



**Facilitating the Transition from Product-Orientated to
Product Service Systems**

In One Volume

Linda Ryan

Submitted for the Degree of Doctor of Philosophy
to the Institute of Technology Sligo, Sligo.

Research Supervisors: Dr. David Tormey, Dr. Perry Share

Date submitted: 15th March 2013

DECLARATION

I hereby declare that the work reported here is my own and that it has not been used to obtain a degree in this institute or elsewhere.

Linda Ryan

EXECUTIVE SUMMARY

Many traditional manufacturing firms within the EU are increasingly challenged by companies operating in developing countries with low-cost labour bases (Yoon et al., 2012). Instead, manufacturers are encouraged to develop competitive advantage by moving up the value chain and providing knowledge intensive products and service. Companies seeking to meet customer expectations and requirements with personalised, flexible and increasingly comprehensive solutions must then convert their product strategies into Product Service Systems (PSS). Due to the inherent differences between the production of goods and services many companies struggle to integrate the two effectively (Friedli *et al.*, 2005). In response to this, numerous models have been developed which aim to integrate product and service development processes and ultimately create a successful PSS offering.

Yet these models neglect to take into consideration existing cultural barriers within companies in relation to the transition from product to PSS provision. Therefore, there is a gap in the understanding of PSS as a complete transition process. This research proposes a model and theory from which a transition process can be derived. This aims to convey the benefits of an integrated product/ service offering, create an awareness and understanding of the level of change required to implement a PSS strategy, resulting in the transition of companies from a product-orientated culture to product/ service orientated culture.

The research initially examines development process models for product, service and product/ services through an extensive literature review which defines the set of requirements necessary to transition to a PSS strategy. Primary research is undertaken with eight product-orientated companies and two practicing service developers to establish the primary cultural barriers to the requirements identified. Based on this information, the ‘**Transition to and Implementation of Product Service Systems**’ (**TIPSS**) process model is developed which synthesises the fundamental components required by the PSS development models and takes into account cultural barriers which prevent the transition to a PSS. A workshop prototype is derived from the process model in order to provide participants with the fundamental skills and knowledge to initiate the cultural transition process. Companies are studied in relation to their transition development and the degree of transition change quantified using established differential indicators between Goods- and Service-orientated cultures. These indicators of cultural transition are used to validate the TIPSS Process model.

PUBLISHED WORK ASSOCIATED WITH THE THESIS

Ryan, Linda; Tormey, David; Share, Perry; Facilitating the Transition to and Implementation of PSS, *Cambridge Academic Design Management Conference (CADMC)*, Cambridge, 5 – 6th September 2013.

Ryan, Linda; Tormey, David; Share, Perry; Transitioning Product Education to Product Service Education, *International conference on engineering and product design education*, DIT, Dublin, 5-6th September 2013.

Ryan, Linda; Tormey, David; Share, Perry; Bridging the gap between research and industry in Product Service System development, *TradeIreland Annual Innovation Conference*, NUI Galway, 12th- 13th June 2012.

Ryan, Linda; Tormey, David; Share, Perry; Comparison of Research Based vs. Industry Developed PSS Models, *International Journal of Service Science, Management, Engineering, and Technology (IJSSMET)* 23rd Jul. 2012.

Ryan, Linda; Tormey, David; Share, Perry; Constraints of service development within the Medical Device Industry: A preliminary study, *Journal of Advanced Materials Research Vol. Materials Science and Information Technology* 433-440 (2012) pp 733-739.

Ryan, Linda; Tormey, David; Share, Perry; Comparison of Research Based Vs Industry PSS models, *Cambridge Academic Design Management Conference (CADMC)*, Cambridge, 7 – 8th September 2011.

Ryan, Linda; *The development of Product Service Systems*; recipient of the Marion McAneney Graduate Research Award for excellence in reviewing academic literature, IntertradeIreland, Queens University, Belfast, 5th October 2011.

Ryan, Linda; Tormey, David; Share, Perry; Constraints of service design in Medical Device Development, *2nd International Conference on Mechanical, Industrial, and Manufacturing Technologies*, Singapore, February 26-28th 2011. Invited for journal submission

Ryan, Linda; Tormey, David; Share, Perry; Comparison of Research Based Vs Industry Developed PSS, *Exploring Services Science Second International Conference on Exploring Services Sciences*, Geneva, Switzerland, February 16-18, 2011. Invited for Journal submission and selected for publication in Revised Selected Papers, Lecture Notes in Business Information Processing, Volume 82, 2011.

NO.	TITLE	PG
	CHAPTER 1: INTRODUCTION	1
1.1	Introduction	2
1.2	Research Rationale	2
1.3	Research Questions	4
1.4	Thesis Structure	5
1.4.1	Chapter One: Introduction	5
1.4.2	Chapter Two: The Development of Product Service Systems	6
1.4.3	Chapter Three: Research Methodology	6
1.4.4	Chapter Four: Transitioning from Product-orientated Culture to Product Service Culture	6
1.4.5	Chapter Five: The TIPSS Process Model	6
1.4.6	Chapter Six: Validation of the TIPSS Process Model	7
1.4.7	Chapter Seven: Conclusion	7
1.5	Conclusion	7
	CHAPTER TWO: THE DEVELOPMENT OF PRODUCT SERVICE SYSTEMS	8
2.1	Introduction	9
2.2	Definitions of Service, NSD, NPD & PSS	10
2.2.1	Definition of Service	10
2.2.2	New Service Development	13
2.2.3	New Product Development (NPD)	14
2.2.4	Product Service Systems (PSS) Development	15
2.3	NSD & NPD activities	17
2.3.1	Common stages of NSD and NPD	18
2.3.2	Stages specific to NSD	21
2.3.3	Stages specific to NPD	24
2.4	NSD & NDP process models	25
2.4.1	NSD Linear and Parallel models	26
2.4.2	The NSD Process Cycle	27
2.4.3	NSD Systematic Learning Model	29
2.4.4	NPD Waterfall Model	31
2.4.5	NPD Spiral Model	31
2.4.6	NPD Stage Gate Model	32
2.5	Product Service Systems (PSS)	34
2.5.1	Service Engineering Design Process Model	37
2.5.2	Technical Service Model	39
2.5.3	PSS Configuration Framework	41
2.6	Comparison of NPD, NSD and PSS models	42

2.6.1	Aims and Objectives of Models reviewed	43
2.6.2	Methodology of Models reviewed	44
2.6.3	Recommended future research of Models reviewed	45
2.7	Model comparison synopsis	47
2.8	Summary of analysis	48
2.9	Current PSS understanding	49
2.10	Knowledge gap identified in PSS models and addressed in TIPSS	51
 CHAPTER THREE: RESEARCH METHODOLOGY		53
3.1	Introduction	54
3.2	Research Strategy	54
3.3	Research Methodology	57
3.3.1	Stage 1: Preliminary Literature Review	58
3.3.2	Stage 2: Quantitative Research	59
3.3.3	Stage 3: Qualitative Research	60
3.3.4	Stage 4: Development and Validation	63
3.4	Conclusions	65
 CHAPTER FOUR: TRANSITIONING FROM PRODUCT TO PRODUCT SERVICE		68
4.1	Introduction	69
4.2	Organisational Culture	70
4.2.1	Dominant logics	71
4.3	Transitioning culture/ logics within the company	77
4.3.1	Lack of awareness of dominant culture	78
4.3.2	Lack of high level support	79
4.3.3	Product-orientated concept of Value Proposition	80
4.3.4	Undefined PSS strategy	81
4.3.5	Product-orientated customer relationship management	83
4.3.6	Product-orientated Knowledge Management	84
4.3.7	Product-orientated Communication Management	85
4.3.8	Product-orientated approach to measuring success	86
4.3.9	Lack of Value Network Management	88
4.4	Transitioning staff focus from product-orientated to PS	89
4.4.1	'Mistake' avoidance mindset	89
4.4.2	No knowledge/ understanding of change rationale	90
4.5	Key findings and Conclusions	92

	CHAPTER FIVE: THE TIPSS PROCESS MODEL	97
5.1	Introduction	98
5.2	Descriptive vs. Prescriptive Models	99
5.3	The Proposed Approach	100
5.3.1	Systematic approach	102
5.3.2	Representation of transition process	102
5.3.3	PSS process and activities	107
5.3.4	Cultural Influencing Factors	109
5.3.5	Information and Knowledge Transition Representation	111
5.4	TIPSS Process Model Summary	114
5.5	TIPSS Process Model Representation	115
5.6	TIPSS Process Model Application	121
5.6.1	TIPSS Process Model Initiation: The TIPSS Workshop	121
5.6.2	Mapping Activity	122
5.6.3	Evaluation Activity	125
5.6.4	Advance Activity	127
5.6.5	Reiteration	128
5.6.6	Full Launch Activity	129
5.7	Conclusions	129
	CHAPTER SIX: VALIDATION OF THE TIPSS WORKSHOP	131
6.1	Introduction	132
6.2	Case Study Company Overviews	132
6.2.1	Case Study Company A	134
6.2.2	Case Study Company B	134
6.3	Data Collection Methods	135
6.4	Validation Criteria: Cultural Indicators	136
6.4.1	Application of Validation criteria	137
6.5	Company A	138
6.5.1	Company A Initial Observations	139
6.5.2	Company A Part 1/3: Benchmarking	141
6.5.3	Company A Part 2/3: PSS Transition Process	147
6.5.4	Company A Part 3/3: Future plans	156
6.5.5	Company A case study overview	161
6.6	Company B	163
6.6.1	Company B Initial observations	163
6.6.2	Company B 1/3: Benchmarking	166
6.6.3	Company B 2/3: PSS Transition process	171
6.6.4	Company B 3/3: Future plans	180

6.6.5	Company B case study overview	186
6.7	Case Study comparison	188
6.7.1	Comparison finding one: Service perception	188
6.7.2	Comparison finding two: Poor communication amongst staff	188
6.7.3	Comparison finding three: Service provision based on customer segmentation	189
6.7.4	Comparison finding four: Under estimation staff resource requirements	189
6.7.5	Comparison finding five: Customer perception of value offering	189
6.7.6	Case study comparison summary	190
6.8	Conclusions	190
 CHAPTER SEVEN: CONCLUSION		194
7.1	Introduction	195
7.2	Thesis summary	195
7.3	Overall conclusions	196
7.4	Key Contributions from research	199
7.5	Recommendations for future research	200
7.6	Conclusion	202
	References	203
	Appendices	221

LIST OF FIGURES

No.	DESCRIPTION	Pg
1.1	Thesis structure	5
2.1	NPD, NSD & PSS overlap	10
2.2	The servitisation of manufacturing	12
2.3	Example of a service blueprint	22
2.4	Linear model of NSD & Parallel model of NSD	27
2.5	The NSD Process Cycle	28
2.6	The Systematic Learning Model for NSD	29
2.7	Spiral Model	32
2.8	Stage-gate Model	33
2.9	Service Engineering Design Process	38
2.10	Framework for PSS configuration	41
3.1	Research methodology structure	57
3.2	Example of Spider diagram used to compare PIM results	60
3.3	Intertwining of Primary and Secondary research	62
3.4	An action reflection cycle	64
4.1	Service co-production & value co-creation according to Service-dominant logic	73
4.2	The Experimental Learning Cycle and Basic Learning Styles	91
5.1	Product to Service cultural change over time	102
5.2	Example of extreme company positioning	106
5.3	Developmental phases for the TIPSS process model	108
5.4	Influencing factors (IF) for TIPSS model	110
5.5	Information & knowledge transition for TIPSS model	112
5.6	TIPSS process model representation	115
5.7	Scenario company placement in the TIPSS Process model	116
5.8a	Scenario illustration of TIPSS	117
5.8b	Scenario illustration of TIPSS (continued)	118
5.8c	Scenario illustration of TIPSS (continued)	119
5.9	TIPSS Process Model Specification summary	120
5.10	Business Model Template	123
6.1	Company A TIPSS Process/ Workshop summary	138
6.2	Company A monthly report summary	147
6.3	Company B TIPSS Process/ Workshop summary	162
6.3	Company B monthly report summary	170

LIST OF TABLES

NO.	TITLE	PG
2.1	Common differences between Manufacture & Service	11
2.2	Classification of new services	13
2.3	Classification of new product categories	15
2.4	Characteristics of product sales vs. product service system sales	16
2.5	NSP activity process vs. NPD activity process	17
2.6	Common stages for NSD and NPD	18
2.7	Stages specific to NSD	21
2.8	Stages specific to NPD	24
2.9	Summary of NSD and NPD models studied	26
2.10	PSS models studied	36
2.11	NPD, NSD & PSS comparison summary	47
2.12	Example of PSS models addressing change in product-orientated companies	51
3.1	Profiles of companies interviewed	61
4.1	Product centric vs. Customer centric companies	74
4.2	Summary of cultural barriers to PSS transition within the company	77
4.3	Impact of cognitive phenomena on managerial motivation	78
4.4	Summary of cultural barriers to PSS transition in relation to staff	88
4.5	Summary of identified cultural barriers to PSS transition	92
5.1	Derivation of TIPSS process model specification	100
5.2	Fundamental differences between goods-dominant logic & service-dominant logic	103
5.3	Summary of CIF headings	109
5.4	Specification of the TIPSS Process model	113
5.5	Sample of Evaluation questions for Customer Segments	125
6.1	Basic profile of companies used as case studies	132
6.2	Data collection methods for Case Study Development	134
6.3	Criteria rating summary	137
6.4	Company A Goods vs. Services benchmark rating	141
6.5	Company A Tangible vs. Intangible benchmark rating	142
6.6	Company A Operand resources vs. Operant resources benchmark rating	143
6.7	Company A Asymmetric vs. Symmetric benchmark rating	143
6.8	Company A Propaganda vs. Conversation benchmark rating	144

6.9	Company A Value added vs. Value proposition benchmark rating	144
6.10	Company A Transactional vs. Relational benchmark rating	145
6.11	Company A Profit Maximisation vs. Financial Feedback benchmark rating	145
6.12	Company A benchmark summary	146
6.13	Company A Goods vs. Services PSS transition process rating	147
6.14	Company A Tangible vs. Intangible PSS transition process rating	148
6.15	Company A Operand resources vs. Operant resources PSS transition process rating	149
6.16	Company A Asymmetric info vs. Symmetric info PSS transition process rating	150
6.17	Company A Propaganda vs. Conversation PSS transition process rating	151
6.18	Company A Value added vs. Value proposition PSS transition process rating	151
6.19	Company A Transactional vs. Financial feedback PSS transition process rating	153
6.20	Company A Profit maximisation vs. Financial Feedback PSS transition process rating	153
6.21	Company A Position PSS transition process summary	154
6.22	Company A Goods vs. Services future plans	155
6.23	Company A Tangible vs. Intangible future plans	156
6.24	Company A Operand vs. Operant future plans	156
6.25	Company A Asymmetric info vs. Symmetric Info future plans	157
6.26	Company A Propaganda vs. Conversation future plans	157
6.27	Company A Value added vs. Value proposition future plans	158
6.28	Company A Transactional vs. Relational future plans	158
6.29	Company A Profit maximisation vs. Financial Feedback future plans	159
6.30	Company A Position future plans summary	160
6.31	Company A Validation Criteria summary	161
6.32	Company B Goods vs. Services Benchmarking rating	165
6.33	Company B Tangible vs. Intangible Benchmarking rating	166
6.34	Company B Operand vs. Operant Benchmarking rating	166
6.35	Company B Asymmetric Info vs. Symmetric Info Benchmarking rating	167
6.36	Company B Propaganda vs. Conversation Benchmarking rating	168
6.37	Company B Value Added vs. Value Proposition Benchmarking rating	168
6.38	Company B Transactional vs. Relational Benchmarking rating	169
6.39	Company B Profit Maximization vs. Financial Feedback Benchmarking rating	170
6.40	Company B Benchmark summary	170
6.41	Company B Goods vs. Services PSS transition process rating	172
6.42	Company B Tangible vs. Intangible PSS transition process rating	172
6.43	Company B Operand Resources vs. Operant Resources PSS transition process rating	173
6.44	Company B Asymmetric Info vs. Symmetric Info PSS transition process rating	174
6.45	Company B Propaganda vs. Conversation PSS transition process rating	175
6.46	Company B Value Added vs. Value Proposition PSS transition process rating	176
6.47	Company B Transactional vs. Relational PSS transition process rating	177

6.48	Company B Profit Maximization vs. Financial Feedback PSS transition process rating	178
6.49	Company B PSS transition process summary	179
6.50	Company B Goods vs. Services rating future plans	180
6.51	Company B Tangible vs. Intangible rating future plans	181
6.52	Company B Operand Resources vs. Operant Resources rating future plans	181
6.53	Company B Asymmetrical vs. Symmetrical rating future plans	182
6.54	Company B Propaganda vs. Conversation rating future plans	182
6.55	Company B Value Added vs. Value Proposition rating future plans	183
6.56	Company B Profit Transactional vs. Relational rating future plans	183
6.57	Company B Profit Maximisation vs. Financial rating future plans	184
6.58	Company B Position future plans summary	185
6.59	Company B Validation Criteria summary	186
6.60	Summary of Case Study similarities	187

LIST OF APPENDICES

NO.	TITLE	PG
A	Company Questionnaire	221
B	Semi-structured Interview questions	224
C	Quantitative Data Spider Diagram	226
D	Company Process Maps	238
E	TIPSS Workshop Booklet	249
F	Evaluation Questions	289

GLOSSARY OF TERMS/ ABBREVIATIONS

Benchmarking: A methodology used to search for best practices. Benchmarking can be applied to strategies, policies, operations, processes, products, and organizational structures.

CIF: Cultural Influencing factors.

NPD: New Product Development

NSD: New Service Development

OECD: Organisation for Economic Co-operation and Development

PSS: Product Service System

PLC: Product Life Cycle

Validation: A process which confirms that the product/ service, as provided, will fulfil its intended use, ensuring that “you built the right thing.”

Verification: A process which confirms that the product/ service properly reflects the requirements specified, ensuring that “you built it right.”

Medical Device Class I: These devices present minimal potential for harm to the user and are often simpler in design than Class II or Class III devices. Examples include wheelchairs, walking aids, examination gloves and elastic bandages.

Medical Device Class IIa: These devices present medium potential harm for the user. For example, antistatic tubing for anaesthesia and contact lenses.

Medical Device Class IIb: These devices present moderate to high potential harm for the user. For example, dressings for chronic ulcerated wounds and severe burn wounds.

Medical Device Class III: These devices present the highest level of potential for harm to the user. They usually sustain or support life, are implanted, or present potential unreasonable risk of illness or injury for example implantable pacemakers and breast implants.

CHAPTER 1 INTRODUCTION

CHAPTER ABSTRACT:

The purpose of Chapter One is to provide an overview of the justification, aims and objectives for the research contained in this thesis. The structure of the thesis as a whole is also provided.

1.1 Introduction

1.2 Research Rationale

1.3 Aims and Objectives

1.4 Thesis Structure

1.5 Conclusion

1.1 Introduction

The aim of this chapter is to provide an overview of the research undertaken. It examines the rationale for the research by outlining the changing business environment. Based on these developments, the research aims and objectives are discussed in order to provide a comprehensive understanding of what the research aims to achieve.

1.2 Research rationale

Globalisation, emerging new technologies, increasing competition, deregulation and economic instability have led to a shifting of Western society from an emphasis on production of goods, to production of services. With this increasingly competitive global market, cost, quality and technology leadership are now insufficient for businesses to secure critical advantage. Instead, differentiation is being provided through the supply of innovative services. Services now account for a greater share of profits than manufacturing operations in many 'manufacturing' companies (Neely, 2007). For example, an average of forty percent of all persons employed in the manufacturing sector in a sample of OECD countries (Austria, Belgium, Germany, Denmark, Spain, Finland, France, Greece, Ireland, Italy, Luxemburg, Netherlands, Portugal, Sweden, United Kingdom) were employed in occupations which can be broadly considered as service related such as management, business, finance and legal professions (Pilat and Wölfl, 2005). This service emphasis has shifted to the extent that some 'now view the manufactured good as incidental' (Graves and Ward, 2007). Instead of mass-produced goods, customers now demand goods and services integrated into customer-specific packages (Davies, 2003 as cited by Brax, 2005). The inclusion of services into total product solutions aids companies to (Brax, 2005):

- Facilitate the sale of goods.
- Lengthen customer relationships.
- Create growth opportunities in mature markets.
- Balance the effects of economic cycles.
- Respond to demand.

This transition of strategic focus from designing (and selling) physical products only, to designing and selling a system of products and services which are jointly capable of fulfilling specific client demands, is known as Product Service Systems (PSS) (Manzini & Vezzoli, 2002).

There are significant potential benefits associated with a cohesive PSS strategy, such as increased revenue, provision of stable and countercyclical revenue source, competitive advantage through customised products and services and higher shareholder value (Cavaliere and Pezzotta, 2012). PSS models aim to integrate products and service development processes into a single cohesive structure. They typically source best practices from both new product and new service development models in order to create cohesive, effective and efficient flows of activities. The literature to be discussed in this thesis reflects that there is a gap in the understanding of barriers to the cultural transition from product-orientated to PSS. It focuses on the development of PSS models which effectively integrate product and service processes. However, they do not take into account existing barriers such as lack of knowledge, skills and resources; and an opposing corporate culture.

When compared to manufacturing, PSS is relatively new. Although significant knowledge and experience have been accumulated, the application of PSS models is still limited (Vezzoli *et al.*, 2012). Compared to products, services are generally under-designed and inefficiently developed (Cavaliere and Pezzotta, 2012). This is particularly true for product-orientated companies as, due to the fundamental differences between the production of goods and services, many struggle to integrate the two effectively (Friedli *et al.*, 2005). Several authors (Davies, 2003; Oliva and Kallenberg, 2003; Gebauer *et al.*, 2004; Kotler, 2003; Hildenbrand *et al.*, 2004) indicate that to compensate for the lack of service knowledge, skill and resources, the shift from manufacture to service-dominant offerings is commonly achieved through incremental change. Despite this cumulative approach to PSS, many product-orientated companies still struggle to effectuate service components. In comparison to product development, a broader range of knowledge is required for PSS design as both products and services are included in its design space (Akasaka *et al.*, 2012). As companies develop knowledge in the specific area of product development, they may lack knowledge and organisation in service development (Crul *et al.*, 2010 as cited by Yoon and Rhee, 2012). Although existing PSS models integrate product and services into a streamlined process, they do not take into account the service knowledge and skills (or lack thereof) available within the company due to the focus on products. This can prevent or limit the level of PSS application as the company does not have the necessary service knowledge and skill resources.

Additionally, a significant factor in any change of business strategy is the existing corporate culture (Nadkarni and Narayanan, 2007; Kwantes and Boglarsky, 2007; MacIntosh and Doherty, 2010; Obloj *et al.*, 2010). Corporate culture plays a significant role in adoption of PSS methodologies as it determines what knowledge is available within the company, its willingness to learn and how it makes strategic decisions. For example, when transitioning from product-orientated to PSS, the corporate culture must adapt to account for ‘soft factors’ associated with services such as customer relationships and customer co-creation (discussed in more detail in Chapter Two). Although of high importance in service provision, ‘soft factors’ are typically of lower importance in product production and are often overlooked. Staff must be made aware of these factors and be willing to learn how to manage and maintain them. Although PSS models often account for existing development processes, they do not account for the existing corporate cultures in which the models will operate (discussed in more detail in Chapter Four). A corporate culture which is opposed to the suggested model will significantly limit its application.

1.3 Research Questions

The primary aim of this research is to facilitate the cultural transition of companies from product-orientated to PSS through a study of companies operating in the Medical Device Industry. This industry was chosen as, due to the high level of regulatory requirements and controls within this industry, implementation of variable service components is particularly difficult. The rationale for the selection of this specific industry is further detailed in Chapter three. In order to achieve this aim, existing cultural barriers in relation to the application of PSS strategy within a product-orientated business must be identified. This research proposes to achieve this through the following research questions:

- What are the primary methodologies and approaches being utilised in current PSS strategies?
- What are the key barriers that firms face in making the transition from a goods dominant logic to a PSS approach?
- How might companies overcome these barriers to transition from a goods dominant logic to a PSS approach?

- How can the cultural/ learning theories and models derived from the research be validated?

1.4 Thesis Structure

The following section provides an overview of the structure of the thesis, in relation to the objective and content of each chapter, and their inputs into subsequent chapters (see Figure 1.1).

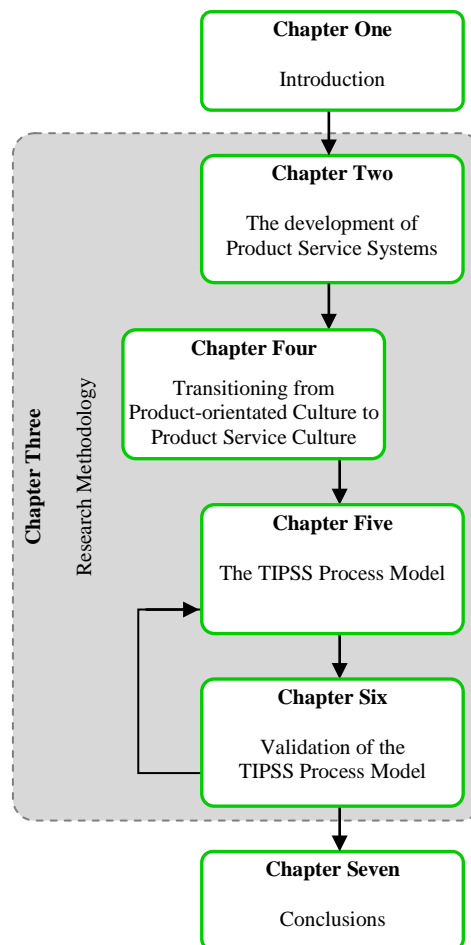


Figure 1.1: Thesis structure

1.4.1 Chapter One: Introduction

Chapter One provides the rationale for the research and details the research questions and thesis structure.

1.4.2 Chapter Two: The Development of Product Service Systems

Chapter Two explores and synthesises the related research and literature regarding New Product Development, New Service Development and Product Service Development processes and models. It includes a comprehensive definition of terminology, common/contrasting development phases and model requirements. The strengths and weaknesses of each model are compared and examined. The key findings and conclusions from this chapter are used to identify and define the knowledge gap in relation to the application and knowledge requirements of the transitional process from Goods- to Service-Dominant Logic.

