implementation. As a result it was abandoned half way through.

6.6.7. Untrustworthy Management

Lack of support or unwillingness of top management provides a huge obstacle to success in implementation. The case revealed such evident. Top management are usually a very powerful group as they contain the decision makers who determine what direction the company takes. They set the goals and decide on the action needed to realise them. Their decisions can lead to success or failure. If trust is lost either through making poor decisions, taking risky decisions or losing the cooperation of the workforce then implementation will be compromised. If these vital groups are not aware of it, new changes can never be made. Things will remain as is. Critical issues will never be solved. No progress or improvement will result and sustainability will be unachievable.

6.6.8. Inadequate Support

Lack of support can be seen as a significant obstacle to success. Logically, if top management do not give their full support to the implementation it is likely to fail. It can be seen that when there is no support actions will become half-hearted as there will be a lack of commitment. Embedded knowledge will fail to be applied fully. From the case studies it was evident that staff who went for training did not then use that

knowledge as they were not allowed to. In fact, they were knowledgeable about what to do but were powerless to act. Externally a lack of support can also appear when customers and suppliers also show a lack of commitment.

6.6.9. Limited Resources

Another barrier is limited resources. These restrict the company from growing, and as shown in the case studies it is normally difficulty in accessing capital and funding that is the cause. Capital and funding are critical factors when intervention occurs. Insufficient capital is likely to lead to an unsuccessful implementation. But it is not just problems over capital that cause problems. The inability to replace obsolete equipment or to use it in ways it was not designed to be used can also have significant impact. Outdated technology can create operational problems. These include production backlogs where machines cannot work at the required speed and lengthy and costly repair as they are more prone to failure.

6.7. Case Studies Summary

The summary of the finding results of the case studies are shown in Table 6.3. and Table 6.4. Table 6.3. represents the application of the Knowing-Doing Map tool in the cases. Table 6.4. summarises the enablers and barriers factors identified in the case studies. From these results it is shown that success case studies achieved the Next Level Dimension which includes Continuity, Efficiency, Flexibility, Independency, Innovative and New Perspective.

In Table 6.3. the movement of the stages was assessed using both dimensions "Doing Dimension" (No Action, Ad-hoc Action, Implement, Sustain, Innovate) against "Knowing Dimension" (Unaware, Aware, Knowledge, Expert). The movement to the next level from the "Initial State" to the "Final State" was indicated in sequence order level of 1, 2, 3, 4 and 5.

Next, the case studies were mapped in the Next Level Dimension of continuous knowledge application. Only case study 5 (C5) did not position itself in any of the level since they did not continuously applying the knowledge. However, other 6 cases (C1, C2, C3, C4 and C6) applied the knowledge continuously.

Table 6.3.: Case Study Summary – Knowing-Doing Map and Next Level Dimension

Knowing-Doing Map	C1	C2	C3	C4	C5	C6	C7
Doing Dimension	No Action Ad-hoc action Implement Sustain Innovate	No Action Ad-hoc action Implement Sustain Innovate	No Action Ad-hoc action Implement Sustain Innovate	No Action Ad-hoc action Implement Sustain Innovate	No Action Ad-hoc action Implement	No Action Ad-hoc action Implement Sustain Innovate	No Action Ad-hoc action Implement Sustain
Knowing Dimension	Aware Knowledge Expertise	Unaware Aware Knowledge Expertise	Unaware Aware Knowledge Expertise	Unaware Aware Knowledge Expertise	Unaware Aware Knowledge	Unaware Aware Knowledge Expertise	Unaware Aware Knowledge
Initial State	**2**	**2**	**2**	**1**	**1**	**1**	**2**
Final State	**5**	**5**	**5**	**5**	**3**	**5**	**4**

Next Level Dimension	C1	C2	C3	C4	C5	C6	C7
Continuity	✓	✓	✓	✓		✓	✓
Efficiency	✓	✓	✓	✓		✓	✓
Flexibility	✓	✓	✓	✓		✓	✓
Independency	✓	✓	✓	✓		✓	✓
Innovative	✓	✓	✓	✓		✓	✓
New Perspective	✓	✓	✓	✓		✓	✓