1.4.3 Chapter Three: Research Methodology

Chapter Three defines and justifies the research and validation methodology used in this thesis. It details the sample process used to select companies for interview and action research/ case study analysis. In addition, it details the data collection methods used in both the development and validation of the proposed model. The shift in research focus from the development of an integrated PSS model to a process model which facilitates a company's cultural transition from product-orientated to PSS is justified and discussed.

1.4.4 Chapter Four: Transitioning from Product-orientated Culture to Product Service Culture

Chapter Four defines the cultural barriers which prevent/ inhibit the transition from a product to a PSS offering. Primary information gathered through company interviews will be used to both support and expand key trends found in the literature in relation to cultural factors. Based on these explanations, cultural barriers in relation to the company as a whole and individual staff are identified. This provides a context in which the proposed transitional model must operate and highlights the principle cultural barriers it must overcome.

1.4.5 Chapter Five: The TIPSS Process Model

Chapter Five presents a set of specifications derived from the literature review and primary research contained in Chapter Two and Four, for a new process model entitled the **TIPSS** Process Model (**T**ransition to and **I**mplementation of **P**roduct **S**ervice **S**ystems). This model serves as a basis for the development of a process which facilitates the cultural transition of a company in order to adopt service components into a Goods Dominant culture. The initiation

of the transition is facilitated through the TIPSS workshop, which is derived from the TIPSS Process model. This chapter concludes with details of the model format, tools and supporting theory.

1.4.6 Chapter Six: Validation of the TIPSS Process Model

Chapter Six details the validation of the TIPSS Process model. This was achieved through two seven month case studies of product orientated companies. Each was analysed in relation to its position at the initiation of the process, over the duration of the study and at its conclusion as regards future intentions. To conclude the chapter, key findings and results from the case study analysis are provided.

1.4.7 Chapter Seven: Conclusion

Chapter Seven provides a conclusion to the research undertaken in the thesis. An overview of the research with a synopsis of the significant findings is provided. This chapter concludes by providing suggested future research in this area.

1.5 Conclusion

This chapter has provided an overview of the rationale aims and objectives of the research. The structure of the thesis was discussed to illustrate the approach taken to achieving these aims and objectives, highlight interdependencies between chapters and the logical progression from one to the next. The following chapter will discuss the existing literature on the chosen topic.

CHAPTER TWO

THE DEVELOPMENT OF PRODUCT SERVICE SYSTEMS

CHAPTER ABSTRACT:

The purpose of Chapter Two is to highlight the gap in the understanding of the transition process from a product-orientated culture to a PSS culture. This is done through the analysis of prior knowledge in relation to New Product Development (NPD), New Service Development (NSD) and Product Service System (PSS) models. This is then used to determine the common fundamental requirements needed for companies to facilitate the cultural transition to PSS. This forms a critical factor in the development of the TIPSS Process model.

- 2.1 Introduction**
- 2.2 Definitions of Service, NSD, NPD & PSS**
- 2.3 NSD & NPD activities**
- 2.4 NSD & NDP process models**
- 2.5 Product Service Systems (PSS)**
- 2.6 Comparison of NPD, NSD and PSS models**
- 2.7 Model comparison synopsis**
- 2.8 Summary of analysis**
- 2.9 Limitations of current PSS understanding**

2.1 Introduction

This chapter contains the literature review of current product, service and product/service terminologies, methodologies and models. As discussed in Chapter One, there is a global shift towards the provision of services. Companies that traditionally focused on the production of products are increasingly required to provide service components in their value offering. Companies seeking to meet customer expectations and requirements with personalised and comprehensive solutions must convert their product strategies into Product Service Strategies. To achieve this, traditional manufacturing companies which operate under a product-orientated culture, must develop and provide service components. In response, a wide range of literature attention (for example business strategy, engineering and service development) has turned to developing PSS models which combine product and service development processes. These aim to amalgamate the core requirements of both processes into a single coherent, effective and efficient process. However, companies can struggle to implement a PSS model because, as discussed previously, product and services differ in their inherent characteristics. As a result, companies may not have, or be aware of the necessary knowledge and skills required to implement a PSS strategy. Additionally, due to the existing product focus in manufacturing companies, they may be reluctant to implement the necessary changes to facilitate service provision.

As discussed, PSS is a combination of product and service components. Therefore, to facilitate discussion of PSS, this chapter will discuss and define the key terms of product, service, New Product Development (NPD), New Service Development (NSD) and PSS. In addition, in order to cohesively understand the PSS approach and requirements, PSS, NPD and NSD activities, processes and models will be analysed and compared. This analysis will highlight the common/ contrasting requirements, methodologies and approaches of the models and their implementation. This analysis will be used to define a gap in the understanding of the implementation a PSS strategy and provide a list of fundamental requirements to facilitate the cultural transition of a company from a Good-dominant to an Integrated Logic.

2.2 Definitions of Service, NSD, NPD and PSS

PSS models integrate components and processes from both NPD and NSD into a new format. As PSS aims to integrate products and services into a single cohesive system, it must take into account the requirements of both NSD and NPD processes. This is shown in Figure 2.1, where PSS combines both NPD and NSD processes. There are no universally accepted terms for the components or series of process stages. In the following section, this author will define key terminology in relation to PSS, NSD and NPD suited to the context of this research.

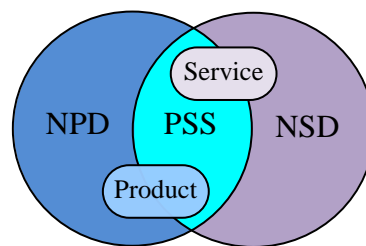


Figure 2.1: NPD, NSD & PSS overlap.

2.2.1 Definition of Service

The service concept has many definitions. Due to the high personalisation of services, several definitions focus on the consumer. Edvardsson *et al.* (2000) defined service as a detailed description of:

- Customers' needs to be satisfied, and how they are to be satisfied,
- What is to be done for the customer and how this is to be achieved.

Alternatively, Clarke *et al.*, (2000) define service as:

- The service operation (the way the service is delivered).
- The service experience (customers' direct experience of the service).
- The service outcome (benefits and results of the service for the customer)
- The value of the service (customer's perception of the benefits vs. the cost of the service).

From a business perspective, Grönroos (2001) defines service as “an activity or series of activities of a more or less intangible nature that normally, but not necessarily, take place in the interaction between the customer and service employees and/or physical resources or goods and/or systems of the service provider, which are provided as solutions to problems.” Davis and Heineke (2005) simply define service as ‘bundles of benefits’, the things that provide benefit and value to the customer.

There are significant differences between the fundamental characteristics of products and services (see Table 2.1). The ‘real-time’ production of services allows modification of the delivery process at the point of delivery. This interaction between service development and service delivery is higher than that of New Product Development (NPD) and production in product manufacturing (Tatikonda and Zeithaml, 2001). Unlike products, which are produced independently from the consumer, service operations are co-created with the customer i.e. a degree of customer input is required in order to complete service provision. For example, customer misuse can directly affect the service outcome. Production and consumption of services are simultaneous (Mills and Moberg, 1982). Due to their intangibility, services cannot be inspected prior to purchase, but must be examined during delivery or post-purchase.

Product	Service
1. Object	1. Deed, act or performance.
2. Tangible.	2. Intangible.
3. Produced, distributed & consumed separately.	3. Produced, distributed & consumed simultaneously.
4. High repeatability.	4. Low repeatability.
5. Low customer participation.	5. High customer participation.
6. Pre-purchase inspection.	6. Surrogate inspection e.g. Word-of-mouth, brand, personnel
7. Created by manufacturer.	7. Co-created by consumer & provider.
8. Low effect of consumer error.	8. High effect of consumer error.
9. High industry standards.	9. Looser industry standards.
10. No emotional demand on supplier.	10. High emotional demand on provider.
11. High satisfaction rates.	11. Low satisfaction rates.
12. Product features.	12. Service experience.
13. Storable.	13. Cannot be stored.
14. Ownership can be transferred.	14. Ownership cannot be transferred.
15. ‘Back room’ operations.	15. ‘Front room’ operations.
16. Long change times.	16. Short change times.

Table 2.1: Common differences between Manufacturing and Service

However, the defining lines between product and service are becoming increasingly blurred (Correa *at al.*, 2007; Graves and Ward, 2007). Trends are moving towards a more product

service approach to business, where both are combined to provide high customer value. As can be seen in Figure 2.2, initially products and services were exclusive of each other. As services began to develop, they were heavily related to product provision (e.g. maintenance, repair, distribution). With the development of PSS, services became capable of holding value separate to that of the product but additional value could be derived if the product and service are used together.

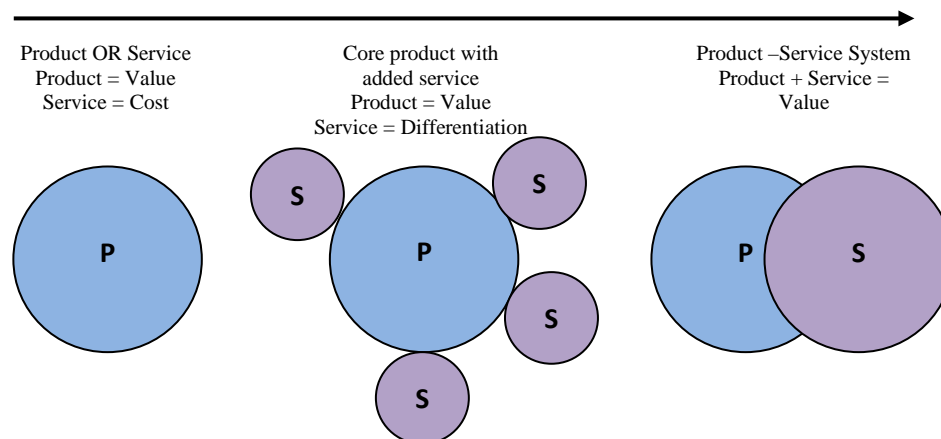


Figure 2.2: The servitisation of manufacturing (Beltagui *et al.*, 2009).

The value of the service is dependent on the structure of the PSS. Product services are aimed at facilitating the sales of a product and supporting its operation. The tangible good can carry the price of the bundled benefits and cover the service cost, or the added value may be charged separately (Brax, 2005). In contrast, service products are tangible, offering-independent and can be purchased separately (Mathieu, 2001). Due to this blurring of products and services, several authors claim that traditional characteristics used to distinguish goods from services (intangibility, heterogeneity, inseparability and perishability) are now insufficient; and distinguishing between them is no longer a desirable objective (Evardsson *et al.*, 2005; Aurajo and Spring, 2009; Cooper *et al.*, 2007). Instead, attention is turning toward operations and marketing perspectives on service management which incorporate both products and services.

Due to the variety of service definitions, and its changing role in business, it is difficult to derive a single all-encompassing definition of service. As PSS strategies aim to integrate product and service processes into a single system, clearly delineating between product and service will simplify discussions. Therefore, taking into account service definitions from

current literature, and keeping aligned to the overall context of this research, this author defines service as: *A series of actions, co-produced by provider and consumer, which can be stand-alone, or bundled with a physical product, to create or add value.*

2.2.2 New Service Development

As discussed in section 2.1, innovative services are increasingly being used as sources of differentiation. Increasing customer expectations, competition and the speed of technical development mean organisations must constantly look for new approaches to service design and delivery. New approaches, methods and techniques offer scope for developing new and improved services and product service bundles. New Service Development (NSD) is a method to provide service innovation. It is seen as essential for enhancing profitability (or viability) of existing services through cost reduction and increased sales; attracting new customers and creating loyalty among existing ones (Fischbacher *et al.*, 2007).

Chase *et al.* (2000) differentiate service design from NSD. Service design specifies the detailed content and configuration of a service concept, while the NSD refers to the overall process of developing service offerings. However, design issues are deemed critical to NSD. In order to define NSD, a definition of what constitutes a ‘new service’ is required. Several authors propose a definition of new services, which range for radical to incremental (table 2.2).

New service Category	Description
Radical Innovations	
Major innovation	New services for markets as yet undefined; Innovations usually driven by information & computer-based technologies. New services in a market that is already served by existing services.
Start-up businesses	
New services for the market presently served	New service offerings to existing customers of an organisation (although the services may be available from other companies).
Incremental innovations	
Service line extensions	Augmentations of existing service line such as adding new menu items, new routes, & new courses. Changes in features of services that currently are being offered.
Service improvements	Modest forms of visible changes that have an impact on customer perceptions, emotions & attitudes, with style changes that do not change the service fundamentally, only its appearance.

Table 2.2: Classifications of new services (Chase *et al.* in Menor *et al.*, 2002).

New services have been defined based on:

- The extent of change to the existing service system or based on the operational process and participants (Stuart and Tax, 1997).
- Any changes to the service concept that requires different competencies from the existing operation (Johnson, 1999).
- An offering not previously available to a company's customer, resulting from the addition of a service offering or changes in the service concept which allows the service offering to be made available (Menor, 2000 as given in Menor *et al.*, 2002).

Due to the broad variety of definitions, it is difficult to derive a single definition of what new service development is. Taking into account new service definitions from current literature, and remaining in the context of this research, this author defines new service development as: *A process which produces an output of an offering previously unavailable to the customer, resulting from an addition to the current provided services. This can result in new services, incremental or radical changes to the current provided services, or changes made to the delivery process.*

2.2.3 New Product Development (NPD)

NPD is one of the most critical tasks in the business process (Chao *et al.*, 2006) as the capability to develop innovative new products can be a key determinant of competitive advantage. Companies develop products to increase sales, profits and competitiveness. Prior research has identified a number of factors which contribute to the success of new product development, including effective communication, product characteristics and work organisation (Brown and Eisenhardt, 1995). NPD has been defined as a set of activities beginning with a market opportunity and ending with the production, sale, and delivery of a product (Ulrich and Eppinger, 2004 as cited by Marion and Simpson, 2009). Similar to that of New Service Development (NSD), in order to define NPD, the term 'new product' must be specified. Beech & Chadwick (2007) classify new products into four categories (see table 2.3).

New Product Category	Product example
Product replacements	A golf company produces golf clubs with graphite shafts.
Addition to existing lines	A fishing equipment manufacturer launches a clothing line.
New product line	A sports drink manufacturer launches a deodorant.
New-to-the-world products	A new sports activity is created.

Table 2.3: Classification of new product categories.

As with service and NSD, it is difficult to derive a definition of what new product development is. To provide a clear delineation between product and service for this discussion, a product is specified as a physical object. Aligned with the overall context of this research, this author defines new product development as: *A process which produces an output of a physical product, resulting in an addition to the current product portfolio, or changes made to an existing product which creates additional value to the customer not previously available.*

2.2.4 Product Service Systems (PSS) Development

PSS has been described as ‘an innovation strategy, shifting business focus from designing (and selling) physical products only, to designing (and selling) a system of products and services which are jointly capable of fulfilling specific client demands’ (Manzini and Vezzoli, 2003). PSS contains a physical product combined with specific non-physical services. It is considered a useful, attractive approach as it fits well into the criteria of strategies to achieve sustainability of product, production and consumption (Manzini and Vezzoli, 2002). The key concept of PSS is that consumers do not specifically demand products, but rather are seeking the utility of products and services (see Table 2.4). From a consumer’s perspective, PSS is a shift from buying products to buying services and system solutions with the potential to minimise the environmental impacts of consumer needs/wants. From the producer/ service provider perspective, PSS involves a higher degree of responsibility for the product’s lifecycle, the early involvement of consumers in the PSS design, and design of a closed-loop system. PSS enables companies to move progressively towards new interaction routes with clients. What the company creates is an integrated solution to meet customer demands which produces a satisfactory utilitarian result.

Traditional product sales	Innovative alternatives: Product Service Systems	
Consumer buys a washing machine to clean clothes in house/ hotel.	Consumer rents a washing machine to clean clothes in house/ hotel.	Client buys a service from a company (laundry) to clean clothes (Company determines best equipment and methods based on client's needs).
Client owns, uses and stores washing machine. Customer is responsible for maintenance and the 'quality' of the cleaning.	Company retains ownership of washing machine and is responsible for maintenance. Client is responsible for use and 'quality' of cleaning.	Company owns, maintains and stores the cleaning equipment including washing machine. Company is responsible for 'quality' of the cleaning.
Initial investment for consumer could be considerable.	Consumer costs are spread over time (they pay a low initial deposit and then pay per wash).	Consumer costs are spread over time (they pay per wash).
Consumer ultimately disposes of washing machine and buys replacement.	Company is responsible for disposal and has incentives to prolong use of product, reuse component and recycle materials.	Company is responsible for disposal and has incentives to prolong use of product, reuse component and recycle materials.

Table 2.4: Characteristics of Product sales vs. Product-service systems sales (Manzini and Vezzoli, 2003).

Product service systems can be classified into three categories (Tukker, 2003):

- **Product-oriented PSS:** The product is owned by the consumer and delivered services are attached to the product itself e.g. maintenance, repair, re-use and recycling, product use optimisation through training. This can minimise company costs by creating long lasting, well functioning products, with product end-of-life being incorporated (e.g. reusable/ easily replaceable / recyclable parts).
- **Use-oriented PSS:** The provider does not sell the product, but its usage and function e.g. product retail, leasing or sharing. The product use can be maximised to meet demand while extending product life and reducing the manufacturing materials used.
- **Result-oriented PSS:** Product is substituted by a service. The service is owned and run by the manufacturer/ provider, e.g. web information replacing maps.

Product Service Systems are a relatively new approach with research at an early-stage. It is the close integration of product with supporting and facilitating services which is blurring the defining lines between products and services. For the purpose of this study, and aligning with the overall context of the research, a Product Service System is defined as: *A tangible*

product with an intangible service, integrated to provide additional customer value which would not be provided by the supply of the product or service individually.

Differences in the key characteristics of products and services require different activities within the development process. As discussed in Chapter One, these differences cause difficulty in PSS development and application within a product-orientated company, as services require a different range of knowledge and skills to that of product development. Due to a product-orientated culture, companies may be unaware of the need for or lack of service requirements and therefore struggle to implement a PSS strategy. In order to fully understand the focus, structure and requirements of a PSS strategy, activities which are common and exclusive to product and service development must be ascertained. These activities are discussed in the following sections.

2.3 NSD & NPD activities

As discussed, product and service components are increasingly being combined to create additional value. The extent of service provision is dependent on the intended PSS value offering. Commonly, the new components are integrated into existing development processes. To gain a complete understanding of requirements for a cultural transition from product-orientated to a PSS, knowledge of the separate product and service development processes is required. This will provide a comprehensive breakdown of the activities within a PSS process. The following section is broken into three segments: Common stages of NSD and NPD; Stages specific to NSD; and Stages specific to NPD. A summary of all NPD and NSD activities are shown in Table 2.5.

New Service Development*	New Product Development**
Strategic planning	Product line planning
Idea generation	Strategic planning
Idea screening	Idea generation
Business analysis	Business analysis
Formation of a cross functional team	Development
Service design & process system design	Testing & validation
Personnel training	Manufacturing development
Service testing & pilot run	Commercialising
Test marketing	
Commercialising	

* Sourced from Alam and Perry, 2002.

** Adapted from Ozer, 2003.

Table 2.5: NSP activity process vs. NPD activity process

2.3.1 Common stages of NSD and NPD

The processes of NSD and NPD are not mutually exclusive. Several steps are common (common steps are highlighted in grey in Table 2.6). The common steps occur at different times within the process and, due to the inherent differences in products and services, the desired outcomes of common stages differ. In order to transition from a product-orientated culture to a PSS culture, companies must be aware of the different approaches and outcomes of each stage for the development and provision of services. These common stages are discussed below.

New Service Development*	New Product Development**
Strategic planning	Product line planning
Idea generation	Strategic planning
Idea screening	Idea generation
Business analysis	Business analysis
Formation of a cross functional team	Development
Service design & process system design	Testing & validation
Personnel training	Manufacturing development
Service testing & pilot run	Commercializing
Test marketing	
Commercialising	

* Sourced from Alam and Perry, 2002.

** Adapted from Ozer, 2003.

Table 2.6: Common stages for NSD and NPD

Common stage 1: Strategic planning

Although occurring at different stages of the development process, strategic planning for both products and services has the same goals. Business strategy for a service company determines its mission, long-term objectives and position relative to other companies in the market (Duffy *et al.*, 2002). Businesses use these strategies to differentiate from competitors by determining what activities will deliver a service experience different to that of competing providers e.g. service leader, a ‘me-too’ or a laggard. Strategy can be seen as a pattern of decisions, anchored by deliberate strategies at one end and by emergent strategies at the other (Mintzberg and Waters, 1985). Grönfeldt and Strother (2006) recommend implementing three key actions in strategic planning for services:

- Identify the optimal market for its services and optimal service for its market and ensure the two match.

- Determine the changes needed and create an arsenal for the battle for marketing leadership.
- Provide necessary value to customers to drive growth and success.

Common stage 2: Idea generation

Idea generation for product and service development have the same intent and outcome, but occur at different times within each development process. In this stage, numerous unchallenged ideas are generated, from internal/ external sources and formal/ informal processes. Although idea generation processes in NSD are not commonly formalised, it is important that they are not considered as an isolated activity, but as a continuous and integrated feature of the development process which requires close management. Blum *et al.* (2000) recommend organisations develop cultures which ‘encourage, reward and respect the free flow of ideas and enquiries’, where the ‘social environment can influence both the level and the frequency of creative behaviour’.

New idea generation has historically been delegated to R&D, marketing and new product development teams. However, due to the nature of services, sales-staff are increasingly being recognised as sources of innovation (Gordan *et al.*, 2006). Sales-staff have first-hand interaction with customers and are optimally positioned to extract customer input, highlight issues and offer alternative solutions to services. Customers often directly generate ideas, which can also be captured by front line staff.

Common stage 3: Business analysis

Business analysis is idea screening under defined business criteria. At the business analysis stage of new product or service development, each proposal is analysed to determine business implications. The objective is to prepare recommendations for which innovations should be implemented. Once the recommendations are made, a complete market assessment is done and a budget assembled for the proposed new product/ service development and implementation (Grönfeldt and Strother, 2006). The quality of the research carried out can have a major impact on the quality of the decisions (Moore and Ottum, 2003).

Common stage 4: Testing and Validation

At this stage, companies ensure that the new products and services function properly before mass production/ provision and marketing. The earlier testing is completed, the earlier full product and service understanding can be gained and potential problems highlighted (Ozer, 2003). For products, testing involves the construction and evaluation of multiple pre-production prototypes. Early prototypes are typically made of production-intent parts (intended geometry and material properties, but not fabricated in the final process) (Eppinger and Ulrich, 2003). Service testing/ prototyping ensures the service proceeds in the correct manner with reliable results. This involves customers participating in a simulated service delivery process to highlight any difficulties within the proposed service.

Common stage 5: Commercialising

This is the final stage in product and service development. At this stage, the product or service has been designed and tested and is ready to be introduced into the desired market. New product commercialisation involves strategic decisions (which new product to offer, who to target, when and why to offer it) and tactical decisions (how to offer it) (Ozer, 2002). At this stage in service development, emphasis is on building and maintaining new service acceptance among service delivery staff, and monitoring of all service aspects during introduction and through the complete service cycle (Bitner and Zeithaml, 2005). Based on information gathered on market response, the service is reviewed and the necessary changes determined.

As the above descriptions indicate, the process of NSD and NPD are not mutually exclusive. Nonetheless, there are defining differences. Product development and manufacture relies on specific inputs and outputs e.g. quantity of raw material used per unit, number of units produced per second. Variations are tightly controlled and minimised over time. In contrast, services are co-created between provider and customer. This creates high variability which is near impossible to regulate. Variations are considered and designed for but not all can be predicted. Due of these inherent differences, product and service development processes require exclusive stages. These are discussed below.

2.3.2 Stages specific to NSD

Unlike product manufacture, services are co-created by the customer and front line service staff. The high-level human involvement results in wide service variability. In order to account for this, service development requires process design, approach and activities different to that of traditional product development. Therefore, companies wishing to transition from a product-orientated culture to a PSS culture must be aware of the specific stages required for service development. Activities specific to NSD are shown in blue in Table 2.7. Common NPD and NSD activities are provided in grey for comparison. By understanding these differences, the areas of potential difficulty in transitioning to a PSS culture within a manufacture company can be highlighted.

New Service Development*	New Product Development**
Strategic planning	Product line planning
Idea generation	Strategic planning
Idea screening	Idea generation
Business analysis	Business analysis
Formation of a cross functional team	Development
Service design & process system design	Testing & validation
Personnel training	Manufacturing development
Service testing & pilot run	Commercializing
Test marketing	
Commercialising	

* Sourced from Alam and Perry, 2002.

** Adapted from Ozer, 2003.

Table 2.7: Stages specific to NSD

NSD 1: Idea screening

Idea screening is used to determine which of the ideas generated have the highest potential to help the company meet strategic business objectives. The screening process can be a single activity or a multi-stage procedure, utilising quantitative or qualitative screening criteria. Due to the amount of resources required to bring a single service to market, idea screening must be rigorous in order to determine which ideas have the highest success potential (McAdam, 2004).

NSD 2: Formation of cross-functional teams

Companies are increasingly relying on cross-functional teams consisting of members of R&D, marketing, manufacturing and sales to acquire information regarding the needs of

markets, technologies, competitors and resources (Chen and Lee, 2007). These terms are seen as important within the innovation process as they enable knowledge sharing, develop trust and overcome spatial and organisational barriers (Love and Roper, 2009). This variety of expertise in the team results in a diverse range of concepts and ideas. As the variety of expertise increases, so does the likelihood of producing innovative ideas (Sethi *et al.*, 2001). These teams must be properly managed as a diverse range of perspectives can make decision making difficult, and cause conflict. Teams must recognise and reconcile different perspectives to be successful (Lovell *et al.*, 2001).

NSD 3: Service design and process system design

In service, this stage determines the procedures, mechanisms and flow of activities by which the service is delivered. This includes interfaces between departments, customers and providers; and detailed considerations of process and activities contributing to the service. Service blueprints (see Figure 2.3 for an example of a service blueprint) are often used at this stage as a tool to visualise service processes, identify improvement opportunities and isolate potential failure points in the system (Berkley, 1996). Blueprints also allow hypothetical alterations to be made to the service, and help predict the affects of those changes. Yet, blueprints can struggle to visualise all aspects of service as they do not separate the depiction of a service from that of its operations (Ma *et al.*, 2002).

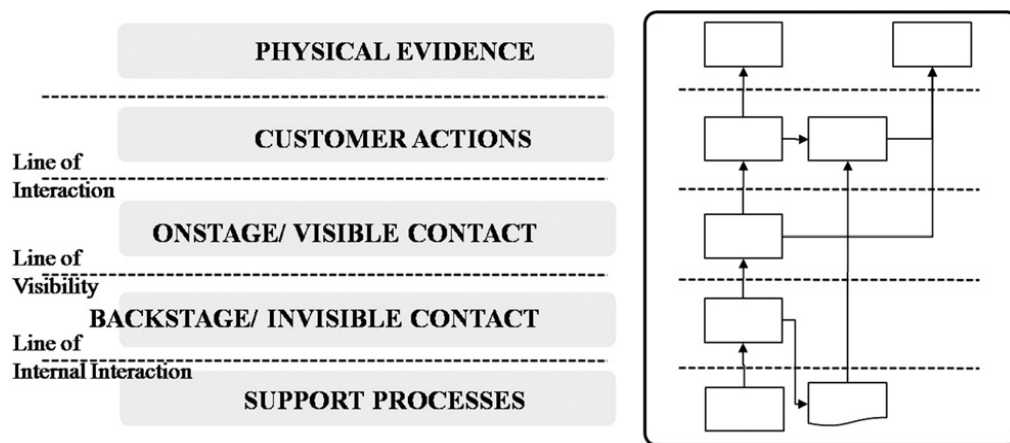


Figure 2.3: Example of a service blueprint (Geum and Park, 2011)

NSD 4: Personnel training

In service provision, training of front line service staff is critical. Unlike products, services can be complex social interactions, rather than simple exchanges due to the levels of

interpersonal interaction conventionally involved in service provision (Foxall *et al.*, 2002). It is important that staff are thoroughly trained and committed to the brand values as they are often the consumer's only contact point. Employee skills and commitment are now considered to be key drivers of innovation and success (Forstenlechner *et al.*, 2005). Asking the salesperson for information has been found to be the most important confusion-reduction strategy (Mitchell and Papavassiliou, 1999). The high number of services entering the market require particular attention in regard to staff training, to ensure knowledge is up-to-date and can be used efficiently.

NSD 5: Test marketing

Test marketing examines the developed service's saleability through small-scale execution of all or part of a marketing programme within a test market. Test marketing duplicates the realities of a national introduction, including competitive and commercial issues (Hair *et al.*, 2009). At this stage of development decisions are made on how service is to be commercialised. New services are often intertwined with the delivery system for existing products so viewing them in isolation is difficult. Alternatively, the new service may be offered to employees and their families for a period of time to assess responses to variation in the marketing mix, or present customers with hypothetical mixes (Bitner and Zeithaml, 2005). Although limited, these approaches to test-marketing of services help give an indication of potential problems.

There are stages specific to service development processes. In contrast to service development, product manufacture outputs are traditionally tangible and easily quantified. Development stages specific to product development allow these quantifiable components to be controlled and captured. By examining these stages, an understanding of the existing processes within which the PSS service development process must operate can be gained. This can be used to examine the differences in product and service development processes which can prohibit the transition to a PSS culture. These stages are discussed in the following section.

2.3.3 Stages specific to NPD

Often product development and production are subject to strict regulations, requiring tightly controlled and monitored processes, for example medical devices, food, pharmaceuticals. This is possible as, unlike services, products can have low levels of customer input. Variation is generally machine and document controlled, and inputs/ outputs are tightly regulated. In order to achieve this, certain stages specific to product development are required. These stages are shown in blue in Table 2.8. Common NSD and NPD activities are shown in grey.

New Service Development*	New Product Development**
Strategic planning	Product line planning
Idea generation	Strategic planning
Idea screening	Idea generation
Business analysis	Business analysis
Formation of a cross functional team	Development
Service design & process system design	Testing & validation
Personnel training	Manufacturing development
Service testing & pilot run	Commercializing
Test marketing	
Commercialising	

* Sourced from Alam and Perry, 2002.

** Adapted from Ozer, 2003.

Table 2.8: Stages specific to NPD

NPD 1: Product line planning

In this initial stage of product development, companies assess the strength of their existing portfolio of products, compare them with those of competitors and consider how many and what kind of new products to develop. The aim is to align business objectives with the technical solutions informed by business case and market analysis (Grübacher *et al.*, 2007). The output of this stage is a product map defining the scope of the individual products and an overview of the product line. This map is continuously updated and revised to reflect the increasing understanding of the business domain throughout the product line development. This allows development of new products relatively cheaply and quickly, better management of new product development programs, and planning of sequential new product introductions.

NPD 2: Development

This stage converts the ideas which survived the business analysis stage into new products. Similar to cross-functional teams in service provision, this stage typically requires collaboration from a variety of functional areas. Collaboration among development teams increases the availability of relevant information and enhances the flexibility and adaptability of new product development activities. This improves the frequency and quality of suitable solutions, and shortens the problem solving process (Sheremata, 2000).

NPD 3: Manufacturing Development

This stage involves the development and piloting of the required manufacturing processes for the new product. It determines which production process will allow the product to be made effectively and efficiently. It also offers the opportunity for companies to consider a portfolio of products which can be developed and manufactured with the same technology.

As discussed, PSS requires an amalgamation of both product and service development processes into a single coherent series of actions which takes into account the inherent characteristics of both. Traditional manufacturing companies which operate under a product-orientated culture can struggle to develop and manage services as they require different knowledge and skills to that of product development. Studying NPD (product development specific) and NSD (service development specific) process models offers the opportunity to view product and service development processes in isolation. This provides insight into the existing processes within the product-orientated companies, new service processes required to provide a PSS and the cultural shift required to account for both.

2.4 NSD & NDP process models

As discussed, NSD and NPD processes vary, but are not exclusive of each other (Djellal and Gallouj, 2001; Menor *et al.*, 2002). In general, successful NSD and NPD companies have strong commitment to innovation, well structured innovation efforts, and allocate substantial resources to innovation efforts (Tidd and Bodley, 2002; Ernst, 2002). Due to strong top management involvement, strategic objectives are long term and employees have a clear understanding of future products and services. This is aided through formalised, well structured and proactive NPD and NSD programs and processes (de Brentani, 2001).

Development processes can be formalised through reference models. These models contain detailed documentation of project flows, structures and responsibilities for the project. Therefore they are able to support project planning, steering and monitoring. They aim to establish transparency from the concept phase and ensure maximum process efficiency. The main objective is to eliminate non-value-adding activities at the earliest possible stage (Bullinger *et al.*, 2003). The following section will analyse three NSD and three NPD process models (see Table 2.9). These were chosen as they represent a variety of approaches to product and service development and are heavily referenced in the literature. Through examining NSD and NPD models, insight into the differing areas of emphasis can be determined. This will highlight areas which may act as cultural barriers due to lack of familiarity, and relevant knowledge and skills.

NSD process models	NPD process models
Linear and Parallel Models	NPD Waterfall Model
NSD Process Cycle	NPD Spiral Model
NSD Systematic Learning Model	NPD Stage Gate Model

Table 2.9: Summary of NSD and NPD models studied

2.4.1 NSD Linear and Parallel models

With linear models, the initiation of a step is dependent on the completion of its predecessor. Although similar in structure, parallel models allow several steps to proceed concurrently. Alam and Perry's (2002) linear and parallel models are based on ten discrete, consecutive process stages (Figure 2.4). Emphasis is on large scale concept generation and comprehensive screening to eliminate weak ideas and retain those with strong potential. Due to high associated costs with little benefit, test marketing is considered but not prioritised. Instead, emphasis is placed on the formation of cross-functional teams, idea generation and idea screening.

This author contends that the strength of the linear and parallel models is the clear, logical progression through the development process facilitating simple and direct implementation. However, a weakness is the complete dependency of each stage on the completion of its predecessor, making the model rigid and inflexible. Customers are demanding services customised to their specific needs. With a rigid development process, companies would struggle to provide any variation within their service range. The lack of repeat stages or

feedback-loops within the system make proposed changes to the process difficult to implement. This can be discouraging and time consuming.

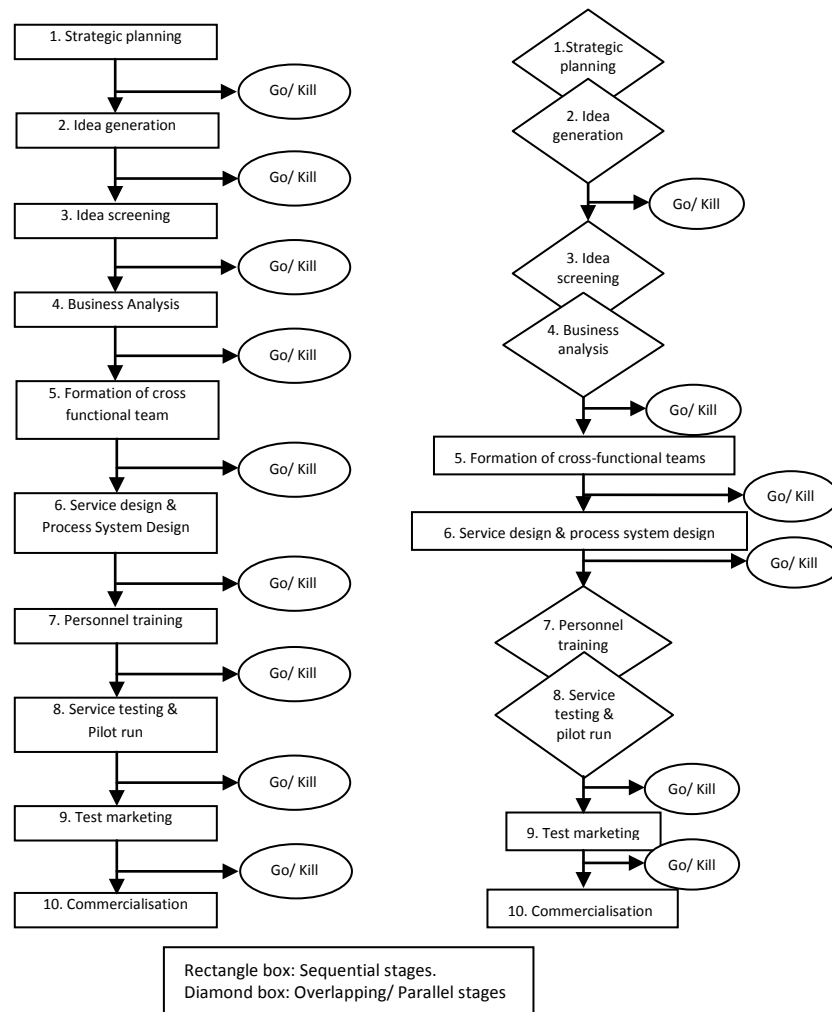


Figure 2.4: Linear model of NSD and Parallel model of NSD
(Alam and Perry, 2002)

2.4.2 The NSD Process Cycle

In stark contrast to Linear and Parallel models, the NSD Process Cycle (Chase *et al.*, 2000) emphasises the cyclical nature of service development. It recognises that the fundamental NSD stages revolve around the design and configuration of service concept components. Resources such as development teams and tools play an enabling function in the development process (Menor *et al.*, 2002). The NSD process is broken into four broad stages and thirteen tasks which must be completed in order to launch a new product (see Figure 2.5).

Through this model, Chase *et al.* aim to support greater speed and efficiency in new service development. The enabling components intend to facilitate innovation within the process and allow developers to design a tailored service offering for the consumer. Claiming some NSD processes were cumbersome, Chase *et al.* focuses on the quick and efficient identification, extraction and exploitation of information. This aims to place the company in an advantageous position, capable of quickly utilising development opportunities.

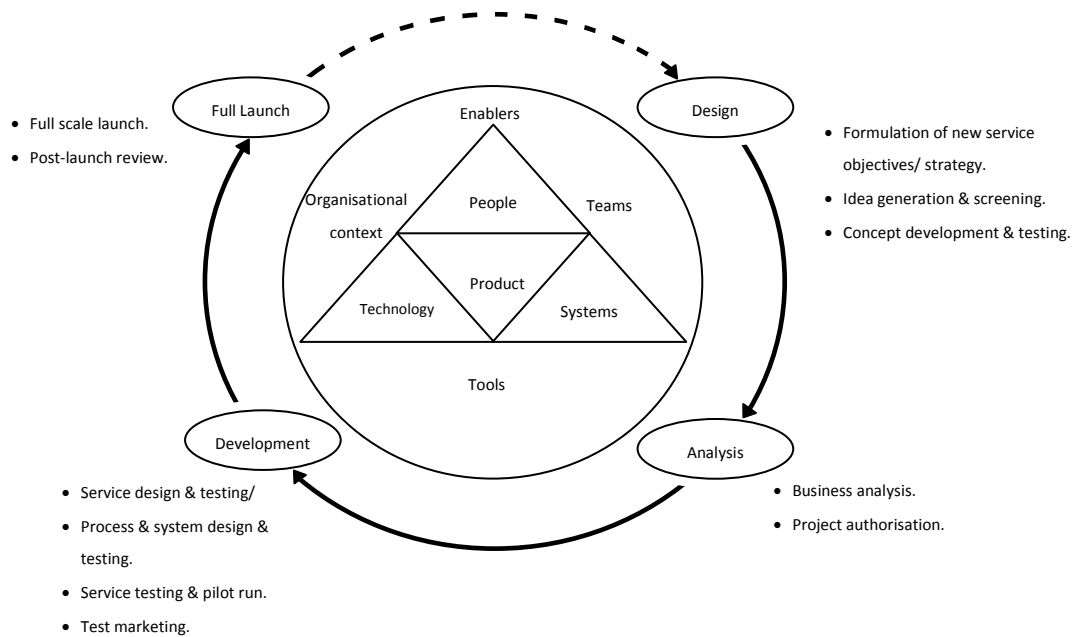


Figure 2.5: The NSD Process Cycle (Chase *et al.*, 2000).

This author contends that although emphasising the cyclical nature of service development, the NSD Process Cycle provides a relatively simple, logical approach to the NSD process. A definite starting point allows easy execution of the model and looped steps are clearly indicated. In contrast to the Parallel model (discussed in section 2.4.1) it does not consider parallel stages which allow independent stages to progress simultaneously, can quicken the development process, and reduces costs. Central within the model is the organisational context, teams, tools and enablers. These central components are made of different combinations of groups, people, product, technology and system. However, it is not suggested at which specific stages these components become involved or in what manner. As the inputs of each component into different stages will vary, the importance of their involvement will differ. Communication is essential. To create a coherent development process, it is important to emphasise the significance of group input and group interaction to

facilitate clear communication. As service provision requires input from both staff and customers, companies operating under a product-orientated culture may struggle to manage the extended role of communication.

2.4.3 NSD Systematic Learning Model

Similar to the NSD Process Cycle above, the NSD Systematic Learning Model (Dimitriadis and Stevens, 2005) presents a continuously moving process (see Figure 2.6). It suggests service development goes beyond a simple cyclical model to a liquid model, with fewer divisions or lines of stages. For ease of discussion, the model is roughly divided into three dimensions:

- The contributors involved in the NSD process and their organisation.
- The decision making process allowing the NSD to progress.
- The changes necessary for the process to be completed.

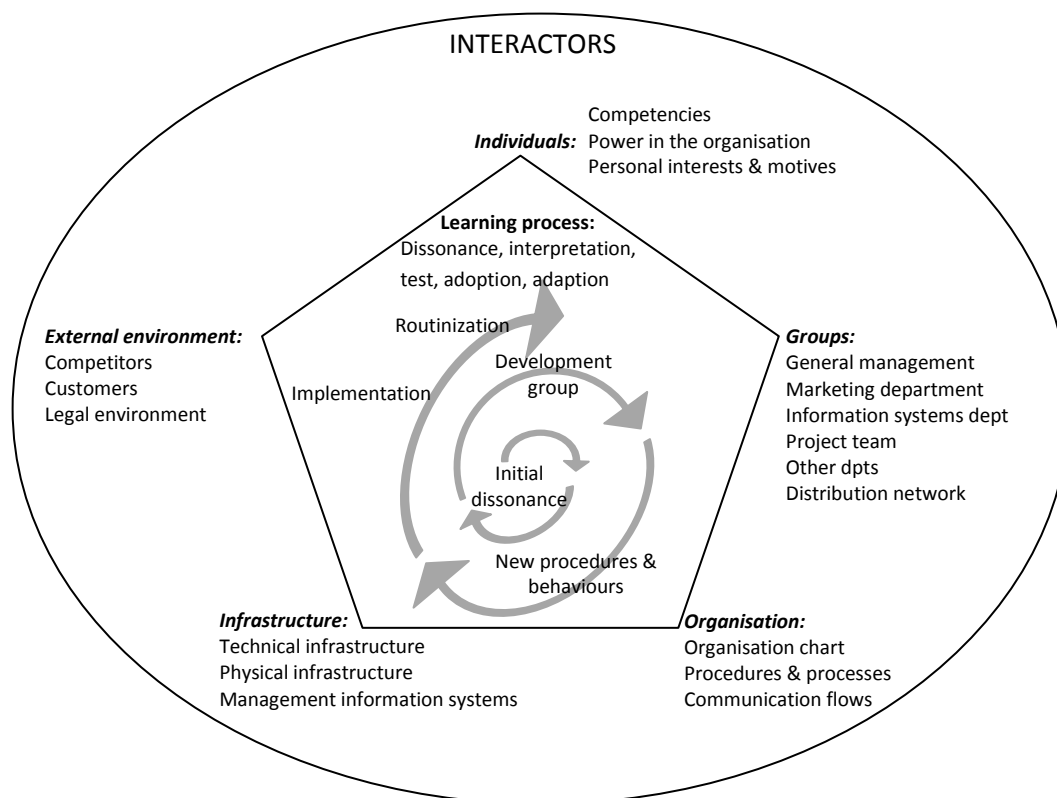


Figure 2.6: The Systematic Learning Model for NSD (Dimitriadis and Stevens, 2005)

This model introduces the concept of interactors (individuals and groups; internal and external), who create knowledge through interaction with each other. It considers how the

individual interprets and gives sense to the data that surrounds the organisation, as more important than the external environment itself. Deep change within an organisation is implemented through this information flow between people during the development. This use of communication as a central role among staff in NSD and is supported by additional research (Lievens and Moenaert, 2000).

This author contends that as services are strongly influenced by ‘soft factors’ or ‘interactors’, it is important that they be considered during the development process. This is particularly true in relation to companies transitioning from product-orientated culture to PSS as ‘soft factors’ are not considered in product development. The Systematic Learning Model takes into account a variety of soft factors which are required to create a comprehensive service. This allows a number of variations to be determined and corresponding solutions to be designed. Yet, as it regards service provision as a liquid process, it does not clearly indicate the sequence of steps needed. To implement the model, the user must think on an abstract level. Product-orientated companies operate in structured, quantifiable processes. As a result, liquid processes which do not provide a clear path of progression will be difficult to apply in a business context. The need for communication between interactors is emphasised, but interdependencies and interactions are not expressed. As effective communication amongst such a diverse quantity of people can be difficult, indications of the links between groups would be highly beneficial.

The models reviewed suggest that NSD process models have transitioned from linear to cyclical, to liquid e.g. Linear/ Parallel models to NSD Process Cycle to NSD Systematic Learning Model. This author argues that this is a reflection of the shift in emphasis from a regimented industry base, requiring little customisation of product, to customer focused companies providing varied, tailored products. In order to capture the variety of human input, models developed to an abstract level. However, this is difficult to implement within a product-orientated culture which requires tight control of processes and results. Variability of process and outputs in product-orientated companies is limited. In contrast, due to the co-creative element of services, variability can be high. Current NSD models do not sufficiently communicate the requirements needed to balance the rigidity of product development and variability of service. This contrast in the service approach (highly adaptive and loosely structured) and the product approach (structured and linear) can be seen when NPD models are analysed in the following section.

2.4.4 NPD Waterfall Model

Structurally similar to NSD Linear models, Waterfall models are the simplest NPD model. Although originally designed for software development, Waterfall models are one of the most commonly used models in NPD. They are characterised by a linear progression of discrete, consecutive process steps. To progress forward, the previous step must be completed. These steps build upon each other so the outcomes of upstream phases provide the inputs for downstream phases. This approach to NDP has advantages and disadvantages (Bullinger *et al.*, 2003):

- Subdividing the development process into predefined steps ensures a level of transparency.
- The model is well suited to outcome-based planning, as the closing of each phase provides a milestone for intermediate outcomes.
- Due to the dependence of stages on the completion of its predecessor, it can be rigid and make changes difficult to implement.

This author contends that waterfall models provide a clear, logical progression through the development process. This reflects the quantifiable inputs and outputs of product production. It provides clear direction to those involved in the process and therefore is simple to implement. Notwithstanding this, the total dependency of stages on the completion of their predecessors makes the model rigid and inflexible and unsuitable for the provision of customised and variable products. Repetition or feedback loops are not considered. Changes require the proposed product to repeat through the entire process, causing a long and costly development. Product-orientated companies operating under this model would struggle to implement a service process as it would not accommodate for the high degree of variability in services.

2.4.5 NPD Spiral Model

Spiral Models are an advanced version of the Waterfall Models. Although steps are linear, they are repeated (see Figure 2.7). This allows review of stages early in the process and changes to be made accordingly. If, on the initial completion of a series of stages, problems are uncovered, changes are made and the steps repeated. Spiral Models aim to bridge the gap between the need for sharp, early and fact-based product development, and the need to be

flexible, agile and to adjust the product's design based on new information and fluid market conditions (Cooper, 2008).

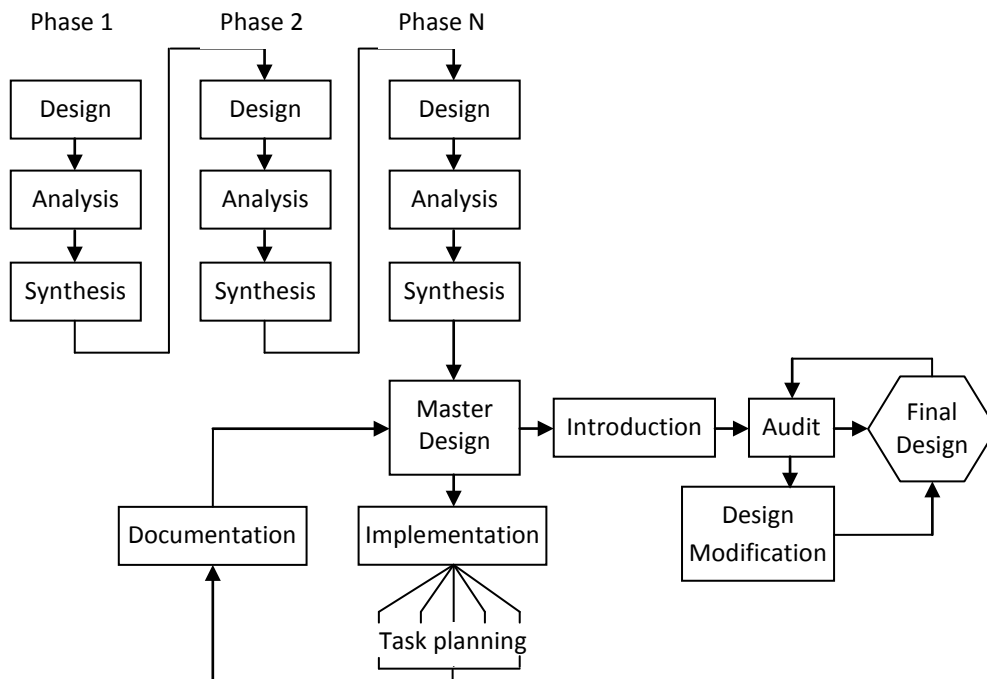


Figure 2.7: Spiral Model (Bullinger *et al.*, 2003).

This author contends that the Spiral Model has many of the same benefits and drawbacks of the Waterfall Model. With simple products, it provides a clear, logical progression through development which is simple to implement. Yet, it can be rigid and inflexible. As with the Waterfall Model, this makes it unsuitable for markets demanding customisable products. The repetition of stages can make the process for intricate products complex and require intense steering to maintain direction. Therefore, product-orientated companies operating under this model will struggle to provide services as the model and the resulting culture does not allow for small problems or changes which may occur. Small instances would require a repeat of the process, complicating and lengthening the development.

2.4.6 NPD Stage Gate Model

The Stage Gate model (see Figure 2.8) approaches product development similar to that of the Spiral model but introduces the concept of criteria or gates. The model consists of a series of stages (where the project team undertakes the work, information is gathered and analysed)

and gates (decisions are made by the project manager to continue with or end the concept). Each gate consists of (Cooper, 2008):

- Deliverables: What the team brings to the decision point. These are decided at the output of the previous gate.
- Criteria against which the project is judged: This includes ‘must meet criteria’ which will immediately remove a concept from consideration if not met.
- Outputs: These outputs include a decision of Go, Kill, Hold or Recycle; a plan for the following steps; and a list of deliverables and date for the following gate.

Although depicted as linear, the process is intended to contain looping, iterations, sequential tasks and overlapping to allow flexibility.

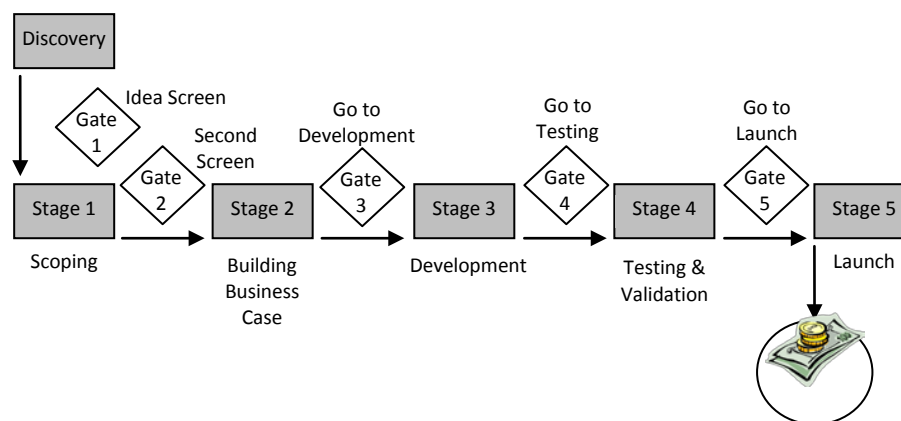


Figure 2.8: Stage-Gate Model (Cooper, 2008)

This author suggests that, although the model is intended to contain looping, repeating iterations, sequential and overlapping tasks, there is no indication as to what, when, how or where these should occur. Although it can be accepted that models can be adapted to the individual company, suggestions for loops would facilitate smoother progression. Without suggestions, companies must determine where to add these additional steps as they progress. This may result in the process being repeated for a single product. Due to the co-creative and variable nature of service, feedback loops are essential to ensure efficient and effective service provision. Companies utilising this model may not capture and distribute the necessary feedback information for service provision. The model also does not indicate which team members are of particular importance at each stage. Only the project manager’s position is specified as the ‘Gate Keeper’. As member input varies at different points in the process, it is can be beneficial to suggest which members will contribute most at certain

stages. As information in service provision can come from a variety of sources (e.g. frontline staff, customers) companies operating under this model may struggle to capture relevant information as interaction between teams is not discussed. Highlighting interactions can facilitate communication and a smooth development process.