Note: C1, C2, C3, C4, C5, C6, C7 denotes Case Study 1 to 7 respectively

Table 6.4.: Case Study Summary - Enablers and Barriers

ENABLERS	C1	C2	C3	C4	C5	C6	C7
Delivered Right Training	✓	✓	✓	✓	✓	✓	✓
Well-Planned Implementation	✓	✓	✓	✓		✓	✓
Right Team And Correct People	✓	✓	✓	✓		✓	✓
Accept Change	✓	✓	✓	✓		✓	✓
New Way Of Thinking	✓	✓					
Full Commitment	✓	✓	✓	✓		✓	✓
Empowerment	✓	✓	✓				
Created Contribution Culture	✓	✓				✓	✓
Strong Drive And Motivation	✓	✓	✓	✓	✓	✓	✓
Learning From Experience	✓	✓					
Know–How Ability	✓	✓	✓	✓	✓	✓	✓

BARRIERS	C1	C2	C3	C4	C5	C6	C7
Resistance To Change	✓	✓	✓	✓	✓	✓	✓
No Drive, No Direction, No Confidence	✓	✓	✓	✓	✓		✓
Insufficient Knowledge	✓	✓	✓			✓	✓
Destructive Environment		✓		✓		✓	✓
Process Complexity		✓		✓		✓	
Deficient Implementation					✓	✓	✓
Untrustworthy Management	✓	✓	✓				✓
No Support			✓	✓	✓		
Limited Resources	✓	✓		✓	✓	✓	

Note: C1, C2, C3, C4, C5, C6, C7 denotes Case Study 1 to 7 respectively

6.7. Important Criteria When Implementation

The study results in new criteria that need to be considered before implementing the intervention which include;

i. The type of company.
ii. Nature of the intervention.
iii. Set the requirements.
iv. Identify critical issues.
v. Prioritise the importance.

Previous studies demonstrated limited exploration of these implementing intervention criteria in SMEs. Other studies attempted to explore intervention in different areas such as market oriented (Hallberg, 1999, 2000), stress management (Bellarosa and Chen, 1997), e-business intervention (Ihlstrom and Nilsson, (2003). However, these comparable criteria were not included in their or others' studies. Therefore, these criteria will add up to the current literature when implementing intervention.

6.7.1. Type of the Company

Cases revealed that prior to the implementation, it is crucial to understand the type of the company in order to determine the type of intervention that is required. For instance, a manufacturing company requires a very different type of intervention when compared to a services company. Training that needs to be delivered is heavily reliant on the type of the company involved as demonstrated by the cases which are

manufacturing companies. The ideal scenario is when the company's background and its issues are well known as it is then easier as the criteria needed for intervention are clearly identified.

6.7.2. Nature of Intervention

Prior to the engagement, knowing the nature of intervention is arguably fundamental (Rosenshine et al, 1996; Cary et al, 1997; Craig et al, 2009; Done et al, 2011; Ismail et al, 2011) to determine what knowledge is needed. Hence, specific production areas that need support can be focused on (e.g. IT, production, administration, human resource, management, marketing, etc.). The reason is to ensure that the correct area for intervention can be identified. An example of a clear identification was quoted as; "... *we are an engineering company, but we do not have knowledge about engineerin*g....". Also, it is suggested that consideration of Bessant's (2005) six dimensions is needed to understand the nature of intervention. For instance, if improvement needs to take place in the operational department, the focus of any intervention should be targeted only in this area. Only then will the implementation fulfil its purpose.

Studies (Rosenshine et al, 1996; Cary, 1997; Craig et al, 2009; Done, 2011) suggest that engaging in intervention means obtaining external support in terms of gaining new knowledge from experts. Therefore, it is viewed that the proactive way to embed knowledge is by taking action to engage with the external providers of help and advice; such as the Knowledge Transfer Partnership (KTP) used in this study. From the case studies the nature of intervention that required attention was focused on operational improvement or formal systems. It is observed that the normal processing procedure is

believed to be the core area of the business. Once the core area is fixed and performance improved, other procedures can be applied to improve performance even further. Cases showed that these two dimensions were important as it generates the main business revenue stream as suggested in the literature (Gurbaxani and Whang, 1991; Rockart, 1982; Roth, 1991).