NSD and NPD models are not exclusive in activities or structure but due to their intrinsic characteristics, the core requirements of the models differ. In response to variable human input within the service process, NSD models have a fluid approach which can verge on the abstract. This can make it difficult for those wishing to transition from product-orientated to PSS to implement the models. NPD models are based around a rigid central process which minimises variation and allows outputs to be quantified. Therefore, companies operating under a product-orientated culture may struggle to manage variation in service. As can be seen from the above discussion, the operation of product and service development processes require a balance of both rigid and flexible processes. Although relatively new, Product Service System Models attempt to find and maintain this balance of factors within a single model by drawing on the approaches previously discussed. To facilitate discussion, the following section will give an overview of PSS. Once this has been clarified, three PSS models which provide a range of approaches will be discussed.

2.5 Product Service Systems (PSS)

PSS combines the components of NPD and NSD into a single process. As discussed in Chapter One, customers are increasingly demanding the provision of services to accompany goods e.g. maintenance, upgrading, user training, process improvement (Aurich *et al.*, 2007). In addition to the product characteristics, accompanying services provide additional selling points by ensuring or enhancing the product performance throughout the product life cycle (Ceglarek *et al.*, 2004; Aurich *et al.*, 2004). Focus is placed on fulfilling customer needs and creating customer value (Lindahl and Ölundh, 2001 as cited by Ijomah *et al.*, 2009). Therefore companies operating under a PSS model, must have the necessary culture to accommodate both product and service components.

Benefits of PSS

For customers, PSS can offer improved customisation and quality. As they often do not retain the physical product but purchase the benefit of it, customers have access to a variety

of products within the company portfolio. PSS offers increased value for the customer through increased levels of servicing/ service components e.g. schemes that extend the product life and its function (upgrading and refurbishment) (Mont, 2002). In addition, the flexible service component can deliver functionality which accommodates the customer's specific needs.

It is suggested that, to maintain a competitive advantage against manufacturing countries with a low-cost labour base, manufacturers in developed economies should move up the value chain and focus on knowledge intensive products and services (DTI, 2002; Angus *et al.*, 2006). This allows companies to move away from standardisation and mass production to highly customisable product/ service bundles. Emphasis is placed on the take-back, recycling and refurbishing of products which allows companies to:

- Minimise waste through the product's lifecycle.
- Reduce both environmental impact and cost.
- Benefit from a continuous and predictable source of materials and components (Williams, 2006).

As a result, a smaller stock of products is needed in order to satisfy demand, intensity of use can increase, as does the probability of a higher service yield before the product becomes outdated (Bhamra *et al.*, 2006). As PSS are often provided through a contract, companies have an opportunity to communicate with customers on a regular basis and gain valuable information on new products, services or upgrades.

Challenges in PSS

The adoption of a PSS strategy creates cultural and corporate challenges (discussed in detail in Chapter Four). Consumers must place value on having a need met rather than owning a physical product. To reduce the risk associated with the introduction of a new service, many manufacturers add services one-by-one (Brax, 2005). Despite this incremental approach, many manufacturers struggle to introduce services. This can be caused by the shift of emphasis to 'soft factors' involved in human interaction (Bullinger *et al.*, 2003). The company must adapt their corporate culture to account for these soft factors, which are typically overlooked in traditional manufacture, in order to produce an effective PSS. To overcome these barriers, the PSS must be sensitive to the culture in which it operates. The

provision of services requires a high level of customer relations management. The central role of staff as the main link between customers and the company can be difficult to manage. For producers, an effective PSS will be more complex than delivering functionality through traditional product based systems. This will require changes at the functional and systematic level (Williams, 2006). Changes to the current system can be a significant deterrent due to (Goedkoop *et al.*, 1999):

- Limited experience in pricing such an offering.
- Fear of absorbing risks traditionally assumed by the consumer.
- Lack of experience in structuring an organisation to design, develop and deliver a PSS.

To function effectively, a PSS must make use of existing infrastructures and networks, e.g. product take-back systems dependent on existing collection services provided by local authorities. This may affect the capacity to provide a service or lack the appropriate technology to deal with a particular product.

As discussed previously with respect to NSD and NPD, development processes can be formalised through reference models which define activities needed to develop the product/service, interrelationships between activities and represent the process structure. Although in relatively early development, PSS also utilises reference models which aim to combine the activities and processes of product and service development into a single framework. Similar to NSD and NPD models (discussed in section 2.4), PSS models are used to determine the order of activities within the development process. As with NPD and NSD models, the approach to stage configuration can vary. The initial review was undertaken in relation to a broad range of models. Three models have been selected for review (see Table 2.10).

PSS process models
Service Engineering Design Process Model
Technical Service Models
PSS Configuration Network Model

Table 2.10: PSS models studied

These represent a broad range of PSS development approaches, methodologies and configurations which capture the majority of model characteristics found in the initial

research. The Service Engineering Design Process Model utilises a gated liner structure. The Technical Service Models takes a parallel approach with strong consideration of existing product orientated processes. The PSS Configuration Network Model has a modular approach with a cyclical feedback loop which integrates findings back into the process.

By examining these models an understanding of the fundamental requirements of PSS can be gained. Comparison of PSS to NSD and NPD models will provide an intrinsic list of differences which must be become part of the cultural norm in order to provide an effective PSS offering. The selected PSS models are examined below.

2.5.1 Service Engineering Design Process Model

The Service Engineering Design Process (Sakao and Shimomura, 2007) proposes a model based on service engineering principles (see Figure 2.9). With service engineering, service contents are provided by a service provider and delivered through a service channel.

Therefore, it considers physical products as a service. The primary aim is to increase the value of the service while reducing the environmental load through intensifying, improving and automating the whole framework of service creation, delivery and consumption. The proposed service model consists of four sub-models:

- Flow model: Considers the intermediate agents between the service receiver and service provider.
- Scope model: Specifies the range of service, from the initial provider to the final receiver, and aims to create an effective service design
- View model: Represents the relationship between the service receiver, the service delivery channel and service content.
- Scenario model: Represents the receivers themselves and their behaviour in receiving the service.

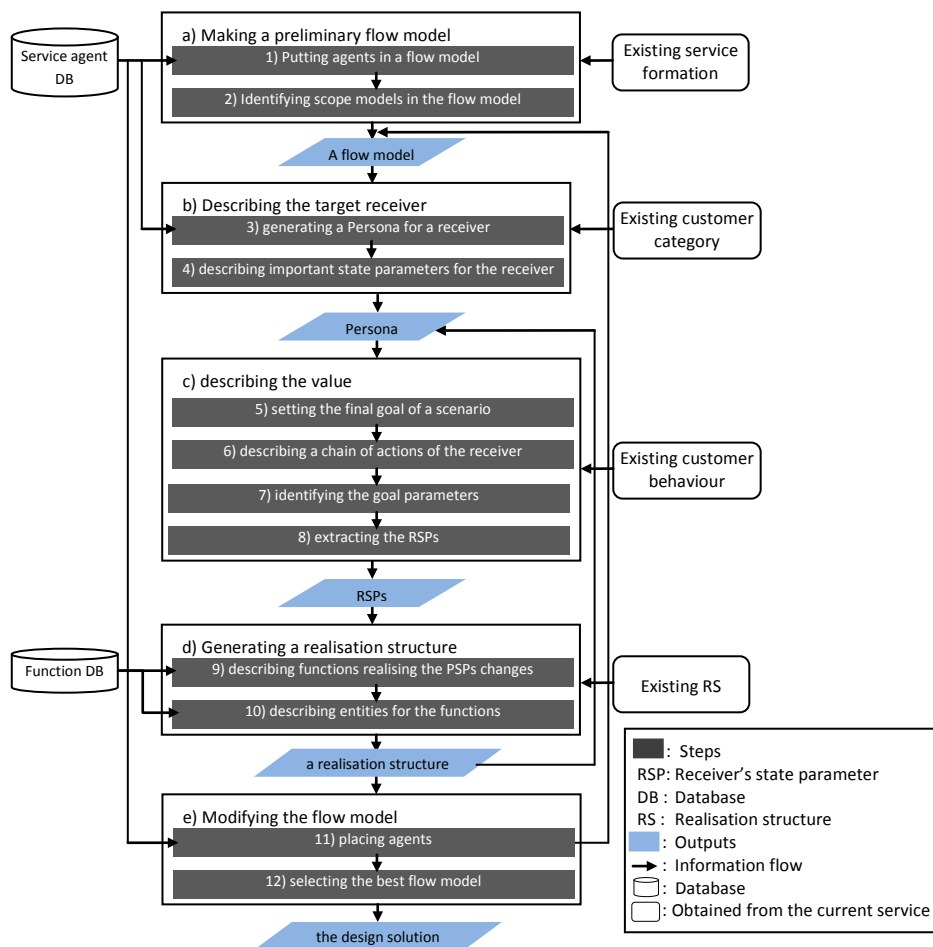


Figure 2.9: Service Engineering Design Process (Sakao and Shimomura, 2007).

This author suggests that the linear structure of the model is similar to that of Waterfall Model, giving a structured process which follows a logical progression. The emphasis placed on the customer's and service providers' role is of particular interest. Service is co-produced between service-provider and customer, and therefore, customer input has a significant effect on the resulting service. Co-creation results in variation which is difficult to regulate. Despite this, early stage awareness of variation allows appropriate procedures to be developed. The critical loop between steps C and D, takes into account these unforeseen developments. However, soft factors can be broad and widely varied. Sakao and Shimomura suggest developing solutions for all scenarios. Product-orientated companies unfamiliar with 'soft factors' may struggle to predict all potential scenarios, and make the development process slow and bureaucratic. The rigidity of the model may also prevent the companies from implementing impromptu solutions during the course of the service provision. These

impromptu solutions are often sources of innovation and additional value and can help accommodate the variability of services. Therefore, this could cause significant difficulty for product-orientated companies who wished to provide a PSS offering.

2.5.2 Technical Service Model

Aurich *et al.* (2006) have developed a PSS model which develops a core product and supplementary technical services e.g. maintenance, retrofitting, refurbishing, user training. The objective of the model is to create a coherent PSS which provides users with advanced benefits i.e. economical, ecological and social benefit. The model is broken into three sub-sections:

- Framework for existing Product Design Process: This restructures existing product design processes in terms of documenting and standardising phases with coherent design activities and corresponding results.
- Framework for Integrating Existing Product and Technical Service Design Processes: Based on the initial framework, processes are broken into modules which are used to create chains of product and service processes.
- Integrated Production Process Model (IPPM): This compiles the required module for the newly proposed Technical PSS in relation to relevant process objects, structures, relations, required functions and corresponding properties.

This author contends that the model breaks the process into manageable activities. This is useful for product-orientated companies which may be daunted by large, unfamiliar stages. The Framework for existing Product Design Processes breaks the process into groups, which are weighted, depending on level of input. This weighting may identify innovative components of the service, or potential problems which can then be resolved. Yet it does not take into account co-dependencies/ interactions between groups or stages. Instead they are depicted as stand alone. Links between groups are important as communication between departments affects the fluidity of the development process and hence the effectiveness of the end result. The outputs of one team will often be the inputs for another. This is particularly important for product-orientated companies wishing to transition to PSS as information in service provision can come from a variety of sources. Indicating important links between

relevant groups will aid the companies in creating coherent lines of communication and facilitate smooth development.

Similarly, the Framework for Integrating Existing Product and Technical Service Design Processes breaks the process into smaller modules and allows each task to be approached on a manageable scale. However, due to the interdependencies of modules required to create the process chains, a coherent understanding of the service process from initiation is required. Variability in services can make this difficult. This is particularly true of product-orientated companies wishing to transition to PSS who are unfamiliar with highly variable processes. Often numerous changes are made throughout the service process, affecting the required inputs and resulting outputs. Although the developers state that changes made must not affect the module output, the high level of variability within service means this is not always possible. With the formation of modules into chains, a change to a single output would have a knock-on effect, requiring a restructuring of the whole process. This could become a particular issue for more complex bundles which require a high number of interlinking modules or new bundles yet to be defined. Product-orientated companies wishing to adapt their offering to a PSS, are more likely to require several iterations of the key service modules. This may require the restructuring of the entire chain, resulting in a significant development time.

The Integrated Production Process Model (IPPM) represents the totality of the initial two frameworks in a singular form which clearly indicates progression from beginning to end. As previously discussed, it may require a coherent understanding of the service process from initiation. This would be difficult to achieve for product-orientated companies, unfamiliar with service development processes. As modules are given to individual partners within the value chain, and interlinked in terms of inputs and outputs, there is a risk of becoming over-complicated. Communication between partners must be continuous to allow chains of modules to link smoothly. Any breakdown in communication would cause a reaction along the chains of modules and potential collapse of the system. IPPM suggests customising and simplifying the modules to suit the required process, yet no example or tool is provided to achieve this.

2.5.3 PSS Configuration Framework

Aurich *et al.* (2009) suggested a concept framework for PSS with a life cycle-orientated configuration (see Figure 2.10) which breaks the process into three element groups:

- Element one: Components of the proposed PSS is broken three areas (Physical product, Product Life Cycle (PLC) or Services) where the structure of the core product and every potential service is analysed to identify possible variables.
- Element two: Data gathered from the first component is processed. The influence of PLC-specific characteristics on the physical product core and its components are determined, and their influence on the existing services noted.
- Element three: This element determines the technical and service configuration used to form a PSS for a specific customer and the expected PLC.

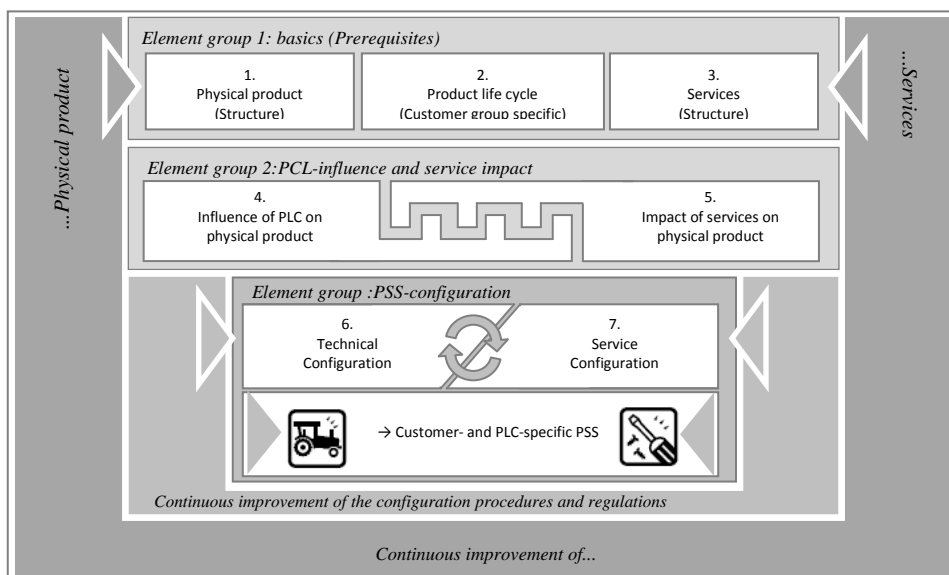


Figure 2.10: Framework for PSS configuration (Aurich *et al.*, 2009).

Aurich *et al.* tested the framework on a simple piece of agricultural machinery, a cultivator, which was broken into individual components. Each was examined under the conditions of its use, then a second time in combinations. This author contends that this would not be possible for more complex products as studying a large number of components would potentially be too time consuming. For testing, services offered were classified in regard to

the overriding objective: technical, qualificatory, process-orientated, logistical, informational or financial nature. These were then subdivided into various modules. These modules describe a service with respect to intended results, the processes necessary to generate the intended results and the resources needed to provide the service. Again, this division of components into modules and the subsequent division of modules into further components within an already divided framework, may be suitable for simpler products/ service bundles, but will become confusing and difficult to manage within a larger system. Additionally, considering all possible variables of a product/ service system is impractical. The inclusion of customers at early development stages will identify the most critical variables and potential problems within the proposed processes.

As can be seen from the above section, PSS models aim to capture and streamline the development process of product service bundles. To gain a cohesive understanding of the developing approaches within PSS, a comparison of NPD and NSD is required. This will establish and rationale the changes in focus, approaches and methodologies of PSS from traditional NPD and NSD. This information can then be used to highlight the cultural shift required to accommodate the necessary product and service requirements when transitioning from product-orientated to PSS. The models discussed will be compared in the following section.

2.6 Comparison of NPD, NSD and PSS models

As can be seen from the previous discussion, NPD, NSD and PSS contain a mixture of similar and contrasting components. In the following section, models are compared in order to highlight and discuss relations, commonalities and contradictions which may inhibit or limit the cultural transition from product-orientated to PSS. Models were compared and contrasted in relation to the following:

- **Aims and objectives:** Aims clarify the objectives of the study and overall direction. Objectives clarify the anticipated deductions from the study. Comparing aims and objectives will indicate potential common/ contrasting problems which can be addressed within this body of research.
- **Methodology:** Methodology determines the process and methods used to gain, analyse and verify information and findings in relation to achieving the objectives. This establishes the level of detail gathered, the focus and validity of the information and the form of

conclusions drawn. The approaches/ methodologies used can indicate best practice and be adapted to facilitate the cultural changes required within this study.

- Future research: Future research indicates areas not covered/ inadequately covered by the study, and additional steps to further validate the proposed models. This will signify areas which the developer has highlighted as lacking or weak in the models. These weaknesses offer opportunities for development within this body of work.

By comparing the models across these areas, an understanding of the perceived problems, the suggested solutions and remaining gaps in the knowledge of transition to PSS can be established. This will provide significant background information which can be utilised in this research. The aims and objectives provide the initial introduction to the intentions of the models studied. These will be discussed first.

2.6.1 Aims and Objectives of Models reviewed

In the models studied, aims and objectives ranged widely. The most common aim within the service models and product/ service models was to further understand the process. This implies that understanding of service and product/ service systems have yet to reach that achieved in manufacturing. In addition to this, as discussed previously, the co-creative component of services creates a high level of variability, further increasing the difficulty in service mapping. Understanding the processes as a complete system will help predict fluctuating outcomes. Understandably, due to the extent of knowledge on product development, this was of lower emphasis within the product development processes studied.

Based on previous studies, which found service development is commonly done intuitively, several models propose a systematic approach. It was suggested that lack of formal methods slow service development and provide inconsistent outcomes. Established methods aim to provide clear lines of progression to reduce variability, increase efficiency and shorten development time. Additionally, product service systems focus on integrating product and service development processes into a single coherent system. The models run stages concurrently, based on interdependences. Similarly, the product development models studied, aim to increase efficiency and shorten development times. Unlike service and product/ service systems, product development is commonly approached in a systematic manner.

This author contends that comparison of the applications and processes are of particular importance. Studying a single process in isolation does not adequately represent the organisation as a whole. Proposed process changes must take into account the 'knock on' effect of changes made. This is particularly important in the context of transitioning from product-orientated to PSS as the shift in focus to service components may have wide reaching effects on costs, resources and organisational structures. The common qualitative methods used, can provide a clear understanding of these interdependencies and indicate those potentially affected by proposed changes. When transitioning cultures it can aid in the management of change and its acceptance among staff. Attention must be paid to patterns in projects as this will provide information on intuitive processes, which may or may not be formally documented.

2.6.2 Methodology of Models reviewed

All models reviewed used qualitative research as their primary methodology. Studies ranged in size from a provision of a single product and maintenance service (Aurich *et al.*, 2006) to a study of twelve companies spread over a variety of industries (Alam and Perry, 2002).

Qualitative methods were used in all models to determine model layout or to validate use.

Only the Service Engineering Process Model combined qualitative and quantitative methods, using customer surveys to determine the needs of the target market. This was surprising as quantitative methods are traditionally used in product manufacture due its measurable nature.

This change of approach could indicate the growing pressure for batch and flexible production of bespoke products which increases variability and, therefore, complicates quantifying outputs. The methods used provide a clear understanding of the inner workings of the companies studied and the processes involved in the proposed models. Common qualitative methods used include:

- Blueprinting the organisation to gain an understanding of the company structure.
- Semi-directed interviews of management and staff.
- Observation of processes and staff.
- Of the models reviewed, five of the nine studies concentrated on single processes. Only three papers considered the interrelations between processes.
- The NSD Linear and Process Model reviewed company archival records, to study past process methods, and their effectiveness.

- The NSD Systematic Learning model observed emerging projects to establish cross-case patterns in the development process.
- The NSD Waterfall Model was used in industrial projects and student project work. The proposed method and traditional methods were compared for ease of use, effectiveness and development time.
- The NPD Spiral Model used cross case comparisons to determine which requirements and guidelines were of importance and which supported the delivery cycle.

The above methodologies were used to establish the position of the processes within the overall context of the company, interdependencies between processes and indirect effects of proposed changes.

Qualitative methods are best suited to service based investigations due to the high level of variability and intuitive approaches as they facilitate a deep understanding of the process and determine areas of crucial importance. However, it is difficult to quantify intangible components, for example atmosphere, which can have significant influence on service provision. Quantitative methods, traditionally used in manufacture, are more suitable to determining measurable affects, e.g. turnover, customer satisfaction. As a result, product-orientated companies may be unfamiliar with qualitative research methodologies.

2.6.3 Recommended Future Research of Models reviewed

Of the nine models reviewed, two did not provide areas for further research, the NPD Waterfall Model and the NPD Stage Gate Model. Of those remaining, a clearer understanding of the NSD process is the most common objective. Although the models studied provided an increased knowledge of service and product/ service process, developers believed further study was needed to gain a comprehensive understanding. In contrast, proposed future research for product development concentrated on refining the suggested models, rather than further understanding the process.

Several authors suggest using established methods to further develop or validate models. In particular, the NSD Process Cycle suggests approaching the NSD process as a portfolio, allowing multiple projects to be managed simultaneously by using established portfolio management methods. Similarly, the Service Engineering Process Model and PSS Framework Configuration suggest the addition of quantifiable components. These are

traditionally used to determine the ratio of cost to value in project implementation, and the rate of return of a launched project.

The development or support of models through the use of an IT (Information Technology) application was also recommended. The NSD Process Cycle suggests further study to determine the effect of IT on the service development process. It is believed that this will facilitate communication, which is an essential component of the service process. The PSS Framework Configuration suggests developing the proposed model into a software programme. The intention is to provide a clear line of progression, and establish patterns and quantifiable measurements. The Service Engineering Process Model was used as a base for the development of a coherent software program which facilitates customisation of the process and simplifies its use.

In relation to further validation, the NSD Linear and Parallel Model, and the NSD Systematic Learning Model propose using quantitative research to determine the affect of the models on business. The NSD Linear and Parallel model was tested on twelve Australian financial service companies. As it was intended to be a generic model, capable of being applied to a range of industries, it suggests further tests on international industries. Similarly, the NSD Systematic Learning Model suggests using qualitative and quantitative methods to validate the generalisation of the model and its level of impact. The PSS Framework Configuration suggests the addition of quantifiable objectives in future models.

Based on the discussion above, it can be suggested that a common thread running through the future research is the affect of PSS models on the business as a whole. NPD and NSD models focus on application within a wider range of industries. Alternatively, PSS models focus on factors within the company itself e.g. fit with the portfolio of existing products, software which allows the model to be customised, the need for quantifiable objectives. This indicates a lack of understanding of PSS processes within existing companies. This contrast is understandable, due to the relatively new occurrence of PSS in relation to long established NPD and NSD models.

As can be seen from the above discussion, there are significant commonalities and differences between the models in relation to their aims/ objectives, methodologies and intended future research. These are summarised in the following section.

2.7 Model comparison synopsis

Based on the model comparison (summarised in Table 2.11) several conclusions can be drawn.

	Aims/ Objectives	Methodology	Further research
NSD	NSD Linear & Process Model	Qualitative	<ul style="list-style-type: none"> Large-scale quantitative survey or longitudinal experiment with broader research sample to validate model. Application of model to other industries. International replication of study. Further study to enhance understanding of the relationship between customer input & new service success.
	NSD Process Cycle		<ul style="list-style-type: none"> Greater understanding of NSD linear & non-linear processes needed. Investigate the impact of best & individual practices on achieving NSD goals. Investigate the effect of information technologies on NSD. Application of project & portfolio management ideas to NSD efforts. Relationship of company's internal service delivery capabilities & current offerings to NSD.
	NSD Systematic Learning Model	Qualitative	<ul style="list-style-type: none"> Qualitative research needed to enrich initial framework, particularly initial & informal stages. Quantitative research to determine impact of learning process on results of development. Mechanisms of adoption or avoidance need exploration.
NPD	NPD Waterfall Model	Qualitative	<ul style="list-style-type: none"> None made.
	NPD Spiral Model	Qualitative	<ul style="list-style-type: none"> Implementation & testing of model to highlight major problems, disadvantageous, & allow refinement.
	NPD Stage Gate Model	Qualitative	<ul style="list-style-type: none"> None made.
PSS	Service Engineering Process Model	Qualitative & Quantitative	<ul style="list-style-type: none"> Constructing a model for balancing value & costs. Model to take into account multiple Personas for a single receiver.
	Technical Service Models	Qualitative	<ul style="list-style-type: none"> Systematic investigation of interrelations between products & technical services & the corresponding design activities.
	PSS Framework Configuration	Qualitative	<ul style="list-style-type: none"> Development of software to display the configuration model & configuration matrices. Appropriate operation figures & quantifiable objectives to be included in the developed software. Consistent procedures for continuous improvement of the configuration model, material & immaterial entities of a PSS to be developed.

Table 2.11: NPD, NSD and PSS comparison summary

Based on the findings, this author suggests that:

- Although the models studied provide an increased knowledge of the service/ product service processes, due to the differences in the core characteristics of product and service development, research is still needed in order to gain a comprehensive

understanding of the transition to PSS. In particular, the affect of proposed process changes must be taken into account.