6.7.3. Set the Requirements of Implementation

This study shows that it is essential to set the requirements before the implementation. It means that knowing what the company really needs is vital. The first step is setting the right goals and objectives. As shown by the cases, before the intervention some of the companies had no clear direction without set goals such as quoted; "*...we have no goal, we don't know our direction, we are not clear with what we do ...*" However, after setting clear goals and objectives, implementation became much focused, and direction improved. The derived lesson is that once the correct objectives are set, the company has to be able to achieve them. Only then can successful implementation be achieved.

Therefore it is suggested that for a company that needs to acquire new knowledge, skills and capabilities, it is a high risk activity which involves intensive learning and big investment as success is not guaranteed (Almeida and Aterido, 2010). As companies come under increasing pressure to compete in the global marketplace, they need to understand more about what they need to know and how they should learn in which case, the requirements should be made clear.

6.7.4. Identify Critical Issues

The cases demonstrated that most of the companies were aware of the issues that faced them and which needed to be resolved. However, they were uncertain about what to do as they lacked expertise to solve them. In identifying these issues, knowing the exact cause of the problem is crucial (Adizes, 1979). The cases demonstrated that internal issues are a result of external pressure predominates and they impact directly on the business as a whole, as demonstrated by one of the cases; "*... we have problems with our suppliers, we do not know how to deal with them, we cannot cope ....*" The important factor is that the main issues need to be identified, focused on, well understood and plans put in place on how they will be resolved. Fixing internal problems first will have an immediate impact on business performance and long term sustainability.

6.7.5. Prioritise the Importance

Study revealed that setting priorities in the implementation means deciding which activities require immediate action and which are less important (and can if necessary be placed on the "back burner"). For instance, in many cases the priority was set to be solving an immediate issue arising in the company which needed to be fixed urgently. Therefore, in planning the implementation, the company needs to focus on what is important and weigh them accordingly to their urgency.

Further, implementation is considered as the core process where improvement takes place. The main action is to deliver training to embed knowledge. In delivering this knowledge the means used are varies such as consultancy, mentoring process, deliver

training, attend course, etc. (Johnston et al, 2008; Ismail et al, 2011), whilst the purpose is to resolve issues based on knowledge specialisation. Once issues are resolved, a new changing process emerges. It is therefore essential to provide the company with up-to-date knowledge, so that old ways of processing can be updated with new ones that are more efficient.

During the implementation, however, obstacles may arise that will ultimately determine its success or failure as shown by the cases including staff mobility, absenteeism, machineries issues, resistant behaviour, etc. However, well-planned implementation with high levels of determination, as demonstrated by the cases, proves that successful implementation is able to deal with any obstacles placed in its path. One case example shown as quoted; "*.... fortunately we have champion in our project that makes our project success ....*".

6.8. Risks

Risk is not the main focus of this study. However, during the analysis, the case studies demonstrated factors that may influence risk. Knowing about these might provide useful guidance to SMEs.

In delivering successful intervention, it is inevitable that risks will occur. However, from the case studies, evidence seems to reveal that few risks occurred throughout the implementation. This probably to the detailed given to putting together the proposal. One case showed no contingency plan was made. It worked under the assumption that implementation would run smoothly from start to finish. However, unexpected events occurred and this caused difficulties not planned for. Further action was then

undertaken and everything returned back to normal. As a lesson, it is therefore strongly recommended that a contingency plan is put in place in the initial plan as events might occur that are unexpected.

Another case showed that the company was reliant on one key person to champion the overall implementation. Very unexpectedly and all of a sudden that person left the company, and faced with no choice the company was forced to suspend the intervention project whilst looking for a new member of staff to take charge. It again suggests that contingency planning is needed where there are numbers of staff who can cover the work of others so that a crisis does not occur. Progress would not be affected as a successor, even if only a temporary one, is already in place.

6.9. Opportunities

The importance of the formed sustainability is that it provides further opportunities for the company. The case studies demonstrated strong evidence they previously had not thought about of opportunities which were considered unobtainable. For instance, one company, C2 has successfully opened a new branch to expand its business.

In addition, new investment in the business is promoted. The case studies revealed that success leads to new investment in either the existing business or in new business ventures. Thus, it confirmed a strong evidence for business expansion. In fact, it created opportunities in new international market as shown in one case, C1. The key point is that new opportunities will arise over time as a company achieves stability.