- With intangible service provision, many service based components cannot be quantified, e.g. staff helpfulness, customer perception. Therefore, in relation to service provision, qualitative methods are best suited to capturing intangible components. These are less common in product development and may cause difficulty when transitioning from a product-orientated strategy to a PSS strategy.
- PSS consists of both tangible (product) and intangible (service) components. Therefore, a balance of qualitative and quantitative approaches must be utilised to coherently measure PSS. Companies operating under a product-orientated strategy are unfamiliar with service processes and may struggle to understand, implement and integrate them into company operations.

2.8 Summary of analysis

This chapter provided a review of literature in relation to the differences in the characteristics of products and services. The process of NPD and NSD was analysed, the similarities/ differences discussed, and proposed models examined. Developed PSS models were investigated and evaluated to highlight any areas of difficulty in relation to the transition of a product-orientated company to PSS. During the course of the analysis, the following key findings were established:

- NPD references models are well established in industry, and provide a rigid linear process to allow for documentation and tight control of variation. NSD models are still in development, and vary from linear models to liquid models with no formal line of progression. This is to account for the high level of human input in services, and variation.
- While systematic product design is well established, service design is still predominantly performed with little or no systemisation. Despite service design models becoming increasingly available, intuitive approaches are still predominantly applied in industrial practice.
- Product and service development stages differ. Therefore, a product-orientated business must alter its operations and approach in order to facilitate both products and services requirements within a PSS.

- The differences between NSD and NPD can deter manufacturers from creating supporting services. The shift of emphasis from manufacturing to ‘soft factors’ requires a shift from a product-orientated culture to a PSS culture.
- Service design is frequently performed detached from product design with insufficient consideration of the mutual influences of products and services. This results in a PSS which is not fully integrated or optimised.
- There is a lack of empirical data concerning practical PSS application. When compared to manufacturing, PSS is in its infancy. Although it offers many potential benefits, due to lack of knowledge and difficulty in integrating product and service processes together as of yet PSS models are not widely used in industry.
- Tools which bundle product and service activities create a clear flow of process. Due to customer co-creation in service, these tools (e.g. reference models, service blueprints) focus on the ‘soft factors’ of service and indicate potential difficulties when transitioning from product-orientated to PSS.
- Integrating processes accommodates providers with a better understanding of their service offering. In comparison to manufacturing, service outputs can be difficult to measure and need to be continuously reviewed. Integrating processes allow for this and present a clearer concept on which to build the service.
- Due to the high level of intuitive methods within service development and provision, outputs and processes can be difficult to quantify. Quantitative research methods, traditionally used in manufacture, rely on precise data in order to deduct numerically based answers. This is not suitable to the variable service development, provision or review. Companies wishing to provide a PSS must account for both qualitative and quantitative data.

However, despite the collective approach to PSS, PSS models do not take into account the cultural barriers to implementing a PSS strategy. The alternative approach taken by the proposed TIPSS Process model (discussed in detail in Chapter Five) will be discussed in the following section.

2.9 Current PSS understanding

As previously discussed in this section, although offering potential competitive advantage, traditional manufacturers are reluctant to implement a PSS strategy. Due to significant

differences in the inherent characteristics of products and services, many struggle to understand the service value of PSS. Additionally, due to the product-orientated culture of traditional manufacturing companies, many are unaware of and are unfamiliar with the 'soft factors' involved in service provision. Therefore, based on the research contained in this chapter, the following key considerations for a model which facilitates the cultural transition of a company from product-orientated to PSS can be defined:

- To create an integrated PSS, a common understanding of the design artefact and its constituents is required. Due to the multi-faceted nature of PSS, communication between all participants, both within the company (management and staff) and outside the company (customers, secondary suppliers) must be emphasised and made explicit. Therefore, product-orientated companies wishing to transition to PSS, must be made aware of the PSS process as a complete system.
- To facilitate understanding of PSS, a systematic design process is required. A structured process prevents ambiguity, provides a clear understanding of the steps needed for development and provides a better opportunity to recognise and capture innovations. Product-orientated companies undertake regulated processes with low levels of variability. Conversely, due to the co-creative service components of PSS, outputs are variable. Therefore, in order for product-orientated companies to transition to a PSS culture, they must find the correct balance of controlling factors for quantifiable components (product) while allowing flexibility for variable components (service).
- In order to allow for, manage and maintain the variable service based components or 'soft factors' of a PSS, companies wishing to transition from product-orientated to PSS must adapt their organisational culture, process structure and managerial approach.
- As product-orientated companies are unfamiliar with service processes, PSS should be comparable/ compatible with established design processes in order to simplify understanding.
- PSS development must allow a free flow of innovation, and ease of change. Due to the high variability of services, new situations and instances are common e.g. customer inputs will vary in relation to the individual and cannot all be pre-empted. Therefore it is essential companies wishing to transition from product-orientated to a PSS culture must establish processes which are sufficiently flexible to encourage, implement and manage change.

- Organisations are made of an interlinking network of processes. Attention must be paid to project patterns to provide and capture information of intuitive processes not formally documented. Product-orientated companies must recognise the value of this tacit information in order to transition to a PSS culture.
- Qualitative methods are best suited to the service component of PSS development as they take into account both tacit and explicit information e.g. documentation, opinion or intuitive approaches. This provides insight into the overt human component of the process from staff and customer perspectives which can be overlooked by quantitative methods. Therefore, in order for product-orientated companies to transition to PSS culture, they must be aware of, capture and utilise both qualitative and quantitative data.

2.10 Knowledge gap identified in PSS models

Of the models studied, common methodologies and approaches can be seen in relation to integrating product and service processes and activities. A number of PSS models have been developed which address an aspect of cultural barriers to the transition from Goods- to Service-dominant Logic (see Table 2.12). Despite the recognition of culture as being a multi-faceted construct, each model addresses only a single aspect of cultural transition.

	Title	Area addressed/ examined
Ceschin (2012)	Critical factors for implementing and diffusing sustainable PSS: insights from innovation studies and companies experience	Barriers to the implementation of sustainable PSS strategies.
Cook <i>et al.</i> (2006)	The transfer and application of Product Service Systems: from academia to UK manufacturing firms	Barriers to PSS concept transfer from academia to industry.
Morelli (2002)	Product-service systems, a perspective shift for designers	Difficulties found with product designers shifting from tangible products to intangible PSS components.
Salonen (2011)	Service transition strategies of industrial manufacturers	Examination of how service intensive strategies can be exploited by manufacturing companies.
Sundin <i>et al.</i> (2010)	From component to system solution supplier: Strategic warranty management as a key to efficient integrated product/service engineering	Examining how warranty management could be used as a strategic tool for integrating PSS processes.
Tan <i>et al.</i> (2010)	Strategies for designing and developing services for manufacturing firms	Examination of design strategies used by manufacturing firms when applying a PSS strategy.

Table 2.12: Example of PSS studies addressing change in product-orientated companies

In contrast, the TIPSS Process Model (discussed in further detail in Chapter Five) addresses multiple transitional barriers (identified through primary and secondary research which is detailed in Chapter Four). In addition, the cause and effect of combinations of these variable on the transitional process are also analysed and accounted for.

The methodology used to identify the cultural barriers to transition and the development of the TIPSS Process Model are discussed in the following chapter.

CHAPTER THREE

RESEARCH METHODOLOGY

CHAPTER ABSTRACT:

The purpose of this chapter is to define, document and justify the research and validation methodology used in this body of research. It details the sample selection process and data collection methods used. The transition of the research focus from an integrated PSS model to a process model to facilitate the transition from a Goods-dominant culture to a PSS culture is discussed and justified. It concludes with the development and validation of the developed TIPSS Process model.

3.1 Introduction

3.2 Research Strategy

3.3 Research Methodology

3.4 Conclusions

3.1 Introduction

A substantial quantity of literature has focused on developing systems which aim to integrate product and service process activities into a single combined framework e.g. a PSS framework. As discussed in Chapter Two, there remains a gap in the knowledge and understanding in relation to the implementation of a PSS framework within an existing company. Companies operating under a product-orientated culture (discussed in detail in Chapter Four) can be reluctant and/or unable to fulfil the requirements of a PSS. Therefore this research focuses on the development of a process model which overcomes existing barriers to PSS and facilitates the transition from product-orientated culture to a PSS culture prior to implementing a PSS strategy. The objective of this research is to:

- Establish the core skills/ knowledge and considerations needed to implement a PSS strategy.
- Identify the predominant cultural barriers to the implementation of a PSS system within an existing product-orientated business.
- Develop a system which overcomes these cultural barriers to transfer the required knowledge/ skills.
- Define a methodology with which to validate the developed system.

This chapter will present and discuss the research methodology applied in the thesis to achieve these objectives; define the scope of the research approach used; illustrate the research design; and provide background for the selected case studies and data collection methods utilised in the research. In addition, the limitations of the research will be discussed and justified in relation to the appropriateness of the approach taken. To begin the discussion, the research strategy will be examined. This will illustrate the overall approach to the research and provide an adaptive set of guidelines which connects the research pattern to the inquiry strategy and methods for collecting data.

3.2 Research Strategy

When choosing the research strategy for this study, the strengths and weaknesses of both qualitative and quantitative methods were considered. Quantitative research typically assumes a high degree of generalisability of research outcomes, has a high degree of abstractness and relies heavily on principles of statistical testing (de Beuckelaer and Wagner,

2007). Statistical analysis allows the researcher to maintain an objective and unbiased view of the results. However, the applicability of quantitative research can be limited as issues may only be measured if they are known prior to the research. For example, a survey can only ask static questions formed around a pre-determined subject. Therefore, quantitative research is evaluative, and is more appropriate when the issues to be tested are known.

Alternatively, qualitative research has a degree of flexibility in design and analysis which allows it to respond and react to particulars that emerge during the study as opposed to explaining observed particulars in light of predetermined theories (Hanson et al, 2011). Additionally, it allows the researcher to interact with the respondents and interaction to occur between respondents. Researcher interaction allows for in-depth problem analysis and a high level of insight; and respondent interaction often stimulates discussion and uncovers unanticipated issues. As a result, qualitative research is deemed more appropriate when used to uncover customer perceptions and attitudes (Nykiel, 2007). It draws data from a broad spectrum of media (e.g. photographs, videotapes, drawings, interviews, diaries) to create rich, thorough, and detailed descriptions of complex behaviours, processes, relationships, settings, and systems. It can provide a clearer understanding of the social and cultural contexts of people's lives and allow the researcher to obtain insights into the underlying cognition, affects and behaviours which can often be overlooked by quantitative methods. As it employs a largely inductive approach to analyzing data it can be difficult for researchers to take an objective view (Chen, 2010). For example, different case study researchers may interpret the same data differently even if they do not differ from one another in terms of their research focus (de Beuckelaer and Wagner, 2007).

As discussed, qualitative and quantitative research methods have strengths and weaknesses related to the form and source of data sought. Prior research in relation to PSS transition/ implementation typically utilises a combination of quantitative and qualitative methodologies. Initial quantitative research is commonly used to gain a broad understanding of the companies/ people involved. This is then used to focus the area of qualitative research. For example, when researching companies transitioning from component to system solution supplier through strategic warranty management, Sundin *et al.* (2010) utilised in-house quantitative data to select customer companies and distributors for interview which were known to have different approaches. Selected companies and in-house staff were then interviewed once (face-to-face) or several times over a period of time (by phone). As found

in this research (discussed in 3.3.4 Development and Validation), face-to-face interviews were preferable but restrictions on staff time significantly limited this option. Although potentially limiting (it provided no opportunity to talk to other staff) phone contact allowed regular updates and so was used as the primary contact medium. Cook *et al.* (2006), who developed a framework to aid UK based intermediaries to implement PSS concepts, took a similar approach. A target industry was chosen (manufactures of electronic instrumentation and industrial air conditioning units for business markets). Five government intermediaries, who had previous experience in this industry, were used to gain access to quantitative data on the target market. Based on the information gathered, four case studies were chosen. A range of data collection techniques such as semi-structured interviews, content analysis of relevant documentation and observation were used to elicit data from multiple sources in each of the companies. Information gathered from the case studies were then used to develop and refine a transfer framework.

Based on analysis of prior research methodologies, in relation to this research a combination of static data (e.g. established processes) and dynamic data (e.g. underlying rationales for strategic decisions) were utilised. Quantitative research was used to collect mass data (i.e. companies producing Class IIb and III medical device) and selection of companies for future study (i.e. high and low scores obtained in the online questionnaire). This is discussed in further detail in section 3.3.2. Although this limited insight into the current operations of the companies, it was felt that it would prevent bias in the selection process. As some companies were known to the author, objective information provided by the companies themselves provided a 'blind' selection process. Qualitative research was used in both the primary research and over the course of the case studies. Due to the cultural focus of the research, qualitative data was best suited as it considers the social and cultural construction of the variables of interest (Bord *et al.*, 2009). Due to potential researcher bias in relation to the qualitative data, to help maintain subjectivity, a methodology was used when contacting the companies. Semi-structured interviews prevented leading and ensure follow-up of previous developments. When analysing the data (discussed in Chapter Six) areas of change were defined. Where possible, changes were measured in relation to direct action (i.e. activities undertaken by staff).

This author contends that a combined approach of quantitative research methods (to systematically select the case studies) and qualitative research methods (to collect and

analyse information during the case studies) will provide a cohesive research methodology. In order to effectively combine the strengths of the two approaches, a sequential approach was used. The research methodology is detailed in the following section.

3.3 Research methodology

In order to create a systematic flow to the research, it was broken into four stages (as shown in Figure 3.1). Information from each stage was used to inform and shape the approach of the successive stage.

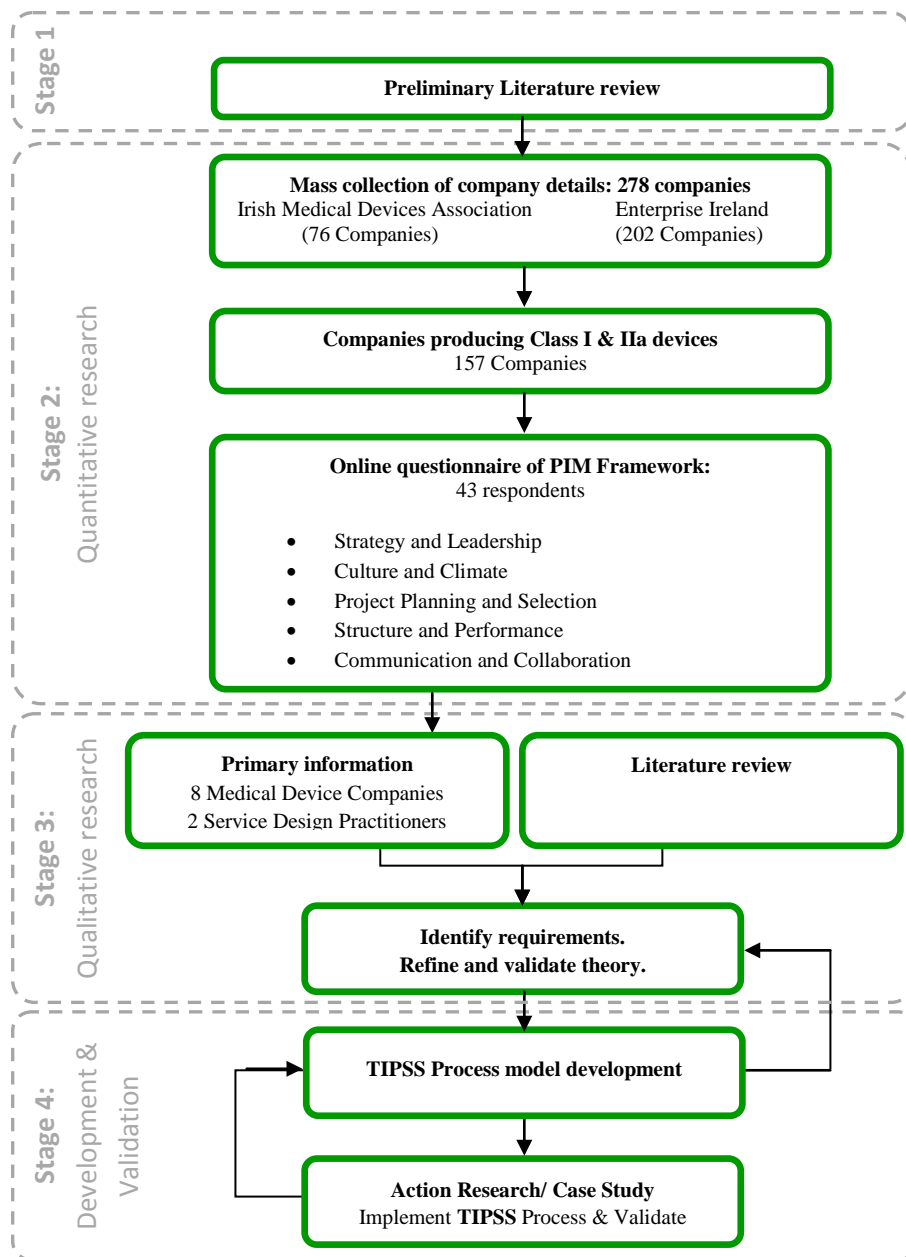


Figure 3.1: Research methodology structure

This format allows a systematic funnelling of information. Stage one provides a base of information to provide an overview of the research area. Phase two provides unbiased selection of companies for qualitative information. Phase three provides identification of specific barriers to transitional change. A secondary literature review supports these barriers in the wider research field. These identified and support barriers can then be addressed in the proposed model. Each stage of the methodology will now be discussed in detail.

3.3.1 Stage 1: Preliminary Literature Review

For both quantitative and qualitative research, a review of the existing literature research aids in identifying what is and is not known about the topic of inquiry (Hanson *et al.*, 2011). Research began with an in-depth literature review on the topic of PSS models. This has been presented in Chapter Two. This was used to provide an overview of the approaches being developed and difficulties being discussed in this area.

A frequently discussed difficulty in the literature is the integration of product and service processes into a single system (Wang and Zhang, 2012; Geum *et al.*, 2011; Dong *et al.*, 2010; Meier *et al.*, 2010; Sakao *et al.*, 2009; Aurich *et al.*, 2009; Sakao & Shimomura, 2007; Gann and Salter, 2000). Discussions range over a broad number of academic disciplines (e.g. engineering, marketing, manufacturing, business strategy) and research focus (e.g. evaluation, process development, management, knowledge management, business strategy, innovation). Due to the inherent characteristics of products and services (as discussed in Chapter Two) an integrated system must balance quantifiable product development and production processes with the variable inputs and outputs of service provision. Based on prior experience in medical device development, this author was aware of the high level of mandatory regulatory requirements which medical device developers must meet. Integrating a variable service offering into tightly controlled processes would be particularly difficult. This represented an interesting perspective in relation to PSS which has received limited attention in the literature. Therefore, the implementation of an integrated PSS system within the medical device industry became the initial focus of the research. Once the scope of the research was defined, Stage two: Quantitative Research began.

3.3.2 Stage 2: Quantitative Research

Quantitative research began with a mass collection of company information (n= 278 companies) within the Medical Device industry. As discussed, due to the high level of regulatory requirements and controls within this industry, implementation of variable components such as services is particularly difficult. As a result, barriers to implementing a PSS are particularly prominent. Companies were categorised in relation to the Class of Medical Device being produced. Medical devices are broken into four classes ranging from low risk (Class I) to high risk (Class III). Class III and Ib are highly regulated and require substantial documentation, testing and development time. In comparison, Class I and Ia are lower risk, have a lower level of regulatory requirements and often shorter development times. This author was concerned that Class I and Ia were more open to innovation as they were less restricted by regulation and as a result did not accurately represent the Medical Device Industry in its totality. However, due to regulatory demands, changes within Class III and Ib companies require significant lengths of time to implement. Therefore, due to the duration of the study, companies producing Class III and Ib medical devices were eliminated from the research. The remaining companies (157 in total) progressed on to the next step of the process.

Companies were asked to complete an online questionnaire adapted from the Product Innovation Management (PIM) Framework (Cormican and O'Sullivan, 2005). The PIM Framework was developed to identify the critical success factors for effective product innovation management. As it focuses on new product development, it would provide an initial indication of a company's approach and willingness to process and strategy change. Research has indicated that NSD and NPD may be considered to have the same underlying dimensions of innovation (Santamaría *et al.*, 2012; Nijssen *et al.*, 2006). Therefore, it was rationalised that a model designed to indicate a company's approach to product innovation would also indicate its approach to service innovation. The PIM Framework is a self-assessment audit consisting of fifty statements. A high score indicates a positive fit between current management practices, systems and traits in relation to best practice. Inversely, an organisation which scores low does not follow appropriate practices and will experience a higher level of difficulty when developing successful products. The original framework was altered to include service components (see Appendix A for list of questions) and distributed to selected companies. Where appropriate, service based questions were asked separately.

Although this threatened to make the questionnaire lengthy, this author felt that separating these components prevented ambiguity. If the question did not apply to the company e.g. no service components are provided, they were asked to score the question a rating of zero.

Forty-three companies responded in total. Scores were reviewed and compared in overall ratings and consistency of results through spider diagrams. Spider diagrams display multivariate data of quantitative variables on an axes starting from the same point and clearly illustrate the performance of companies across several categories. Four consistently high scoring companies and four constantly low scoring companies (i.e. high or low score across all categories) were chosen for interview and progressed to the next stage of the process, Qualitative Research. Figure 3.2 shows an example of a high scoring company and a low scoring company in a single spider diagram. A full list of spider diagram results are in Appendix B.

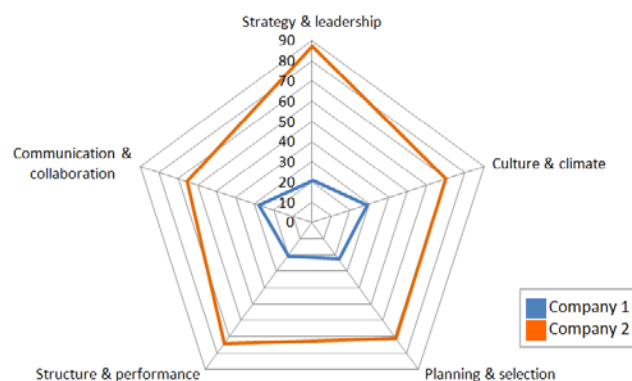


Figure 3.2: Example of Spider diagram used to compare PIM results

3.3.3 Stage 3: Qualitative Research

The interview goals were to establish the company's current culture, an understanding of their current offering, their perception and experience of service, their current development processes and their willingness/ openness to change (a list of guiding interview questions can be found in Appendix C). As the product-orientated companies considered themselves product manufacturers with little or no service components, their level of input in relation to service focused areas was limited. Therefore, two service practitioners were also interviewed. These were well established in the field and had worked across a broad spectrum of industries. Interviews with service practitioners provided insight into establishing service processes within a manufacturing context and provided a point of

reference for best practice. During the course of the interviews, current development processes were mapped for both the companies and the service practitioners to provide a focal point and facilitate discussion in key areas identified in the literature review. For example, processes were used to discuss the perceptions of value and the intended value outputs. Stages involving customers were used to discuss customer involvement, the perception and value of customer input and current customer relationships. To ensure the maps correctly and accurately represented current processes, they were reproduced in a formal format and signed off by interviewees after the interviews concluded (See Appendix D for maps). A profile of the companies and service practitioners interviewed is given in Table 3.2.

PIM Rating	No.	Primary Contact	Primary Product area	Size
Low	C1	CEO	Orthotic devices	SME
High	C2	Chief Technical Officer	Varicose Veins	SME
High	C3	CEO	Clinical trial management	SME
High	C4	CEO	Wireless patient monitoring	SME
High	C5	Technical Precision Engineer	Range of surgical devices	SME
Low	C6	Sales Director	Catheter Solutions	SME
Low	C7	R&D Director	Range of surgical devices	SME
Low	C8	Director	Vascular diseases	SME
	S1	CEO & Principal Consultant	Service Design	Sole trader
	S2	CEO & Principal Consultant	Service Design	Sole trader

Table 3.1: Profiles of companies interviewed.

However, early in the qualitative research, an unexpected anomaly developed. As an introductory interview question, companies were asked to give their definition of innovation. It was intended that this would lead discussion into the process of introducing new products and implementing changes within the company. When discussing innovation or any potential developments within the company, the companies did not mention service in any respect. When service was discussed, companies were uninterested and the topic was quickly dismissed. When further explored, it was revealed that the company's concept of service was limited to those directly supporting the product (i.e. maintenance, repair, delivery) and were not considered as a potential innovation or additional source of revenue (discussed in more detail in Chapter Four). As the companies had no interest, little to no resources were dedicated to service provision or development. The limited services which were provided, were those expected/ demanded by the customers. Rather than viewed as potential sources of

revenue, they were seen as unavoidable costs. As a result the companies had no intention of implementing extended/ additional service components and therefore were uninterested in PSS. When discussed with the service practitioners, this was found to be a common problem in product-orientated companies. This author recognised that even if a highly effective PSS model was developed, the lack of interest in PSS as a concept by product-orientated industries would greatly limit its application. Rather than service offerings being viewed as a drain on resources, companies must view them as potential areas for competitive advantage. In response to these findings, the research focus shifted from designing an integrated PSS model to determining how transition a product-orientated company culture to a PSS culture.

Due to this shift in research focus, secondary research (discussed in detail in Chapter Four) was undertaken to analyse the literature approach to transitioning to a PSS culture. This was used to gain a deeper understanding of PSS, highlight common approaches/ methodologies to be found in the literature (as discussed in Chapter Two) and highlight limiting cultural factors in relation to the transition to PSS (as discussed in Chapter Four). This information was then used to direct questions in the remaining company interviews.

In order to determine the primary barriers to cultural transition, each interview was transcribed and analysed using Computer Aided Qualitative Data Analysis Software, NVivo. Goods-dominant approaches and difficulties/ issues in relation to service were highlighted. This allowed interviews to be cross referenced and commonalities highlighted. Additional literature research was used to further support common findings in a broader context e.g. common findings in previous studies, similar studies across a range of industries and case studies. This was useful as often qualitative data is compared with existing relevant literature in order to formulate new theories and approaches to alleviating difficulties in industry in relation to translating research findings and theoretical knowledge directly into practice (Chen, 2008). This cyclical approach to research intertwined primary and secondary information into a cohesive, self-supporting format (see Figure 3.3).

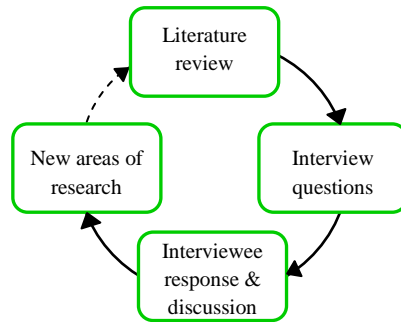


Figure 3.3: Intertwining of Primary and Secondary research

Gaining an understanding of these areas on both a focused and broad level was essential as it provided the context in which changes must be implemented in order to transition from product-orientated to PSS culture. Once these had been established, a system capable of overcoming the cultural barriers to the transition to PSS while delivering the defined content required by a PSS could be developed and validated. Development and validation is detailed in the following section.

3.3.4 Stage 4: Action Research/ Case Study, Development and Validation

Information gathered and synopsised in Chapter Two and Four was analysed to create/ define the requirements of the knowledge/ skill content and the transition process, called the TIPSS Process Model. The TIPSS Workshop was then developed which met the specifications as defined by the process model, and act as the initiation point of the process. Both process model and workshop are detailed in Chapter Five. An initial trial workshop was held with a group of trainee designers and an engineering company which operates in a variety of industries including medical device development. After each trial, feedback was gathered and implemented i.e. changes made from the initial workshop were implemented before the run of the second workshop and changes from the second workshop were implemented before the case studies. From these preliminary trials, the TIPSS process content, presentation and supporting material was generated, changed and/ or refined. Once the format of the TIPSS Process was defined, it could progress onto the validation stage.

The ultimate goal of validation is to ensure the TIPSS Process addresses the problems highlighted in the research, to provide accurate information about the process and to ensure it is actually used. As with similar research in both PSS application and transitioning cultures (Geng *et al.*, 2011; Zhu *et al.*, 2012; Stock *et al.*, 2007; Allameh *et al.*, 2011), an action

research/ case study approach was selected to validate the effectiveness of TIPSS. Action research, as the name suggests, refers to a class of research methods where interventions are part of the research process. It stems from the basic contention that complex social processes can be best studied by introducing changes into these processes and observing the effects of the changes (Porter *et al.*, 2012).

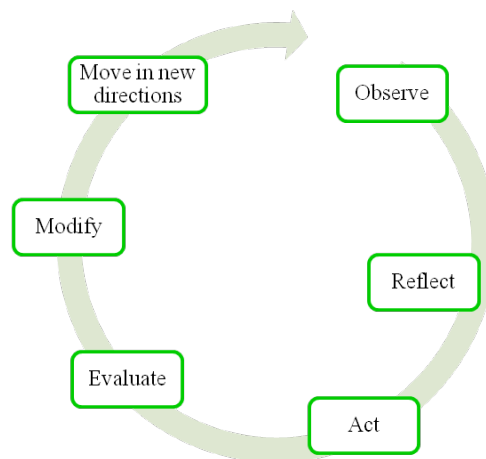


Figure 3.4: An action reflection cycle (McNiff, Jean & Whitehead, 2011)

As discussed in Section 3.2, qualitative case studies are an empirical research method that primarily uses contextually rich data from bounded real-world settings to investigate a focused phenomenon (Barratt *et al.*, 2011). Instead of statistical sampling from a defined population, case study researchers utilise a theoretical or biased sampling approach where cases are chosen for theoretical reasons. Case studies are often used when there is a gap in existing theory that does not adequately explain the phenomenon under investigation; the research is explanatory (i.e. “how” and “why” types of questions) and the context and experiences of contributors are critical (Eisenhardt and Graebner, 2007; Fisher, 2007).

Final validation was achieved by undertaking the TIPSS Process with two companies which were then studied over a seven month period (further details of the companies studied in Chapter Six). Focused case studies are often best suited to qualitative research as it allows the necessary depth of analysis required to gain sufficient insight (Forman *et al.*, 2008; Sobal, 2001). Both companies fit the basic criteria as manufacturers of Class I Medical Device, were product orientated and did not consider themselves to provide any service components. Companies were contacted on a regular monthly basis or after a significant event e.g.

conference, launch of new products/ services. Although a higher level of contact was preferred, staff in both companies were under significant time pressure and were reluctant/ unable to provide additional time.

On-site visits were difficult due to concern regarding IP protection. To overcome some of the IP concerns, a confidentiality contract was offered. In addition, it was agreed that company names would not be specified in any published/ public documents. Access to documentation would be tightly controlled and documentation containing company specifics would be destroyed after the research was completed.

Documentation sent to new customers prior to the process was also collected and reviewed. In addition, customer documentation (printed or digital) generated during the study was collected. This provided an additional source of information and traceability in relation to the products/ services being provided, and changes in customer communication/ relationships. Information gathered over the duration of the study was analysed in relation to cultural indicators (discussed in detail in Chapter Six) in order to draw conclusions in respect to the effectiveness/ ineffectiveness of the proposed process and future work required in the research area.

3.4 Conclusions

Numerous studies have agreed that there are significant difficulties in effectively integrating product and service development processes into a single PSS model. As a result, the initial research focus centred on the development of an integrated PSS process model. However, primary research highlighted a significant overall lack of knowledge and understanding of PSS within product-orientated companies. As a result, PSS processes were not provided or were significantly limited as product-orientated companies were unwilling and/ or unable to provide PSS offerings. Therefore, research shifted to the development of a process model which facilitates the transition of a product-orientated culture to a PSS culture. Therefore, the main research objectives are to:

- Establish the core skills/ knowledge needed to develop a PSS offering.
- Identify barriers to the transition to a PSS culture within a traditional product-orientated business.

- Develop a process model to overcome these barriers and transfer the knowledge/skills identified.
- Define a methodology to validate the developed process model.

It was determined that a combination of qualitative and quantitative research methodologies was best suited to achieve these objectives as:

- Quantitative methodologies allow the researcher to maintain an objective view of data and therefore, make an unbiased case study selection.
- Qualitative methodologies allow the researcher to obtain insights into the underlying cognition and behaviours which directly affect the organisational decision process.

In order to maintain a level of control, research was approached systematically and broken into four stages:

- Stage 1: Preliminary Literature Review
 - Used to identify gaps in the understanding of PSS and its application.
- Stage 2: Quantitative Research
 - Mass collection of company details operating in the Medical Device field.
 - Selection of companies based on the Product Innovation Management (PIM) framework, which measures a company's alignment to best practice.
- Stage 3: Qualitative Research
 - Interviews with ten selected companies (eight product orientated, two service practitioners) to highlight common perspectives and practices in relation to product and service development.
 - Additional literature reviews to support primary findings in a broader context.
- Stage 4: Development and Validation
 - Primary and secondary data used to define the requirements of the PSS knowledge/ skill content and transition process, called the TIPSS Process Model.
 - Define the methodology for the application and validation of the TIPSS Process Model within two companies.

As discussed, this research methodology has been applied in similar studies and creates a coherent approach to answering the defined research questions. The selection approach

provided sufficient distance between the researcher and the companies to prevent bias and the extent of contact over the duration of the research was sufficient to capture the degree of change while not acting as a barrier to company participation. Change was quantified based on direct actions rather than discussions/ plans of change to provide a true indicator of transition. Nonetheless, no methodology is perfect. On reflection, if the research was to be undertaken again, two primary changes to approach would be made:

- Qualitative research undertaken with the eight product companies (four high and four low scoring companies) to further examine:
 - Comparison of strategy e.g. degree of detail, future planning, scope.
 - The differences in processes within the companies.
 - The effect of static versus dynamic processes on staff and the value offering.
 - The differences in information/ knowledge sought, captured and distributed.
- Increase the duration of the study as this could provide a clearer indication of transition as there would be significant time for changes to process and full operations to be implemented.

The following chapter details the primary data gathered through industry interviews and second literature review which supports these findings in a broader context. The method of data gathering and analysis is discussed further in Chapter Six.

CHAPTER FOUR

TRANSITIONING FROM PRODUCT-ORIENTATED CULTURE TO PRODUCT SERVICE CULTURE

CHAPTER ABSTRACT:

Primary and secondary research contained in this chapter support and build upon findings detailed in Chapter Two. The purpose of this chapter is to highlight and discuss existing cultural barriers in relation to the transition from a Product-Orientated culture to a Product Service culture i.e. transitioning from a Goods-Dominant logic to an Integrated/ Service-Dominant logic. This provides the context in which the TIPSS model must operate.

4.1 Introduction

4.2 Organisational Culture

4.3 Transitioning culture/ logics within the company

4.4 Transitioning staff focus from a product-orientated to PSS

4.5 Key Findings and Conclusions

4.1 Introduction

It can be seen that increasing competition (Foote *et al.*, 2001) and decreasing profit margins (Brown and Neu, 2005; Kallenberg and Oliva, 2003) have resulted in some product-orientated companies increasingly turning towards service provision. Nevertheless, many companies struggle and/ or are reluctant to implement the necessary changes required to operate under a PSS strategy. As discussed in Chapter Two, a substantial body of literature has focused on developing systems which aim to integrate product and service process activities into a single combined framework. These frameworks have the potential to aid companies in developing personalised, flexible and comprehensive product and service solutions. Yet it is noted that these frameworks operate under the assumption that companies are willing and capable of initiating the changes required to commence PSS activities. As indicated by the companies interviewed in this research (discussed in Chapter Three), existing, established cultures can act as significant barriers when converting strategies. In order to initiate PSS, companies must redirect and adapt their product-orientated business strategies to facilitate the distinguishing characteristics of services.

The primary approach to this transition is through the conversion of a company's culture from Goods-dominant logic to an Integrated logic (discussed in detail in Section 4.2). Research in relation to existing barriers to the transition to PSS remains relatively under-researched. Through a combination of primary research and secondary research, this chapter discusses the effect of dominant logics, the driving force behind company focus, decisions and strategy, in relation to the transitioning of dominant cultures. Barriers to transition are considered in relation to both the overall company and its individual staff. Understanding the rationale behind these processes will provide insight in relation to altering habitual approaches and facilitate the addition of new service components within a product orientated company.

The findings of the primary research¹ and the secondary research are discussed in the following sections. To facilitate discussion, organisation culture and dominant logics will be discussed. Based on the primary research and supported by secondary research, cultural

¹ Quotes from the primary research are shown in italics with the name of the originator as shown in Table 3.2 page 61.

barriers to the transition from product-orientated to PSS will be discussed on a company and staff level.

4.2 Organisational Culture

Organisational culture is considered a broad topic. It has been defined as common beliefs, attitudes and values held among organisational members of a business, shared normative beliefs and shared behavioural expectations, or a particular set of values, beliefs, and behaviours that characterises the way individuals and groups interact in progressing toward a common goal (Kwantes and Boglarsky, 2007). Therefore, in recognising the organisational culture of a business, the thought process involved in strategic decisions can be understood, and the transition process adapted to suit. The main reason for corporate cultural broadness is, as it is an emergent property of human interaction, it is constantly being negotiated. The values and beliefs that emerge from these ongoing negotiations and practices among group members become a source of reference for what is considered acceptable or unacceptable in an organisation in terms of right and wrong behaviour (MacIntosh and Doherty, 2010).

During primary research, all interviewees were asked to discuss what they considered as innovation. Answers centred on the concept of radical and incremental value-add in terms of product (i.e. sustainability, longevity, cost reduction) and customer (i.e. meeting customer requirements, emerging customer requirements). Yet none considered service as a source of innovation. When discussed, service was considered to be supplementary to the product, offering only support to product functionality (i.e. maintenance, repair, purchase). This finding was supported by the wider experience of the service practitioners, *'You're trying to convince them that there's a business benefit'* (S2).

In relevant literature, there are two opposing perspectives in relation to the main influencers of Organisational Culture (Tsui et al 2006):

- The Functionalist view considers founders and CEOs as the primary source, transmitters and maintainers of organisational culture. They shape the culture through their actions and leadership behaviour.
- The Attribution view argues that the people within the organisations develop their own implicit theories regarding cause and effect. They have a general preference that

overestimates the role of leadership in determining organisations' performance outcomes and leaders are simply romanticised images that allow staff to interpret organisational events.

It can be seen that these views are not exclusive of each other. When trying to implement cultural changes, the areas and levels of resistance across the groups will vary. The service practitioners interviewed by the author utilise a combination of these approaches. Typically management is the primary contact as they control investment decisions. Once the decision has been made to invest in a service component, a frontline staff member is assigned '*kind of like the project champion within the organisation*' (S1). This person provides the practitioner with information in relation the processes already established within the company and insight into both staff and customers. Insight into staff is considered essential as, due to lack of familiarity and unease with breaking routine, they are '*typically resistant to change*' (S1). Therefore, it is important to consider barriers and influencing factors at the managerial/ company level and the individual staff level.

4.2.1 Dominant logics

It has been argued that one of the key factors in the success of a new business venture is the dominant logic of the company (Nadkarni and Narayanan, 2007). Dominant logic is the manner in which companies conceptualise and make critical resource allocation decisions. Over time these develop into mental maps, business models and processes which become company norms (Obloj *et al.*, 2010). Although dominant logics can offer clarity in relation to goals and strategy, adhering to a strict dominant logic can adversely affect innovation and limit opportunities for competitive advantage and financial gain. Organisational logic focuses the attention of staff on issues and solutions that are consistent with the prevailing logic (Vermeulen and Raab, 2007). Companies must be careful to prevent the dominant logic from restricting their view of potential new areas of expansion, new approaches and new innovations as they are considered outside the 'company norm'. Instead of strictly adhering to a goods- or service-dominant logic, companies must operate under an integrated logic, which facilitates both products and services under a PSS system. This section discusses the fundamental logics found in the companies interviewed, the principles of each logic and the benefits of an integrated approach. This will provide a cultural overview of the companies

reviewed in the study (discussed in detail in Chapter Three and Chapter Five), and an overview of the main differences in the proposed new PSS culture.

Goods-dominant logic

Goods-dominant logic developed from a combination of works concerning the creation of national wealth through production and export of surplus tangible commodities (Smith, 1776 as cited by Lusch *et al.* 2007). It views value as embedded in an organisation's offerings of product, which is then distributed in the marketplace in exchange for goods and/ or money. In its most basic form, Goods-dominant logic proposes the following (Vargo and Lusch, 2004):

- The purpose of economic activity is to make and distribute things that can be sold.
- To be sold, these things must be embedded with utility and value during the production and distribution processes and must offer to the consumer superior value in relation to competitors' offerings.
- The company should set all decision variables at a level that enables it to maximise the profit from the sale of output.
- For both maximum production control and efficiency, the good should be standardised and produced away from the market.
- The good can then be inventoried until it is demanded and then delivered to the consumer at a profit.

Goods-dominant logic was the primary logic within all companies interviewed, '*We can make the product for X and sell it for Y. That's really where it's at*' (C8). This logic was further evident in the distinction between the roles of producer and consumers. In Goods-dominant logic, value is created by the provider in relative isolation from the customer and the fundamental organisational resources utilised in the process are operational resources, such as materials and machinery (Åkesson and Skålen 2011). This can be attributed to the inherent characteristics of products (as discussed in detail in Chapter Two). For those interviewed, value for the customer was a substantial consideration during development, '*If they don't value it there's no point offering it*' (C4). Conversely, customer involvement was predominantly limited to specific stages of product development (e.g. early stage research to define user requirements, and testing to ensure the product meet these requirements),

‘Probably as you see it there, too late to talk about our end customers (indicates late stages of the development process) but that’s realistically how it’s been happening. By the time we get down there and have something physical to put in their hands, that’s when we would get it into the hands of an end customer and say look, what do you think of this?’ (C5). For companies operating under Goods-dominant logic, products dominate the total offering. Services only enhance product offerings and improve customer interaction with the product (Mathieu, 2001). Products are the main source of revenue with services providing only a marginal contribution (Oliva and Kallenberg, 2003).

With the rising importance of service provision amongst product-orientated companies, the validity of Goods-dominant logic is increasingly being called into question. It has been argued that innovative companies share a different mindset or mental model on how markets work when compared with the traditional view of Goods-dominant logic (Lusch *et al.*, 2006; Edvardsson *et al.*, 2011). It is argued that Goods-dominant logic assumes that value is added through industrial processes, embedded in goods, distributed and then realised in a transactional exchange, also known as value-in-exchange (Vargo and Lusch, 2004). This is in contrast to value defined by Service-dominant logic.

Service-dominant logic

In contrast to Goods-dominant logic, Service-dominant logic is based on the theory that the customer is a co-producer of value, not the target of the value. Rather than value being embedded in the offering of a product or service, value is realised in use and is co-created through collaboration among the contributors of the ‘value network’. In its basic form, Service-dominant logic proposes the following (Vargo and Lusch, 2004):

- Identify or develop core competencies, the fundamental knowledge and skills of an economic entity that represent potential competitive advantage.
- Identify other entities (potential customers) that could benefit from these competences.
- Cultivate relationships that involve the customers in developing customised, competitively compelling value propositions to meet specific needs.

- Gauge marketplace feedback by analysing financial performance from exchange to how to improve the company's offering to customers, and improve company performance.

In contrast to Goods-dominant logic, the operational resources of Service-dominant logic are the skills and knowledge of its staff and customers, also known as *operant* resources which are intangible and dynamic, '*Service can start off as a process or a way of doing something you can package and your intellectual property might be in a method of doing something rather than a technology or a tool of a product*' (S2). It is contended that companies can gain competitive advantage by identifying and developing these fundamental operational resources as they represent the primal source of innovation, organisational knowledge and value (Lusch *et al.*, 2007; Åkesson and Skålén, 2011). It is important to note that the customer is *always* a co-producer, and the company delivers not value, but value propositions. The proposition means that customer relationships constitute a service system, not simply market-based relations (Dimitriadis and Stevens, 2005). As the customer integrates their own set of resources and competencies into the service (as shown in Figure 4.1), they influence the success of the value proposition (Ordanini and Pasini, 2008).

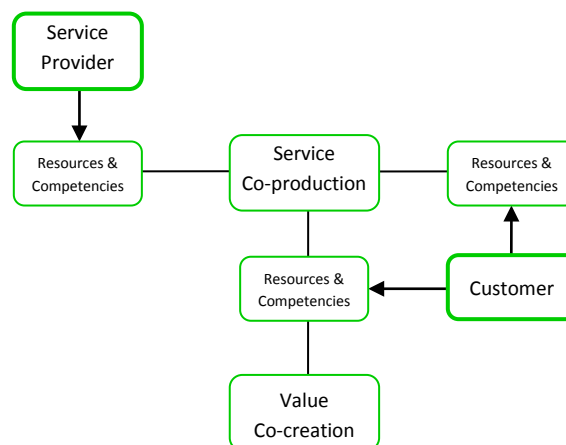


Figure 4.1: Service co-production and value co-creation according to Service-dominant logic (Ordanini and Pasini, 2008)

Customer-centric Logic

Customer-centric logic holds many of the same core components of Service-dominant logic but approaches value provision differently. It is not considered a subset of Service-dominant logic but rather a different perspective (see Table 4.1 for differences). It positions customers

as the centre focus, rather than service, the service provider or the system. In contrast to Service-dominant logic which concentrates on what companies are doing to create the service, customer-centric logic instead focuses on what customers are doing with the services to accomplish their own goals. The primary concern of the company is not the offering, whether it is seen as an outcome (physical good, service solution) or as a process (service interaction), or a combination of both, but rather the customer's life and the tasks that the offering is related to (Heinonen *et al.* 2010). This both requires and allows companies to gain an in-depth insight into customers' activities, practices, experiences and context, than convert these insights into concrete ways to participate in and support the customer's processes in terms of service offerings (Grönroos, 2008). This can be achieved through a variety of methods e.g. User-centred Design, Ethnography, Design Anthropology.

	Product-centric Company	Customer-centric Company
Goal	Best product for customer	Best solution for customer
Value creation route	Cutting edge products, useful features, new applications	Customising for best total solution
Mental process	Divergent thinking: How many possible uses of this product?	Convergent thinking: What combination of products is best for the customer?
Organisational concept	Product profit centre, product reviews, product teams	Customer segments, customer teams and customer P&Ls
Most important process	New product development	Customer relationship management
Measures	Number of new products Percentage of revenue from products less than two years old Market share	Customer share of most valuable customers Customer satisfaction Lifetime value of a customer Customer retention
Culture	New product culture: Open to new ideas, experimentation	Relationship management culture; searching for more customer needs to satisfy
Most important customer	Most advanced customer	Most profitable, loyal customer
Priority-setting basis	Portfolio of products	Portfolio of customers – customer profitability
Main offering	Specific products	Personalised packages of service, support, education and consulting
Approach to personnel	Power to people who develop products Highest reward is working on next most challenging product Manage creative people through challenges with a deadline	Power to people with in-depth knowledge of customer's business Highest rewards to relationships managers who save the customer's business
Sales bias	On the side of the seller in a transaction	On the side of the buyer in a transaction

Table 4.1: Product-centric vs. Customer-Centric Companies (Galbraith, 2002)

Customer-centric logic argues that viewing the service offering outside of its context of use limits the understanding of the value offered. By viewing the offering in context, including all facilitating and supporting services before and after, Customer-centric logic aims to gain

an understanding of what sense-making process customers use to construct their experience of value (Heinonen et al. 2010; Grönroos, 2008; Schembri, 2006).

Integrated Logic

As can be seen from the above section, there are significant differences between Goods-dominant logic and Service/ Customer-dominant logic. Due to the service components in PSS, in order for the companies interviewed to successfully implement a service component, they must alter their dominant logic. It must be emphasised that transition is not a one-dimensional effort to transform manufacturing organisations into service-orientated organisations but a delicate balancing act in which multiple business logics must co-exist (Windahl & Lakemond, 2010; Day *et al.*, 2004). Therefore, the intention is not to substitute Goods-dominant logic with Service-dominant logic. Rather, companies must increase the breath of their PSS offering, which they must manage and coordinate (Kowalkowski, 2010). Although it may appear that the fundamentals of Goods-dominant and Service-dominant logic are diametrically opposed, the degree of customer interaction and customisation between different types of goods and services vary. For example, financial services are in the mass-service business and provide little customisation. Alternatively, manufacturers of large expensive machinery have a tradition of involving customers in product design and production (Davies, 2003).

An Integrated Logic approach is taken by both service practitioners interviewed. For example, in line with Service-dominant logic, customers are seen as essential co-creators of the service, *'What you really see is that it is the people who are involved in delivering the service and receiving the service who are the key people who have to have input into the design of the service,'* (S1) who operate within a value network, *'You're actually doing things like optimising the network and you're helping the customer get more value out of the assets that they've purchased'* (S2). In line with Customer-Centric logic, the offering is viewed in the context of how the customer is using the product, *'... everyday you're seeing them use your product. You're seeing how they're benefiting from the service. So you're capturing requirements for how you could improve that service based on real hands on experience of your customer'* (S2). When facilitating the transition from product-orientated to PSS, both service practitioners consider the core product offering and the PSS strategy the company wishes to achieve. This indicates the balance of product or service focus required to achieve

the desired PSS. However, finding and managing this balance between Goods-dominant and Service-dominant logic is difficult. The balance and transition process between each logic is individual to the company in which it operates. The following section discusses the main difficulties companies must overcome in transitioning from a Goods-dominant to an Integrated logic. The discussion is broken into two main sections, Transitioning culture/logics within the company; and Transitioning staff focus from a product-orientated to PSS.

4.3 Transitioning culture/ logics within the company

Corporate culture is the pattern of shared values and beliefs that help individuals understand organisational functioning, and therefore, provide them with norms for behaviour in the organisation. Organisations with strong corporate cultures are, in general, more successful than companies with weak corporate cultures as staff hold common beliefs and standardised behaviours (Haynes, 2009). The dominant culture significantly impacts on decision making and profoundly affects the character of activities and structure, by shaping how activities are carried out and how the organisational structure will operate (Gebauer and Friedli, 2005). This means that effective organisational learning as well as the ability to change Goods-dominant practices and mindsets is needed, but can be difficult. For example, it can be difficult to change things such as an engineer's inclination for technical features, a salesman's focus on product sales, or a service technician's working method for maintenance and repair activities (Kowalkowski, 2010). In the companies interviewed, services were viewed solely as a means to support the functionality of the product, *'The service element isn't much more than ongoing maintenance, and fault finding and stuff like that... So it isn't awfully, if you like, value add'* (C4). Due to this Goods-dominant perspective of services, the potential of services within the companies is hindered. As a result, time and resources invested is limited and the value generated by implemented services is low. Therefore, in order to create an effective PSS process with high value service components, companies must transition from a Goods-dominant logic to an Integrated Logic. In order to achieve this transition, several significant barriers must be overcome. The primary barriers (see Table 4.2 for a summary of barriers discussed) which the TIPSS Process model must address are discussed in detail in the following section. How TIPSS addresses these barriers is discussed in detail in Chapter Six.

Transitioning culture/ logics within the company
Lack of awareness of dominant culture
Lack of high level support
Product-orientated concept of Value Proposition and management
Undefined PSS strategy
Product-orientated customer relationship management
Product-orientated Knowledge Management
Product-orientated Communication Management
Product-orientated approach to measuring success
Lack of Value Network Management

Table 4.2: Summary of cultural barriers to PSS transition within the company

4.3.1 Lack of awareness of dominant culture

Traditional manufacturing values focus on efficiency and economies of scale, with flexibility being costly. Alternatively, traditional service-orientated values centre on innovation and customisation, with flexibility and variety as a driver of profit. This potential clash between different norms and values, the intrinsic culture of the company, can be seen as a conflict between the dominant culture and the counterculture (Friedli *et al.* 2005). Transition to an integrated logic can be difficult as it represents a radical departure from a manufacturing company's established strategy. It involves a change in expertise and attitudes, and challenges conventional ways of thinking (Davies, 2003). An integral part of this transition process is to get companies to recognise their current logic. By determining and being aware of the current dominant logic, the boundaries within which the new culture will operate can be established. It forces participants to recognise and justify actions and processes which have become accepted norms and may no longer hold value. This opens discussion for the potential value-add areas for services beyond those of a product support role, *'I'm trying to educate business... You need to compete with companies who can maybe manufacture products cheaper so you need to look at ways of differentiating. Services are one of the ways to do that'* (S1). Through this awareness of dominant logic and questioning of cultural norms, potential areas for change can be determined. This facilitates the application of service within the context of the company. However, in order for this transformation to successfully occur, support of the required changes must be shown at managerial level.

4.3.2 Lack of high level support

In order to change the reigning culture, the mindsets of staff must also change. This requires strong internal marketing and encouraging employees to gain a better understanding of customer benefits derived from services (Friedli *et al.* 2005). In order for the transition requirements to be implemented, managerial staff and above must fully understand and support the necessary adaptations and alterations, *‘There’s no point in a service type manager bringing you in and trying to change everything if the people above him aren’t aware and in agreement that things need to change..... A lot of companies can be quite insular in what they’re doing’* (S1). Managers who have operated in the manufacturing industry have learned to excel at designing and manufacturing superior products and the processes involved in making and selling them (Brady *et al.*, 2005). Therefore, shifting their mindset, and developing new skills and capabilities to function under the new logic can be challenging (Salonen, 2011). Table 4.3 lists three common limiting mindsets when transitioning dominant logics in managerial staff.