6.10. Impact on the Sustainability of the Intervention

From the case studies many issues could be explored. For instance, the main argument lies on what happened to the implemented interventions, whether the process worked and produced a positive impact or is otherwise still unchanged with negative impact. There is no measure to ascertain that knowledge is "absorbed" and sustainability is achieved. The accurate level of TP and sustainability level was reached and when did it occur remains uncertain. Importantly, the argument centres on whether the company has already benefited from the intervention.

The answers to these intriguing questions are that there is no clear or accurate measurement on whether the company is tipped, sustained and succeed from the intervention process or otherwise relapse. It is quite difficult to justify the exact indication that tipping point is occurring and sustainability is achieved. Bessant (2005) believes that a firm's tipping point is triggered by looking at what determines its growth success. It is argued that the tipping point is measured based on the growth and success of the company. In response to these, we may gauge the success of the company in terms of sustainability and growth by looking at improvement or innovation that is achieved. While there is arguably no accurate measure to identify at which point sustainability is reached, this challenge in conveying the tacit knowledge in SMEs is associated with improved performance. From the cases, it is evidence that the sustainability level can be said to be "effective", as the knowledge transfer is fully deployed in the daily process which brought new improvement and transformation to the company as a whole. As long as the company is moving forward under the new development and not deteriorating back to its initial state it is fair to say that the tipping point has been reached. Subsequently when improvement leads to further progress, it is

perceived that sustainability has occurred. With constant increases in performance, capacity develops and the company can progress the extra mile to the next level.

The investigations that were considered in this study was assessing the case studies through the processes involved within the implementation of external interventions. The search lies on to what extent sustainability plays its role. As shown by the case studies, to a certain extent, the external interventions worked tremendously in transforming the companies. It was clearly evident that the companies sharpened their capabilities and capacity as an impact of the sustainability of intervention. Having said that, hence it is very difficult to reject that sustainability is a result of the intervention.

The study revealed that the successful knowledge transfer process opens up so many unforeseen opportunities for improvement and potential investment in SMEs. It is crucial that SMEs need to believe that knowledge transfer is trustworthy. The intense amount of absorbed knowledge and deployment is often resisted at first (Tichey, 1980; Aislabie, 1992; Jones, 2006), because of fear that this knowledge transformation will be used opportunistically, and at the same time affects them such as jeopardises their current position. However, upon full deployment of absorbed knowledge into daily practice, improvement started to become apparent. Once things become better, staff started to embrace change. Thus from the case study research carried out, it is clear that sustainability does impact on intervention. Findings show strong evidence that intervention has benefited companies to a certain extent.

6.11. Summary

This study attempts to develop the conceptual framework into a form which can be used practically to reveal factors influencing sustainability during the intervention process. The proposed frameworks offer the contribution factors of enablers and barriers that derived from the exploration of results. In order to achieve sustainability in business growth, a company needs to consider constraints and motivating factors that drive the company forward. Results demonstrated that the enabler factor drives the company to progress, whereas the barrier factor impedes the company from moving. The very essence of the implemented knowledge derived from intervention is an improvement. Cases demonstrated that the best performance appears to shape the company into a better position and more open to any challenging circumstances.

From the findings, the theoretical concept that was applied in the practical application was shown to be valid. Findings show that companies which successfully applied the embedded knowledge seemed to promote the impact on the sustainability of intervention. Simply put, the combination of the three dimensional concepts of Absorptive Capacity, Tipping Point and Knowing-Doing Gap seems to benefit SMEs if implemented correctly. The developed sustainability frameworks offer a clear guidance for SMEs to consider when implementing intervention. As a result, it is perceived that these frameworks will enable SMEs to evaluate the influencing factors that will assist in making decision for changes.

Out of all, the underlying cause is that once the required knowledge is implemented in practice, the changes that a company desires become apparent. As predicted, an improvement for better turns into a reality. It is evident that new transformation as a result of the impact on sustainability of intervention created new changes to move to the next level.

Chapter 7

CONCLUSION

Only a life lived for others is a life worthwhile.
(Albert Einstein)

CHAPTER 7 CONCLUSIONS

7.1. Introduction

The purpose of this chapter is to present the overall view and to present a conclusion to the research. It refreshes the research aim, objectives and questions of the study in order to confirm that they have been achieved and answered. It also assesses the usefulness of the developed framework and relevance to be used by SMEs. The chapter then discusses the limitations of the study, suggestions for future work and finally draws the conclusion.