Factors motivating managers to extend the service business	Cognitive phenomena limiting managerial motivation to extend the service business	Impact of cognitive phenomena on managerial motivation
Valance	Overemphasis on obvious and tangible environmental features.	The overemphasis on obvious and tangible environmental characteristics explains why managers do not place a high valance (reward) on extending the service business, thus limiting the investment of revenues in service.
Expectancy	Scepticism of the economic potential of services	Scepticism of the economic potential explains why managers seem to underestimate the probability that their effort in the service area will result in successful performance.
Instrumentality	Risk aversion	Risk aversion limits managerial expectations of estimating accurately the probability that extending the service business will result in receiving the reward.

Table 4.3: Impact of Cognitive Phenomena on Managerial Motivation (Friedli et al. 2005)

In order to fully exploit the benefits offered by a PSS system, managers must change their perception of services from add-on, to services as ‘value-added’ activities (discussed further in section 4.3.3). To achieve this, they must be made aware of the economic potential of extended services and be willing to invest in the necessary resources. This should be done even if the resources are invested in areas beyond the traditional core competencies of product manufacture. Changes in service awareness at the managerial level then filter down to employees. Additionally, managers must encourage and be open to suggestions from employees who often have a better grasp of potential services and service improvements due

to their involvement in its provision and frequent interactions with customers. In order to fully exploit the potential benefits and financial returns of services, a broader concept of value proposition must be recognised and implemented.

4.3.3 Product-orientated concept of Value Proposition

Goods-dominant logic rests on the belief that companies succeed by creating superior products and by enhancing the features of existing products, product innovation, product line extensions and new product features, *‘(Anything) that adds value to the business from an external viewpoint, so intellectual property, products, process, continuous improvement... I think traditionally it’s more associated with product development’* (C7). As a result, companies operating under a Goods-dominant logic can perceive services as add-ons, which are often given for free in order to sell products (Friedli *et al.*, 2005). When providing a PSS, the level of importance placed on the tangible product can shift depending on the strategy being implemented. For example, under an integrated logic the company must consider the customer’s requirements and identify the combination of products and services that will be required to solve the entire problem, *‘In many cases it’s turned on its head now. You actually give away product for free in order to sell service, because the service you can sell year on year. Whereas a product you may only sell once’* (S2). Therefore, in order to achieve value beyond the tangible product they must broaden their concept of value. This is one of the earliest processes implemented by the service practitioners, *‘So the discussion becomes more than just we’re providing a product. It often becomes we’re enabling our customers to do something. We’re solving this problem. Immediately it brings into the discussion, into the equation, even into their minds that what they’re selling is not just a product. It’s a solution for something’* (S1).

Goods-dominant logic creates a limited view of services which can obscure the potential opportunities and competitive advantages offered by an integrated PSS (Kowalkowski, 2010). Service concepts generated under a Goods-dominant logic can be limited by (Ahuja and Lampert, 2001):

- The familiarity trap: Experience leads to path dependent learning and shying away from the unfamiliar.
- The maturity trap: A tendency to favour mature solutions.

- The propinquity trap: The tendency for companies to search for solutions which are similar to existing solutions (they shun pioneering technologies).

In order to fully exploit the potential benefits of an integrated system, companies must change their perception of the value offered by services. Value is made possible through value co-creation, shifting from the means of production to the means of utilisation. The provider role shifts more towards that of a resource integrator, and value is determined by the customer as value-in-use, whether in direct interaction with the provider or in indirect interaction through goods in use (Kowalkowski, 2010). Integration of both product and service is key as offered solutions should provide more value than the sum of the individual parts (Nordin and Kowalkowski, 2010).

Additionally, the perceived value offered under a Goods-dominant logic is in the product itself, *'We have a tendency very much in this company because we're very much engineering led both in where the company has come from, and the CEO is ex-Intel, ex-engineer so we've a tendency to wallow in how brilliant our technology is'* (C5). Under an integrated logic, value is determined using the customer's perspective. The customer needs to perceive and determine the value of the offering. Providers affect the meaning of the value through proposing, showing and educating the customer (Möller, 2006). The success of value creation is dependent on both the customers' and the providers' ability to perceive and determine value. In order to maximise and fully exploit the benefits offered by PSS, companies must both be aware of and properly manage these dynamic components through a clear and coherent strategy.

4.3.4 Undefined PSS strategy

The type and extent of services offered by a product-orientated company influences the ability to augment the core product offering. This is similar to the product type and breadth of a product range, which is considered to constitute key strategic decisions in the field of product management (Gebauer, 2008). Conversely, many manufacturing companies developing a service component do not have a service strategy, *'We're going to learn by doing with the service piece, in terms of what offering the customers really want'* (C3). To successfully launch a PSS, executives of product companies must first decide whether the primary focus should be to support and develop existing businesses or to grow as a new and independent platform. They must discern the source of competitive advantage in the service

market in which they chose to compete. This provides a base on which to build a systematically co-ordinated and transparent procedure which can support the development of new service products. Although manufacturing companies have a clearly defined product strategy, they often lack the experience, knowledge and skill to define a service strategy, *'There are some people in some companies that are aware that services are important and that they have to grow services, but they're also unsure of how to go about doing it... Be specific about what you're trying to design and what you're trying to change'* (S1). A clear service strategy is essential as it provides a clear development path and encourages companies to make the appropriate organisational arrangements and resource allocations.

A clear service strategy allows a company to differentiate itself from competitors through product and service combinations. In order to implement a successful and deliberate service strategy, companies should (Friedli *et al.*, 2005):

- Gain a comprehensive understanding of the market in terms of customer needs, market potential and future service trends. As PSS operations increase, companies should aim to build a network of sales, technical staff and external practitioners, which systematically collect and record current and future customer needs.
- Ensure all relevant areas of the company affected by the service strategy are involved in the development process. This aids the integration of the relevant organisational components and increases the acceptance of the strategy.
- Aim for the entire procedure (strategy analysis, development, implementation and monitoring) to be systematic and transparent. Additionally, analysis, strategy development and implementation phases should be monitored, and goal fulfilment and measures defined and tracked.

Due to the combination of numerous components, both new and familiar, it is essential companies ensure their strategy emphasises the smooth integration of product and service factors into a comprehensive customer solution (Davies *et al.*, 2001; Foote *et al.*, 2001; Eisenstat, *et al.*, 2002; Windahl and Lakemond, 2010). Companies must learn to build solutions that are scalable, taking into consideration the additional resources required for increased levels of customer interaction and co-creation.

4.3.5 Product-orientated customer relationship management

Goods-dominant logic views services as units of output, *'If you look at the design control procedure then it gives you the nitty-gritty, what's actually happening in the design and development phase, or the design and development cycle'* (C6). Alternatively, Service-dominant logic views service as a process during which something is done for another party. Therefore, when transitioning from a Goods-dominant to an Integrated logic, the core of value creation moves from a "producer" to a collaborative process of co-creation between parties (Vargo and Lusch, 2008; Yan *et al.*, 2010). Essentially, the ultimate aim of the company is to assist customers in their value-creation processes and create long-term relationships (Windahl and Lakemond, 2010). Companies and their staff need to apply a holistic perspective on value creation and customer relationships and not view all product and service sales as separate and static. Products, services and customer relationships must integrate together to provide a coherent, cohesive and adaptable package.

Shifting perspectives from that of product and services as static offerings to customer activity cycles can help companies quantify their level of interaction and co-creation with customers and identify opportunities for providing additional value, *'If you start talking to them about customer needs, and conclusions, and you start talking to them about the opportunities in that way, rather than looking at what we make. A lot of manufacturing companies, I find, their mind set is 'This is what we make. Now go sell it.' ...That discussion really opens their mind sometimes as to the different activities, the different services and products that they could do'* (S2). To fully exploit the additional value offered by this interaction and co-creation, companies must intimately understand the customer's own value creating process. Sales efforts must be directed at persons capable of understanding how the resultant solution impacts these processes, and interaction with the customer must occur through an extended sales process. Customers often rely on the relationship they have established with the company and their staff to determine whether or not to purchase. Therefore, to effectively communicate the service before purchase and deliver the value offering of the service itself, staff must recognise and understand their role in the new service. Staff must be aware of how their company brand and values are perceived and how to effectively communicate their corporate views to the customer. This requires training, as well as selection of persons with the correct behavioural characteristics (Salonen, 2011). Nonetheless, it is necessary as companies have to learn to interact with their customers in a fundamentally different way to

that of a product-orientated organisation (Vargo & Lusch, 2004). Service interaction with customers generates significant quantities of tacit information which can be overlooked in traditional product-orientated processes. In order to fully exploit the insights provided by co-creation, product-orientated companies must alter their knowledge management practices.

4.3.6 Product-orientated Knowledge Management

When dealing with services, resources are broken into *operand* resources, (tangible, static resources that require some action to make them valuable) and *operant* resources (which are usually intangible, dynamic resources that are capable of creating value) (Kowalkowski, 2010). Goods-dominant logic emphasises *operand* resources. This can cause *operant* resources, such as knowledge, to be overlooked and competitive advantage opportunities to be missed. Knowledge creation and management is a critical factor in business competitiveness as it allows companies to respond to current and future business opportunities and requirements. Organisational culture plays a significant role in building and reinforcing knowledge creation and management as it affects and determines how staff learn, acquire and share knowledge (Alavi and Leidner, 2001, de Long and Fahey, 2000). Knowledge can be broken into two types (Kakabadse *et al.*, 2001):

- Tacit knowledge, also known as embedded and sticky knowledge: Subjective and experience based. It is difficult to express as it is embedded in the individual's actions, experiences, beliefs, images and knowhow.
- Explicit knowledge, also known as leaky knowledge: Objective and rational. It can be easily documented and distributed to others through guidelines, procedures and reports.

Although Tacit and Explicit knowledge seem diametrically opposed, they complement each other in relation to knowledge creation and conversion. Explicit knowledge without tacit knowledge insight quickly loses its meaning (Nonaka *et al.*, 2000).

In traditional product based companies, there is often an emphasis on explicit knowledge, as it is easily documented and traced back to product output. For example, *'You generate the idea. You fill out a form basically which describes the problem you're trying to solve, how you're solving it, how it's different from the competitive options out there, who invented it.'*

Then it's witnessed... They're signed. They're scanned. They're put into a bound laboratory notebook ...Then if we think there's value in the idea, we'll go ahead and file a patent on it' (C7). In contrast, due to the intangible and co-creative nature of services, there is often an emphasis on tacit knowledge. For example, staff can often manage a difficult customer if they have dealt with them previously, and are familiar with how best to approach them. In order to transition from a product to an integrated-logic, the value of tacit knowledge must be recognised, captured, and shared. Knowledge is often embedded within the staff through their first hand knowledge of the customer. Therefore, to fully exploit a product service, a company's explicit and tacit knowledge must be recognised, valued and utilised. To do this, companies must ensure there are sufficient protocols and open lines of dialogue with staff and customers to sufficiently capture and distribute knowledge to keep it current. Due to the multifaceted nature of service provision, this knowledge comes from a range of sources. Companies must ensure relevant knowledge is collected from all parties within the service provision and distributed amongst the appropriate staff to ensure a smooth flowing PSS process.

4.3.7 Product-orientated Communication Management

Knowledge management and communication are tightly intertwined components within an organisation and affect its overall operations. Information is not knowledge until it is analysed and acted upon, and it will only be acted upon in the right organisational culture (Smiti, 2004). Within PSS, information and activities in product design and service design are mutually dependent (Geng et al, 2011). Companies must be aware of the numerous lines of communication it must create and maintain between internal and external partners to fully exploit the value offered by PSS. Communication of information to the relevant parties is important as it allows companies to identify and seize opportunities for value creation, *'On a quarterly basis we have a team that sits down and says, right, well, what can we do? How can we make things better?'* (C3).

Additionally, companies must manage customer communication i.e. any direct communication providers have with their end users, in order to involve them in the value creation process and establish long-term customer relationships, *'Often, if you want to really, really design a service properly, than it means listening a lot to what your customers are telling you, what you're front line staff are telling you'* (S1). Effective communication closes

the gap between what customers expect and receive in terms of products and services (Meier *et al.*, 2010). Yet effective communication is a complex and fragile human process that demands strategic design, careful monitoring, and responsive adaptation (Kreps and Neuhauser, 2008). The provider must ensure methods and tools are in place to convincingly show the offering's potential in use beforehand (Kowalkowski, 2010), '*So it depends on one industry to another it'll be different but typically your bundle needs to be structured so that your customer can clearly see where the value items are*' (S2). Understanding and treating the customer as a co-producer is also one of the key premises underlying the concept of customer integration and can be used to predict possible future changes in customer drivers (Rese *et al.*, 2009; Jacob and Ulaga, 2008).

Communication with external partners within the value chain is also important, '*Keep an eye on how you're actually going to get the units flogged, and who are your partners going to be*' (C8). In traditional design processes, product and service design activities are conducted separately and by different staff. Consequently, it can difficult to share the necessary information between the product and service activities during the design phase (Hara *et al.*, 2009). Service practitioners emphasis the need to consider PSS as a single process. Communication with relevant partners within the value network also provides insight into the performance of each PSS component. Due to the combination of tacit and explicit knowledge (as discussed in section 4.3.6) evaluation of PSS requires different methodologies to that of traditional product-orientated processes.

4.3.8 Product-orientated approach to measuring success

Product manufacture generates tangible outputs which can be measured with some objectivity. For example, within the companies interviewed, IP generation provided a tangible indicator of innovation, '*Well we've done the search but then you need to go and draft IP, because ultimately that's what the valuation of the company depends on*' (C2). In contrast, the intangible and co-creative nature of services (as discussed in Chapter Two) makes quantifying services a challenging and complex task, '*Now the big challenge that you'd face with something like that is how do you know from a manufacturing point of view? How do you test the reaction of the market to the service?*' (S2).

Linguistic information (spoken information which is not captured in a tactile manner) represents tacit knowledge and can be overlooked by product-orientated companies which

typically operate under defined numeric information. However, when customers make decisions, they typically employ tacit knowledge and linguistic information (Benítez *et al.*, 2007). Consumers' beliefs characteristically involve perceived associations between the service and its associated attributes, stemming from their direct experiences with the service and past experiences with other services of analogous nature. In the absence of explicit measures, companies must rely on consumers' perceptions of service quality to identify their strengths and/or weaknesses, and design appropriate strategies (Karatepe *et al.*, 2005). For a PSS in which services can be quantified, it is critical to define value metrics jointly with the customer and to be able to measure them systematically (Kowalkowski, 2010). Therefore, in order to gauge the effectiveness of a quantifiable PSS, companies must consider both the quantifiable numbers generated by product production, and the tacit information concerning the service. As services require customer co-creation, they create lines of communication which can be utilised to gather this tacit information. Processes and systems must be established and maintained to capture the explicit information generated during the service delivery e.g. feedback forms, customer reports, staff reports.

When considering the financial feedback of an integrated system, the service component must also be considered in a broader context than is traditionally done for products. The service developers interviewed found that manufacturing companies place emphasis on the direct financial return generated by service. In order to appreciate the value offered, a broader scope of service based benefits must be considered, *'In some cases if it's a revenue generating service, some of the measures would be how much revenue was generated. Are we more profitable?... Sometimes it's less tangible. It's around customer satisfaction. It's around the buzz'* (S1). Direct traceability of services to financial return can be difficult, depending on the structure of the PSS. For example, if services are in a supporting role to products, such as product support forums, the resulting benefit may be customer retention rates, which can often be related to positive customer relationships (discussed in section 4.3.5). If the product is simply a delivery tool for the service, such as a phone service, financial benefit can be traced through subscription fees. Therefore, not all benefits derived from an integrated system can be directly attributed to direct financial return. When determining the true value offered by an integrated system, companies must consider the balance between the product and service within their own context, and be aware of the indirect value offered by an

integrated system. Again, as discussed above, this can be established through collection of explicit data.

4.3.9 Lack of Value Network Management

PSS can be a complex process which requires numerous contributors pooling their knowledge and activities together within a single value chain. Therefore, when developing an integrated system, internal co-ordination among business units and more intense external co-operation with other contributors in the wider business network is required (Windahl and Lakemond, 2006; Matthyssens and Vandenbempt, 2008; Davies, 2004; Galbraith, 2002). Companies interviewed were aware of the value network involved in the development, production and distribution of their product, *'The model that we've got now is much smaller and uses outsourcing for quite a number of the elements'* (C1). However, due to lack of familiarity with service processes, they could not ascertain if operators in their value chain would be required to or capable of contributing to a service component. Indirect/ direct connections and dependencies on other organisations provide a more complete picture of the challenges when developing integrated solutions. Developing and understanding relationships with other network members allows companies to better understand (Peppard, and Rylander, 2006):

- Where value lies in the network and how value is co-created.
- How the company's activities will affect the network.
- How other members are likely to respond.

Companies operating together in a value network can gain access to specialised component suppliers, subcontractors and service providers with which to develop and supply complex solutions. Therefore, value networks can provide access to service knowledge and skills not available in a product-orientated company. Being aware of the value chain highlights lack/ availability of skills and knowledge available to the company. Co-ordination and cooperation of businesses within the network can enable organisations to improve customer satisfaction rates and reduce operational costs through intelligent, optimised forecasting, planning and scheduling of the service chain, and its associated resources such as people, networks and other assets (Jung, 2011; Stubbings *et al.*, 2008; Sarkis *et al.*, 2007).

As discussed, corporate culture and dominant logics are multifaceted. In order to effectively alter a reigning dominant logic, change must be accepted, implemented and managed across all participants involved in the process. Change will not be achieved if it is only enforced from a managerial level. Staff must also be open and willing to make the necessary changes. Therefore, the following section will discuss potential cultural barriers to change from a staff perspective.

4.4 Transitioning staff focus from product-orientated to PSS

Employee service perceptions reinforce the cultural transformation from a Goods-dominant to an Integrated logic. This can overcome the typical cultural behavioural pattern of product manufacturers (Friedli *et al.*, 2005). Therefore, in order to transition from a Goods-dominant logic to an Integrated logic, changes are required from both a high level company perspective and an individual staff perspective. Changes from a staff perspective are discussed below (see Table 4.4 for list of staff orientated cultural barriers).

Transitioning staff focus from a product-orientated to PSS
'Mistake avoidance' mindset
Lack of customer relationship management

Table 4.4: Summary of cultural barriers to PSS transition in relation to staff

4.4.1 'Mistake' avoidance mindset

Goods-dominant logic emphasises the need for maximum production control and efficiency as mistakes are both costly and time consuming, '*You make a mistake here, it is big money. You are in serious trouble if you miss something*' (C2). In contrast, services are quick and simple to mock up and trial. Mistakes should not be viewed as negatives, but rather as opportunities for productive learning. This approach is considered to have a positive impact on learning and performance of and within an organisation (van Dyck *et al.*, 2005). Staff involved in the service development process should be encouraged to find new ideas through testing and learning from mistakes. This is only possible if the company actively supports such attitudes and staff feel comfortable and confident enough to freely offer suggestions (Stevens and Dimitriadis, 2005). Staff and management must recognise mistakes as opportunities to (Harteis *et al.*, 2008):

- Prevent subsequent mistakes of the same kind through improvements of new and existing practices.
- Create ‘negative knowledge’ concerning how things are *not* shaped and *not* functioning.

Due to the differences in both the development and supply of products and services, mistakes in the transition from one offering to the other are inevitable. Yet mistakes indicate something new is being tried. Staff and management’s acceptance of and willingness to make mistakes, encourages a broader range of ideas, diversifying from the current value offering, ‘*As you go through the process here, what you really see is that it is the people who are involved in delivering the service and receiving the service, who are the key people, who have to have input into the design of the service*’ (S1). It prevents/ deters companies from remaining stuck in old norms and familiar areas (as discussed in 4.3.3) and instead, opens opportunities for expansion into unexplored areas. As discussed in section 4.3.5, service provision requires higher levels of customer interaction and co-creation with front line staff becoming the main contact point for customers. Therefore staff must be aware of the importance of establishing and maintaining customer relationships as vital components in the PSS offering.

4.4.2 No knowledge/ understanding of change rationale

As discussed above, the differences in the inherent characteristics of products and services require staff to expand their current skills, learn new skills, gain new knowledge, and change certain practices (Kowalkowski, 2010). Changing falls to the individual as it often requires breaking a habit and/ or leaving a comfort zone. Adults need to know why they are required to learn something before they learn it, and their readiness to learn is triggered by their moving from one developmental stage to another (Knowles *et al.*, 2005). Therefore, in order to transition staff from a Goods-dominant logic to an Integrated logic, the rationale for the change must be communicated. Studies have shown that clearly communicating corporate strategy across the organisation is key to organisational change (Done *et al.*, 2011).

Involving frontline staff in the PSS development can both provide insight into the customer requirements and facilitate learning of new skills, ‘*If you think about bringing in your front line employees, a big point that I make to companies, is that by involving them in this, they get to learn how to do this as well*’ (S2). Therefore, to facilitate staff in the transition from

Goods-dominant to Integrated logic, it is essential that the company clearly communicates the reasons for the changes. Staff must plainly understand their role within the transition process and their role within the company once the changes have been implemented. This can greatly reduce resistance to change as they feel secure in their position within the process.

When developing/ presenting changes, companies must be aware of how best to present information so as to be fully absorbed by staff. Learning styles refers to the preferred way in which an individual approaches a task, a learning situation or tries to solve a problem (Kolb and Kolb, 2009; Cassidy, 2004; Cohen 2003; Oxford, 2003; Peacock, 2001). They provide an overall pattern which gives the general direction to learning behaviour. Kolb (2001) breaks learning styles into four groups (see Figure 4.2):

- **Diverging:** The dominant learning abilities are Concrete Experience and Reflective Observation. People with this learning style are best at viewing concrete situations from many different points of view. They perform better in situations that call for generation of ideas, such as brainstorming.
- **Assimilating:** The dominant learning abilities are Abstract Conceptualization and Reflective Observation. People with this learning style best suited to understanding a wide range of information and putting it into a concise, logical form.
- **Converging:** The dominant learning abilities are Abstract Conceptualization and Active Experimentation. People with this learning style are best suited to finding practical uses for ideas and theories. They are good problem solvers and make decisions based on finding solutions to questions or problems.
- **Accommodating:** The dominant learning abilities are Concrete Experience and Active Experimentation. People with this learning style primarily learn from “hands-on” experience. They tend to act on ‘gut’ feelings rather than on logical analysis.

The relation between these basic learning styles can be seen in Figure 4.2.

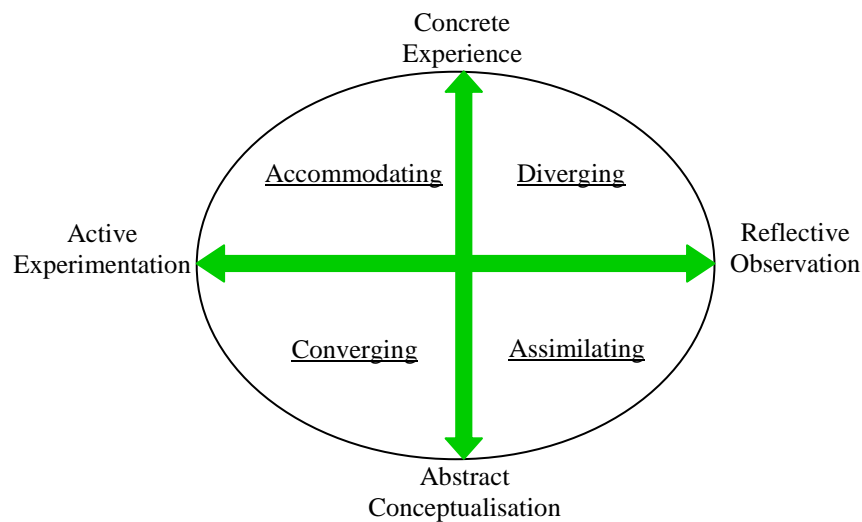


Figure 4.2: The Experimental Learning Cycle and Basic Learning Styles
(Kolb and Kolb, 2009)

These groups are not exclusive of each other and most learners operate under a combination of approaches. For example, both service developers interviewed used visual aids to illustrate linkages between activities and facilitate discussions, *‘By doing a service blueprint they can visually, straight away, see their connection to their customer. They see how important their role is in delivering the service to the customer’* (S1). The learning process can be greatly facilitated if the learning styles of staff can be determined, and the learning environment designed to reflect these styles (Babadoğan as cited by Dağ and Geçer, 2009). Therefore, when transitioning from one dominant logic to another, companies should consider the predominant learning skills of their staff, as this will ease the learning process required for the transition.

As discussed above, staff’s openness to change plays a significant role in the implementation of cultural change. In order for a company to effectively transition from a Goods-dominant to an Integrated logic, it must account for and facilitate staff participation in its development and delivery.

4.5 Key findings and Conclusions

Companies are increasingly turning to product service combinations to provide comprehensive solutions and create competitive advantage. Nevertheless, many companies

struggle to integrate the two effectively. In response to this, numerous frameworks have been created which aim to effectively integrate product and service development processes, and maximise the potential benefits of a PSS strategy (as discussed in Chapter Two). These frameworks do not take into account the context of the companies in which the frameworks will operate, staff reluctance to change and existing opposed dominant logics. These can create significant barriers to the successful implementation of an effective PSS. This chapter discusses the primary barriers which the TIPSS Process Model must address (summarised in Table 4.5) in order to facilitate the transition from Goods- to Service Dominant logic.

Transitioning culture/ logics within the company
Lack of awareness of dominant culture
Lack of high level support
Product-orientated concept of Value Proposition and management
Undefined PSS strategy
Product-orientated customer relationship management
Product-orientated Knowledge Management
Product-orientated Communication Management
Product-orientated approach to measuring success
Lack of Value Network Management
Transitioning staff focus from a product-orientated to PSS
‘Mistake avoidance’ mindset
Lack of customer relationship management

Table 4.5: Summary of identified cultural barriers to PSS transition

It is important to note that barriers identified were present in all companies interviewed. As discussed in section 3.3.2, eight companies were chosen for interview. Four scored highly across each category of the questionnaire. Four scored low across each category of the questionnaire. Although each company highlighted the barriers listed in Table 4.5 to some degree, the occurrence/ extent of these barriers were more prevalent in the lower scoring companies.