7.2. Results Review

At the beginning of the study, the aim of the research was set as to develop a framework for achieving sustainability by improving business performance with an intention to assist SMEs. The objective was set in order to determine how to achieve this aim. The findings can be said to show that this research has achieved the aim and objective in which a sustainability framework (Chapter 6) was successfully developed. The author believed that this framework can be used as a road map to SMEs or policy makers when in view of implementing an external intervention. It suggests the influencing factors that need to be considered in improving their operational performance and ultimately move to the next level and beyond.

The concern is whether this thesis is able to answer all of these research questions raised earlier and sufficiently enough to produce the necessary findings. Hence, the findings of this research should profoundly be able to answer all of these questions.

Question 1.

How and to which extent can external intervention influence knowledge-transfer in helping SMEs to improve their business performance and lead towards sustainability?

From the findings, external interventions are proven to effectively convey the embedded knowledge and encouraged transfer of skills in the workforce to improve the SMEs' business operation. It is not limited to that only. In fact, the transferred knowledge and skills have successfully developed the expertise within the organisations, changed their way of thinking and changed their daily work practice to become better. Evident from the cases demonstrated that the better the operation, the better the throughput result would be, which in return increased the company's revenue. Thus it adds up to the literature that intervention can be considered as a holistic way of transfer knowledge of improving sustainability in business performance.

Question 2.

Is there a need for a framework that enables a structured approach to be used, in order to support and enhance knowledge for SMEs seeking strategic and practical improvement in creating sustainability?

The findings demonstrated that there is a need for a framework to be developed. For this reason, a sustainability framework (Chapter 6) was conceptually developed to guide SMEs in seeking to reach their goals and targets. A structured approach (Chapter 6) was built to facilitate the journey of the company to an efficient and fully functional organisation. Therefore, the development of this framework is perceived will help SMEs to have clear idea on critical factors that need to be considered when acquiring support of an external knowledge for new changes.

Question 3.

Are there any barriers in external interventions and transfer of knowledge? What risks and obstacles are present in knowledge transfer process?

Results revealed that barriers exist in the development and deployment of the external interventions and transfer of knowledge. Risks and obstacles are presented (Chapter 6) as a trigger of impediment factors to the knowledge transfer implementation. Even though barriers, risks and obstacles occur, however, these would not stop SMEs to move extra mile. Advantageously, it is a challenge for SMEs to portrait a clear dimension of what should be avoided or minimised in keep progressing.

Question 4.

How a company can acquires knowledge and to what extent it may helps in sustainability of long term performance?

Results suggest that a company can acquire knowledge via a correct implementation of intervention. The embedded knowledge if deployed and applied appropriately will result in long term performance. The application of knowledge enhancement has positioned the company to tip, sustain and even moved beyond. Results revealed that effective intervention motivated SMEs to make extraordinary progress, unexpectedly, from the initial stage to the next level or beyond innovation which was almost not possible before. Not only that the successful intervention leads to long term performance, results revealed that it also created new value gain to the company entirely.

Question 5.

What are the influencing factors involved during the intervention processes that can lead to sustainability?

The influencing factors were identified as enablers and barriers, developed in sustainability framework (Chapter 6) and reviewed against the case studies (Chapter 4) and analysis (Chapter 5). In addition, the awareness of the important criteria when implementing the intervention was also set out as a guideline.

7.3. Contribution to Knowledge

This study has made a significant contribution to which it has a lot to offer not only to SMEs, but may also interests other parties such as practitioners and policy makers as it shapes policy and practice.

The research has addressed a key issue most relevant to industry, higher education institutions and also policy sectors. At least five main contributions have been presented as the result of this research as briefly stated in the following:

Firstly, the study has critically reviewed the extant literature to identify a very important gap in the understanding of a key element in relation with development of SMEs as key players of the economy. While there has been some extensive background to the knowledge and practice of how firms may be supported to improve and grow sustainably, the work identified both theoretical gaps and practical insight of what happens really in the process of external intervention, particularly those initiated by the policy and driven by the higher education institutes.

Secondly, it has identified the influencing factors that are critical to the development and deployment of the implementation processes of intervention through rigorous analysis of the Literature (Chapter 2), case studies (Chapter 4) and analysis (Chapter 5). A framework for growth sustainability was developed (Chapter 6) titled as “enablers” and “barriers” to assist SMEs highlighting the necessary decision. This particular contribution focuses on motivating factors to follow, as “enablers”, and impediment factors to hinder the process, as “barriers”, in gaining, absorbing and utilising new knowledge for improvement. These critical factors signify for the SMEs, as a roadmap, the right path to pursue their plans for using external intervention for improvement and growth, and also to prevent obstacles and issues that are likely to occur in this process and their progress for development. As such the study has offered new knowledge contributing to our understanding of the complexity of different journeys of SMEs in implementing intervention for sustainable development.

Thirdly, it has provided an understanding of a new way of thinking that underpins the success of the development and deployment of intervention implementation when obtaining external support. The findings contributed that intervention is accepted by SMEs as a critical instrument in obtaining external support for improvement as it gives a significant impact for success. Besides, the finding has also contributed guidance when considering intervention. A clear guidance was outlined to offer an insight to SMEs of priorities that need attention. Significantly, this contributes to a new perspective in an academic domain which was lacking.

Fourthly, this research has developed a theoretical framework by integrating a number of key concepts. The existing framework (Bessant et al, 2005; Phelps et al., 2007) was first applied to show the importance of the suggested dimensions. A new approach to extend that framework was introduced by integrating another concept of "Tipping Point" (Gladwell, 2000), combined with "Knowing-Doing Gap" (Pfeifer, 2000) and "Absorptive Capacity" (Cohen and Levinthal, 1990; Zahra & George 2002; Lane et al, 2006; Todorova and Durisin's 2007). The initiated integration of these theoretical concepts proved quite fruitful and provided a sound vehicle for analysing the main issues and on its own is a new contribution to the extant literature (Organisation Learning and Absorptive Capacity, Tipping Point, and sustainable growth).

Finally, this research has brought a new perspective of practitioner-orientated framework into academic literature through an empirical work. The reviews first showed a lack of focus in the extant literature to theoretically and conceptually address the issues in relation to intervention models for assisting firms particularly in SMEs. With the findings of this empirical study, some new academic perspectives are opened

to the current literature which can present new opportunities for extended research and richness of the theories. The study therefore fulfils the need to compensate the shortfall in theoretical notions and their applications in studying SMEs and supporting SMEs.

7.4. Contribution to SMEs

The research has revealed the journey of an intervention process as well as the impact of the sustainability that was investigated and discussed. The framework guideline was also designed as a structured approach of the influencing factors that SMEs need to be aware of. It is suggested to be an advantage for SMEs to fully utilise this framework for their benefits.

The findings also suggest that the intervention is highly recommended for SMEs. The correct implementation will bring improvement and increase capacity to run the operation and to improve business processes. From the findings, it is evident that the intervention can transform a company from a state of lacking in knowledge to highly specialised, such that they can even perform outstandingly beyond the intervention.

Simply put, SMEs are not alone. External help is always available for them whenever they face a crisis or business turmoil. The cases proved that intervention was capable of improving their business to enable them to become fully functional.

7.5. Research Limitations

Inevitably this study has limitations beyond the control of the author which can be outlined as follows:

- **Insufficient data for open ended questionnaires.**

  The initial intent was to design a mixed data collection of questionnaires and cases which would suit the investigation. The questionnaires were expected to be more supportive as secondary data that could produce various results with various views. However, the pilot study turned out to receive a very low response rate that made the delving into the questionnaires for the bulk of the data for the research almost unachievable. Thus, further investigation could not be performed due to insufficient data.

- **No clear intervention processes of current studies to be used as a benchmark.**

  Current research works (in qualitative) do not clearly describe processes involved in the intervention. The intervention study (Canon, 1997; Devins et a, 2002; Johnston et al, 2008; Done et al, 2011; Ismail et al, 2011) appears to be insufficient to measure the processes of the entire implementation. Therefore the current benchmarking that can be used as a guidance to measure the work is assumed as inadequate or not available yet.

- **Insufficient sample to see the failure cases.**

  It is envisaged to be a good opportunity to see more intervention failure cases, so that more exploratory reasoning of the failure cases can be delved. Most of the available cases were exceptionally successful. It was difficult to find a less successful case.

- **Need for more case studies.**

  For this particular study, it is believed that the more cases to explore with ample time, the more exploratory the results would be. As such, various unexpected outcomes would likely to be. It would be better if more cases could have been examined.

7.6. Suggestion for Future Research

This study attempts to produce evidence of the conceptual model into a construct which eventually reveals the sustainability factors within a company involved in the intervention process. A framework was developed and sustainability factors were defined from the investigations.

From the stages involved, this research focuses on the sustainability factor only. From the conceptual perspective, this study will have an implication for future research.

Suggestions for future work are recommended as follows:

- **Research in quantitative methods.**

Future research is suggested to continue developing the extensive framework in achieving sustainability to be done in a quantitative method. The detail of structured quantitative methods and functions of intervention is suggested to be explored in depth in future research to see the statistical results.

- **Research to be carried out using questionnaires.**

A questionnaire data collection method could not be carried out on this study although attempt was made earlier. Therefore it is suggested for future work that a study can be done using questionnaire method for data collection. It is anticipated that will result to various opinions from different respondents can be seen from open ended questionnaires to produce a different result besides strengthen the study.

- **To carry out more cases of less successful intervention.**

For future work, it is recommended to conduct more cases of less successful intervention. Therefore more exploratory results could be found out as to why the intervention was not successful. Consequently, a guidance of precaution and action can be set out as a benchmark for a company not to relapse to old practices.

- **To conduct more cases.**

It is highly suggested to conduct more cases with different nature of dimensions. The variations of dimensions are anticipated to produce more variety of results. Therefore more exploratory outcomes can be seen and contributed.

- **Research in last stage covering in innovation process.**

  Future research is recommended to work on the last stage of innovation factors which is the highest level of the knowing-doing map. It is foreseen that the last stage of the map, without doubt, requires further development.

7.7. Conclusion

From the extracted views of literature (Chapter 2) and case studies (Chapter 4), there were lessons derived. The outcomes contributed to a sustainability framework development (Chapter 6) and important contribution to knowledge. The gist of the result of the findings is that it is necessary for SMEs to engage with the external intervention in order for them to solve their current issues and, in reality, to improve. Intervention is suggested as a wise investment for cost and time saving in fixing issues and to keep moving, particularly if it is beyond their expertise, provided that the implementation is correctly implemented, well-planned, always adhered to the plan and the transferred knowledge is fully deployed in daily practice. Only then, sustainability can be reached and from that point the company can keep going. Simply put, their issues can be fixed and their needs for improvement can be fulfilled.

The study revealed a different journey of each company had been through in implementing intervention to bring improvement by looking at Bessant (2005) model (Absorptive Capacity and Tipping Point) with an added concept of Knowing–Doing Gap (Pfeffer and Sutton, 2000, 2013). The question remains on to what extent that the sustainability of the impact of the external intervention can hold. Evident demonstrated that the complicated process of implementation shown by each company resulted in

influencing factors that affects the sustainability of the impact of the external intervention known as enablers and barriers.

The level of the absorption and application of knowledge indicates the level of improvement achieved. For instance, the higher the level of knowledge absorption and application is, the better the improvement is achieved. Knowledge absorption only is not enough. By integrating the absorption and application consistently, only then improvement can be achieved.

Taken as a whole, it may thus be concluded that achieving sustainability, by taking into consideration intervention and knowledge as the key element, can be reached and is no longer impossible. Evidence shows that an external intervention is capable to transform SMEs from doing no action to achieving an extremely improved performance. The perception is that intervention is predicted to deliver knowledge that can function and empower SMEs in improving their operations and processes to be better. As benefited to all, it created new values to SMEs.

The developed framework has contributed to the body of knowledge appears through the investigation of the crucial factors that impact on the sustainability of external interventions in companies. In fact, in a situation of turmoil, achieving sustainability in business seems to be a priority. Therefore, not only can sustainability be viewed in an academic area, but it can also be viewed as a domain of ever evolving industry problems that are driven by technological innovations. Results demonstrated evidence that external interventions encouraged process improvement, transferred skills more in the workforce and encouraged businesses to undertake further development.

To conclude, the intervention project has highlighted the means of knowledge transfer to SMEs. The study has helped reveal how truly significant the intervention processes are in keeping sustaining the impact of the external intervention in a business.

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Strive not to be a success, but rather to be of value.
(Albert Einstein)

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Appendix

The only source of knowledge is experience.
(Albert Einstein)

APPENDIX

Ques

tionnaire

Interview Questions
(Intervention Life Cycle)

(Please note that all is confidential and will be analysed anonymously)

Note: The questionnaire is aimed companies that have carried out significant internal changes through external intervention (e.g. consultants, mentoring, working with a university or college, sector based improvement programme etc.). The idea is to investigate how this external support may have resulted in achieving sustainable growth by assessing the processes involved throughout the intervention.

Please answer the questionnaire with reference to the most recent intervention.

1. ISSUES

a. Were there any critical internal and external issues that have prompted the company to urgently seek changing and what were these?

b. Were there any internal and external barriers that were stopping the company from growing or slowing down its growth rate at that time?

2. RECOGNITION OF NEED

a. Was there a need for external support for the company attempting to implement new knowledge enhancement?

b. Why do the company needs an intervention?

c. What was the nature of intervention?

d. What was the area that need to be focused on?

e. Were there any support and motivation from internal and external that have driven the company to urgently seek changing and what were these?

3. OBTAINING SUPPORT

a. Was it normal for the company to seek external support when internal change or new knowledge is required?

b. Has the company obtained external support before this intervention?

c. Has the company attempted to address the above critical issues internally first? If yes why did this not work, if no why not?

d. How did the company go about obtaining external support to address these issues?

e. What were the factors that drove the company to proceed with the intervention?

f. What was the nature of the intervention?

g. How long ago did this intervention occur?

4. INITIAL STATE

a. What was the company's initial level of awareness and knowledge in the area of intervention?

b. Was there any initial internal resistance to seeking this external intervention?

c. Who internally championed this intervention?

d. Was there a budget set for this intervention?

5. PLAN

a. Who was the driving force for implementing the intervention?

b. Was there any internal plan being set for this purpose or was it arranged with external support?

c. Was there an internal implementation team put together for this intervention?

d. Were there initially any specific targets set for the intervention?

e. Did the intervention plan include a training element? If yes how wide was this?

f. Were staff made aware in advance of the intervention?

g. Were there any other actions being taken to initiate the intervention?

6. IMPLEMENTATION

a. How long did it take from recognition of need to planning to implementation ?

b. What external and internal resources where used to implement the plan?

c. Where there specific targets set? Did they change during the intervention?

d. Where there any milestones throughout the intervention and where they normally achieved?

e. Which part of the company was intervention directed at initially?

f. Where there other parts of the company not originally planned for also affected.?

g. What was the duration of the intervention? Was this set in the plan?

h. Was the external support intervention continuous or intermittent?

i. If intermittent, how often and what was the duration of each session?

j. Did the intervention involve any formal training of staff? Did the staff have a chance to apply the lessons from the training during the intervention?

k. What was the level on interaction between the external intervention staff and the targeted staff in the company? (Formal, informal, through documented meetings , training, mentoring, etc.)

l. Were there any barriers to the implementation?

m. What were the enabler that facilitated the implementation stage?

n. Where there any incidents that would have jeopardised the intervention?

7. IMPACT

a. What were the company areas affected by the intervention?

b. What was the significant improvement gained from the intervention?

c. Were there any targets missed or not achieved and why?

d. Was there any point where the company deteriorated as a result of the intervention?

e. Was there any kind of new knowledge skills or expertise being embedded during the implementation?

f. What was the depth of knowledge gained from the intervention in terms of scale and scope?

8. SUSTAINABILITY

a. Has the intervention continued to achieve an impact beyond the end of the intervention? If yes how, if not why not?

b. Does the company still follow or apply the knowledge or procedures acquired from the intervention? If not why not?

c. Have external support providers returned to deal with issues still arising from the intervention?

d. Do the staff still manage to apply the knowledge from this intervention unaided?

e. Since then, have the staff applied the acquired knowledge in other areas of the business?

f. Since then, have the staff modified or customised any *other* processes/products/operations based on the knowledge acquired from the intervention?

g. Have staff acquired any new knowledge in this area without external intervention?

h. Have they changed what they learnt? Was there any kind of new innovation as a consequence of the embedded knowledge?

i. Are there any key staff with the role of searching for or acquiring new knowledge?

j. Would you consider the staff better at receiving new knowledge as a result of this intervention?

9. REFLECTION

a. Would the company embark on a similar exercise again and why?

b. What would you do differently if you were embarking on this intervention again?