Drawing from these cultural barriers the following key findings can be determined:

- Dominant logic determines the manner in which companies conceptualise and make critical resource allocation decisions. This presents the biggest obstacle to overcome when transitioning from product-orientated to PSS.
- To successfully implement a PSS, an integrated logic which balances product service activities and mindsets must first be established. To achieve this:
 - The current dominant logic must be considered and adapted as it indicates existing attitudes, normative values and dominant paradigms.
 - Managers must fully support the transition to PSS. This positively affects staff attitudes and eases the transition to an integrated dominant logic.
 - Companies must broaden their concept of value offering as a narrow view of service value can limit the potential areas of expansion.
- Companies wishing to transition to an integrated logic must define a PSS strategy as it identifies:
 - The intended competitive advantage of the PSS.
 - The balance of product and service activities (services which support the products, or a new, independent platform).
 - A base on which to build a systematically co-ordinated and transparent procedure which can support the development of new service products.
- When defining a PSS strategy, companies should:
 - Gain a comprehensive understanding of customer needs, market potential and future service trends.
 - Ensure all relevant areas of the company affected by the service strategy are involved in the development process as it creates awareness and sense of ownership among staff. This significantly aids in transitioning dominant logics.
- Customers must be recognised and included as a significant partner in the PSS process. Therefore:
 - Companies must assist customers in their value-creation/ co-creation processes and create long-term relationships. This helps the company understand the customer's broader business needs and operating environment, and find better ways to link with these processes.

- Companies must learn to interact with their customers in a fundamentally different way which is suited to their PSS value offering.
- To successfully transition from a Goods-dominant logic to an Integrated logic, companies must learn to recognise, capture, exploit and distribute both tacit and explicit knowledge.
- Due to the multi-faceted and co-creative nature of PSS, additional emphasis must be placed on communication between all parties involved as:
 - The success of PSS value creation is dependent on the customers' ability to perceive and determine value before purchase. Therefore, it is essential that it is clearly communicated.
 - Customer roles within the process must be clearly communicated to ensure their co-creational input and fully exploit the potential benefits.
 - Information and data generated within the PSS must be communicated to the relevant parties in order to continually improve the PSS process and value offering.
- The intangible and co-creative nature of services requires a broader approach to measuring the success and effectiveness of a PSS as:
 - Linguistic/ verbal information provided by customers during service co-creation is an important source of subjective evaluation. It must be properly captured and communicated within the company. This can be used to indicate customer satisfaction levels and highlight areas of potential value expansion.
 - Companies must consider the value of integrated products and services in a wider context than solely financial return, for example improved customer retention and loyalty rates as service benefit may not be directly financially traceable.
- Companies must be aware of all the corporate contributors with the PSS value chain as:
 - Operating within a value network can provide access to specialised component suppliers, subcontractors and service providers with which to develop and supply complex solutions.
 - Companies must be aware of dependencies within the chain to prevent over reliance.

- Staff must:
 - Learn to expect, accept and learn from mistakes during the service development process.
 - Recognise the importance of customer relationships in the context of service provision; and establish/ maintain these customer relationships to facilitate service co-creation.
 - Understand their role within the proposed offering, and the rationale behind it.
 - Be willing to change skills and shift emphasis/ focus to new skills needed for the new value offering.

These findings and conclusions create a synopsis of potential cultural barriers to an organisation's transition from a Goods-dominant logic to an Integrated logic, which would adversely affect the application of a PSS strategy. Therefore they provide a key list of factors which must be considered, accounted for and overcome prior to implementing a PSS model.

CHAPTER FIVE

THE TIPSS PROCESS MODEL

CHAPTER ABSTRACT:

The objective of this chapter is to detail the aims, design and development of the TIPSS Process model. Specifications of the TIPSS Process model, based on the findings and conclusions from Chapter Two (knowledge gap in current PSS models) and Four (cultural barriers to the transition process) are given.

- 5.1 Introduction**
- 5.2 Descriptive vs. Prescriptive Models**
- 5.3 The Proposed Approach**
- 5.4 TIPSS Process Model Summary**
- 5.5 TIPSS Process Model Representation**
- 5.6 TIPSS Process Model Application**
- 5.7 Conclusions**

5.1 Introduction

Drawing from Key Findings and Conclusions in Chapter Two and Four, this chapter outlines a significant part of the contribution to this research. The following chapter proposes a new model, the **Transition to and Implementation of Product Service Systems** or 'TIPSS' process model, which will prescribe the transition process of Goods-dominant culture to an integrated culture. It includes the development and implementation of a workshop prototype which initiates the transition process as prescribed by the TIPSS Process model. As discussed in Chapters Two and Four, current research does not take into account existing cultural barriers to the transition of a product-orientated strategy to PSS orientated strategy. Therefore, the main contributions made in proposing this model are:

- Further understanding of the cause and effect of existing dominant cultures in relation to the transition of companies from product-orientated to PSS.
- Further understanding of the transition process when changing from Goods-dominant to an Integrated culture.
- Development of a process and tools to facilitate this transition.

The new transition model is a synthesis of the fundamental components required by proposed PSS development models (as determined by the literature research discussed in Chapter Two) which takes into account cultural barriers (as determined by the primary research conducted with companies as discussed in Chapter Four). From the transition model, a workshop has been derived to initiate the transition process. This provides participants with the fundamental skills and knowledge required to begin the transition from a Goods-dominant to an Integrated culture. Objectives of the proposed process model are:

- To distil, communicate and facilitate the fundamental knowledge and skills necessary to implement a PSS strategy.
- To distil, communicate and overcome existing cultural barriers to PSS.
- To provide a test platform for evaluating the impact of knowledge and cultural barriers on the implementation of PSS strategies.

This chapter will first describe the basis for the new transition model and detail the derivation and implementation of the process model.

5.2 Descriptive vs. Prescriptive Models

Development models can be broken into two groups: Prescriptive and Descriptive.

Descriptive and analytical research asks how the world is and how things are (Korhonen, 2007). In contrast, prescriptive research argues how the world should be and what should be done.

In order to effectively and efficiently facilitate the transition process, the TIPSS Process model takes a prescriptive approach. As with the TIPSS Process model, prescriptive model development can be represented as a cycle in which (Hansen *et al.*, 2004):

- The (theoretically derived) prescriptions about practice are carried out in work situations.
- The resulting experiences are precisely described in order to generate better understandings.
- The resulting understandings are reflected over in order to generalise them to theory, which could then form the basis for better prescriptions.

This cyclical development process allows prescriptive models to continuously adapt and improve. This allows recommendations to be implemented according to best practice existing in the industry (Le Coze, 2008). Of particular importance within this research is that they provide a clear progression of process which can help overcome lack of familiarity.

The prescriptive approach does have some drawbacks. As the process is defined, a clear final objective is set. It cannot account for unexpected changes which may occur during implementation. Unexpected events can change the entire process which can result in a different outcome to that expected or desired. Companies can be reluctant to divert from the prescribed processes despite the lack of desirable outcomes. To balance this risk, the TIPSS Process model is designed to be cyclical. At the initiation stage of the process, the TIPSS workshop, companies establish the initial goal. Rather than selecting a single goal and continuing blindly on a strict development path, as they advance through the transition process companies are encouraged to re-evaluate goals and overall strategy. This proactive approach helps prevent unexpected occurrences, and facilitates a quick response time when

undesirable outcomes occur. The following section details the specifications of the TIPSS Process model's prescriptive approach.

5.3 The Proposed Approach

In Chapter Two, New Product Development, New Service Development and Product Service System Development (PSS) models were reviewed and appraised. All models assessed neglected to take into consideration the willingness, or lack thereof, of companies to change, and the likely lack of in-house knowledge and skills required to implement a PSS strategy. Consequently, no model provided guidance or structure in relation to implementing the necessary changes to culture or resources prior to applying the proposed models. The difficulties in transitioning from product to service development and provision have been noted in other PSS related research. As current models fail to prescribe or describe the transition requirements for PSS, this author proposes that there is a necessity for such a model.

The objective of this section is to propose an appropriate model which that considers the cultural difficulties in transitioning from a Goods-dominant logic to an Integrated logic. It is important to note that the intention of the model is not to replace one dominant logic with another but to find a balance of products and services which best suit the company's requirements. It is also important to note that the proposed model is not a PSS model which defines the stages required to implement a PSS offering. The TIPSS Process model is a prelude to the full implementation of a PSS strategy, intended to create a culture in which a PSS could effectively be applied. In order to construct such a model, the primary facets of the appraised PSS models were examined (as discussed in Chapter Two) and cultural barriers within the companies analysed (as discussed in Chapter Four). Therefore, the development of the model described draws heavily from the 'Key Findings and Conclusions' in Chapter Two and Chapter Four.

This author will propose and develop a transition model, known as the '**Transition to and Implementation of Product Service Systems**' or '**TIPSS**'. This model will contribute to the area of PSS research in two ways:

- It will establish a basis for prescribing and representing PSS from a transition perspective.
- It will serve as a base from which functional specifications can be derived for developing and implementing processes and tools to support transition activities.

Table 5.1 presents the specifications for the TIPPS Process model. The rationale for the specification emerged from the relevant findings in Chapter Two and Four, and associated literature. Each specification is individually detailed and the associated TIPPS Process model component is presented.

No.	TIPSS Specification	Chapter Section	Supporting Literature
1.	Systematic approach	2.4 NSD & NPD process models 2.6 Comparison of NPD, NSD & PSS models	Grönfeldt and Strother, 2006; Tidd and Bodley, 2002; Ernst, 2002
2.	Representation of transition process	2.2 Definitions of NSD, NPD & PSS 2.6 Comparison of NPD, NSD & PSS models 3.4.4 Defining a clear strategy 3.5.2 Customer relationships	Correa et al, 2007; Graves and Ward, 2007; Brax, 2005; Mathieu, 2001; Edvardsson et al 2005; Aurajo and Spring, 2009; Cooper et al, 2007; Beltagui et al, 2009
3.	PSS process activities	2.3 NSD & NPD activities 2.6 Comparison of NPD, NSD & PSS models 3.4.7 Communication 3.4.9 Value networks 3.5.2 Customer relationships	Sakao and Shimomura, 2007; Aurich et al, 2006; Aurich et al, 2009; Grönfeldt and Strother, 2006; McAdam, 2004; Foxall et al, 2002; Ozer, 2003; Bitner and Zeithaml, 2005; Chen & Lee, 2007; Eppinger and Ulrich, 2003; Grübacher <i>et al.</i> , 2007
4.	Information Transition Representation	2.3 NSD & NPD activities 4.3.3 Broadening & Managing the Value Proposition 4.3.6 Knowledge management 4.3.7 Communication 4.4.3 Communication/ Learning Styles	Love and Roper, 2009; Chen and Lee, 2007; Chase et al., 2000; Dimitriadis & Stevens, 2005; Ahuja & Lampert, 2001; Möller, 2006; Alavi and Leidner, 2001; de Long and Fahey, 2000; Nonaka et al., 2000
5.	Influencing Factors	4.3.1 Awareness of & overcoming the reigning culture 4.3.2 Managerial support 4.3.5 Customer relationships 4.3.7 Communication 4.3.8 Measuring success 4.4.3 Communication/ Learning Styles	Gebauer & Friedli, 2005; Friedli <i>et al.</i> 2005; Salonen, 2011; Kowalkowski, 2010; Ahuja and Lampert, 2001; Windahl & Lakemond, 2010; Salonen, 2011; de Long & Fahey, 2000; Hara <i>et al.</i> , 2009; Matthyssens & Vandenbempt, 2008; Stevens and Dimitriadis, 2005; Dağ and Geçer, 2009

Table 5.1: Derivation of TIPPS Process Model Specification

5.3.1 Systematic approach

The majority of models studied (New Product Development, New Service Development and Product Service Systems) adopted a logical, systematic approach. As discussed in Chapter Two, models which have a liquid format can be difficult to apply as they provide little structure. In contrast, a systematic approach clarifies the activities to be undertaken and provides a clear path of progression. Therefore, the proposed TIPSS Process model will also have a systematic representation of activities.

5.3.2 Representation of transition process

The TIPSS Process model represents the transition of companies from traditional product development and production to the supply of integrated products/ services. As noted in Chapter Two and Chapter Four:

- There are significant differences in the inherent characteristics of products and services. Therefore, there are also differences in the methods and processes of product and service provision.
- The PSS models studied depict the activities required for the provision of PSS, but do not take into account the cultural context of the company in which these models will be implemented.
- Existing culture and context of companies, e.g. knowledge, skills and resources, affect the transition process and can be actively adapted/ altered to account for service components.

In order for companies to transition from Goods-dominant to Integrated logic, a preliminary cultural change is required. This cultural shift ensures the support and willingness of staff to implement the necessary changes, and provides a base on which a PSS strategy can be implemented. The TIPSS Process model proposes to show a relationship between the culture within a company, and the type and extent of adoption of PSS strategy. This author strongly contends that existing culture is one of the main barriers to the implementation of PSS. Therefore, as the culture changes, the range and extent of PSS application over time will be positively affected. This transition is represented on the graph below (Figure 5.1).

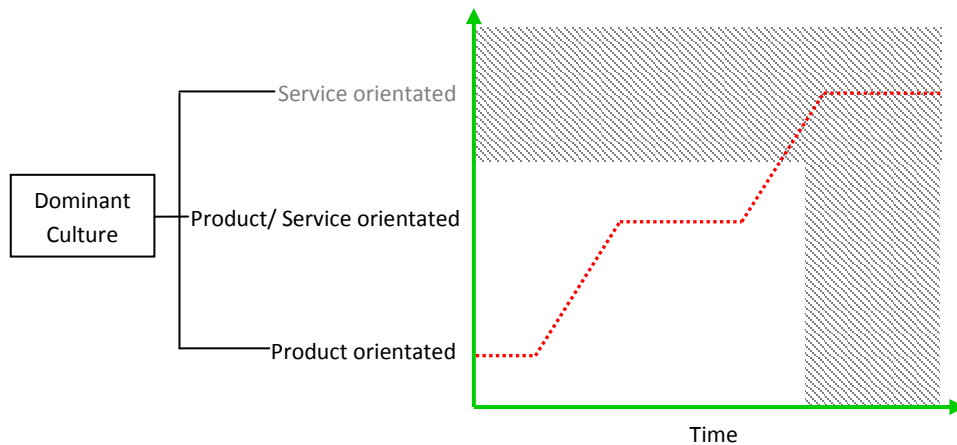


Figure 5.1: Product to Service cultural change over time.

The company's value offering is represented on the vertical axis:

- Product-orientated: Company is predominantly product focused. Services are not provided or are limited to those directly related to the product e.g. maintenance, repair, distribution.
- Product/ Service orientated: Both product and services are provided and their value is intertwined.
- Service orientated: Company is predominantly service focused. Products are not used or only act as delivery tools for service provision.

It is not the objective of the research to transition companies to service-orientated companies. Rather, the study aims to facilitate the cultural transition which will allow for the combination of product and service offerings, optimally balanced to best suit the company's strategy. Additionally, the transition from Product to Service orientation requires significant change over a significant period of time, which is too long for this body of research. Therefore, the research will focus on the transition from product-orientated to PSS orientated. The excluded area of transition from PSS orientated to Service-orientated is hatched. The positioning of the company along this axis is dependent on the extent of the service offered. Companies offering no services will be positioned lower on the axis, and companies offering pure service will be positioned higher up the axis. The change in balance between the product and service over time is represented on the horizontal axis.

The degree of cultural change is measured over time as reflected through changes in the cultural indicators as listed in Table 5.2. Eight fundamental differences can be found

between a Goods-dominant logic and a Service-dominant logic (Lusch *et al.*, 2006). These eight fundamental differences provide a list of cultural indicators and are discussed in the following sections.

Goods-dominant Logic	Service-dominant Logic
Goods	Service(s)
Tangible	Intangible
Operand resources	Operant Resources
Asymmetric Information	Symmetric Information
Propaganda	Conversation
Value Added	Value Proposition
Transactional	Relational
Profit Maximization	Financial Feedback

Table 5.2: Fundamental differences between Goods-dominant and Service-dominant logic (Lusch *et al.*, 2006)

Cultural indicator 1: Goods vs. Service(s)

This relates to how the company perceives itself. Companies operating under a Goods-dominant logic consider selling goods as their primary goal. Financial growth is achieved by increasing the number of product sales. By contrast, Service-dominant logic sees goods as a mechanism for delivering services. Financial gain is created by considering the flow of the service, e.g. the optimal configuration of goods if any, the optimal organisation/ network configuration to maintain the service, and the optimal payment mechanism. Therefore, a company with an Integrated logic (which combines goods and services) will consider their offering beyond the tangible product.

Cultural indicator 2: Tangible vs. Intangible

In Goods-dominant logic, value is placed in the functionality of the tangible goods. In contrast, Service-dominant logic focuses on providing solutions. Explained through a simple example, rather than selling the drill (product-orientated mindset) the company sells the hole the drill creates (service-orientated mindset). As companies transition from a Goods- to a Service-dominant logic, the emphasis placed on tangible goods will decrease.

Cultural indicator 3: Operand resources vs. Operant resources

In Goods-dominant logic, value is placed on *operand* resources. These are typically static, e.g. machinery, premises, raw materials. In Service-dominant logic, resources are ordinarily *operant*. By contrast, these are typically dynamic, intangible and can provide the main competitive advantage e.g. customer relationships, staff knowledge. That extends to the value network where all participants in the value-creation process can be viewed as dynamic *operant* resources. Accordingly, they can be viewed as the primary source of organisational innovation and value creation.

Cultural indicator 4: Asymmetric Information vs. Symmetric Information

In Goods-dominant logic information is predominantly asymmetric e.g. the company has certain knowledge which the customer does not. By contrast, Service-dominant logic suggests an impartial flow of information with all exchange or trading partners (Lusch *et al.*, 2006). Idealistically, it aims to remove barriers that give differential advantage to one partner over others. The extent and position of barriers within the company is tailored in relation to the desired position of the company and its offerings.

Cultural indicator 5: Propaganda vs. Conversation

In a Goods-dominant logic, communication is traditionally done through a third party media e.g. website, marketing campaign, printed media. Service-dominant logic is predominantly carried out through conversation and dialogue between customers, employees and relevant stakeholders. This allows companies to actively listen to the market and gain feedback from offerings, ideas for new offerings and generate/ maintain customer relationships.

Cultural indicator 6: Value added vs. Value Proposition

In Goods-dominant logic value is a property of a product which is added in the manufacturing process. The money exchanged for the product reflects the value in the process. In Service-dominant logic value is ultimately created through co-creation with customers, who determine the value of the offering through its use. The creation of value through use means that companies can only make a value proposition which, if accepted, is then co-created. The money exchanged for the service is an indication of the customer's perceived value offered by the value proposition.

Cultural indicator 7: Transactional vs. Relational

In Goods-dominant logic, customer interaction is predominantly transactional based. After the transaction, contact with customers is minimal. In Service-dominant logic contact with customers is much higher. Relational or social contracts are used to create bonds between the company and customer.

Cultural indicator 8: Profit Maximisation vs. Financial feedback

In Goods-dominant logic, companies focus on profit maximisation through single transactions. Profits are increased through the altering of the product and processes e.g. improved functionality, process optimisation, reducing raw material wastage. Service-Dominant logic learns from financial outcomes as it attempts to better serve customers and obtain cash flows for the company. The financial return from offerings is a co-produced signal which represents supply and demand factors, indicating the minimum potential value of resources in use. This is used as an indicator of customer wants and needs.

These binary oppositions are indicative characteristics of pure Goods- and Service-dominant logics. As the culture transitions from Goods- to Service-dominant, cultural changes can be traced across these criteria. For example, as illustrated in Figure 5.2, a company located at position one would provide goods only. Value would be placed on the product functionality, manufacturing processes and static resources e.g. machinery, premises, raw materials. Customer contact would be limited to transactions only, with third party media as the predominant form of customer communication e.g. website, printed brochures. Profit would be maximised through altering of product and processes e.g. improved functionality, process optimisation. Alternatively, a company located at the opposite end of the scale (as illustrated in Figure 5.2 position two), would be service focused with emphasis on the provision of solutions. Dynamic resources e.g. customer relationships, staff knowledge, would be highly valued and information readily shared through frequent customer contact during service co-creation.

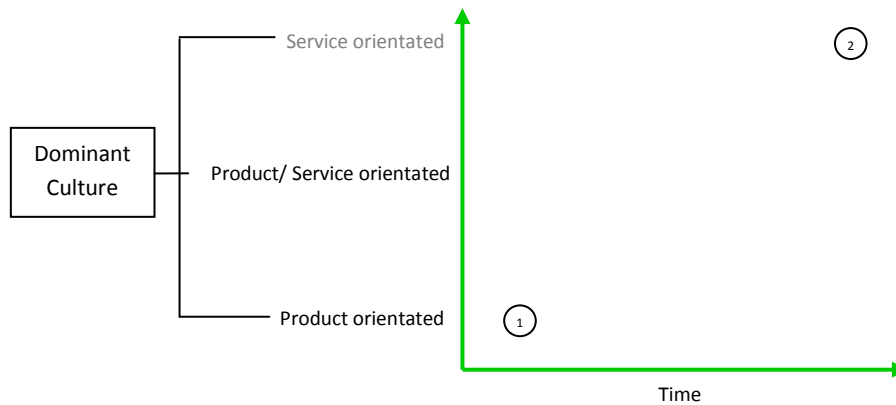


Figure 5.2: Example of extreme company positioning.

Therefore, by linking these cultural indicators to the company orientation, the transition from Good-dominant to PSS and Service-dominant logic can be mapped.

5.3.3 PSS process and activities

As previously discussed, the PSS models studied represent useful and innovative approaches in relation to PSS methodologies. Conversely, as discussed in Chapter Two:

- Models studied do not take into account existing cultures within the company or their adaptation for PSS provision.
- Models studied do not compensate for lack of familiarity with the PSS process.
- A clearly defined competitive advantage provides a base on which to build a systematically co-ordinated and transparent procedure. This can then be used to support the development of new service products.

Therefore, the TIPSS Process model will adopt and integrate existing development processes and utilise them to facilitate a cultural transition. This presents an opportunity to relate new service development processes to existing product development processes, creating a level of familiarity. This is an important contribution in establishing a basis for representing the transition from product-orientated culture to PSS culture.

Additionally, as noted in Chapter Four:

- Although manufacturing companies have a clearly defined product strategy, they often lack a sufficiently defined service strategy.

- Internal co-ordination among business units and more intense external cooperation with other contributors in the wider business network is required for a PSS.
- Perspectives must shift from that of product and services as static offerings to customer activity in order for companies to quantify their level of interaction and co-creation with customers and identify opportunities for providing additional value.

Therefore, a clearly illustrated, logical approach to PSS will help clarify both the process and strategy. Areas where additional resources are required can be highlighted and external partners integrated where necessary. Customer involvement within the PSS in relation to both its development and delivery must be recognised and facilitated. As customers directly affect the PSS output, they must be considered partners within the value network.

In Chapter Two, it was established that NPD and NSD processes and activities are not exclusive of each other. As the models studied take a comparable approach to product and service development, this Author proposes that the TIPSS Process model adopt activities from a well referenced prescriptive model. The NSD Process Cycle (Chase *et al.*, 2000) (discussed in detail in Section 2.4.2) was developed based on knowledge of both product and service development processes. It illustrates a clear series of development phases, while representing the cyclical and variable nature of PSS within its central activities. This model draws on previous product, service and product/service approaches and is widely referenced and firmly located within the literature. For these reasons, the TIPSS Process model will adopt the stages identified and defined in the NSD Process Cycle model.

The NSD Process Cycle model identifies four primary phases in PSS development: *Design, Analysis, Development and Full launch*. Development activities in product, service and product/ service development processes (as discussed in Section 2.3) can be categorised under these headings and follow the same progression format. Therefore, as representing every development activity would be unrealistic, it is proposed that the development phases of *Design, Analysis, Development and Full Launch* be adopted within the TIPSS Process model to indicate the progression path (see Figure 5.3).

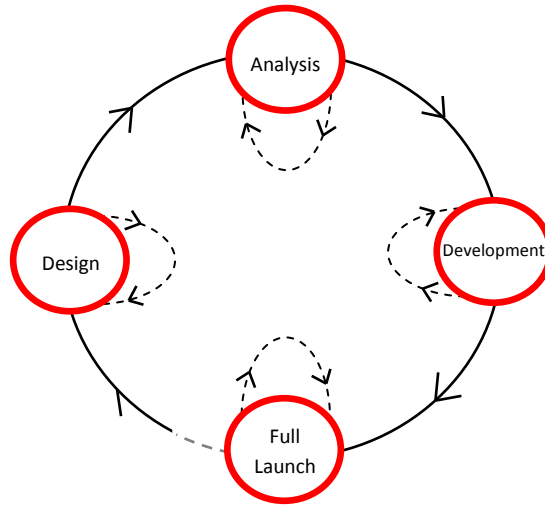


Figure 5.3: Development Phases for the TIPSS Process model

It is important to note that the development process is not linear but cyclical, a continuous loop of concept generation, development, feedback and improvement. Additionally, as discussed in Chapter Four, due to exploration into new areas, mistakes will be made and should be encouraged within the development process. Phases should not be considered as strictly sequential. Rather the process contains repetition of individual phases (as indicated by dashed lines) and returns to non-sequential phases (i.e. If a project is in Development, the company can return to/ repeat the Design phase if required). This cyclical approach is strongly reflected in the NSD models discussed in Chapter Two.

5.3.4 Cultural Influencing Factors

As discussed in Chapter Four, the intrinsic culture of a company and its staff can greatly affect the rates of adaptation, adoption and change when transitioning from Goods-dominant logic to an Integrated logic. This author contends that the existing culture is the predominant limiting factor in relation to PSS process/ activities and information/ knowledge transition as it represents:

- Cultural barriers to change in relation to existing mindsets and skills of both staff and management.
- Information/ Knowledge limitations and barriers to learning.
- Resistance to change due to lack of understanding and familiarity through poor communication.

Therefore, the TIPSS Process model proposes to represent the cultural barriers (identified and discussed in Chapter Four) within the transition model, collectively known as *Cultural Influencing Factors (CIF)*. The CIFs within the TIPSS model can be summarised into three headings: *Awareness of the current dominant logic*, *Knowledge management* and *Communication* (see Table 5.3 for summary groups). CIFs are significant in relation to the TIPSS Process model as they directly influence the knowledge available, information absorbed and knowledge applied. Therefore they directly affect the inputs and outputs of the knowledge transition process. For example, lack of communication within the company adversely affects staff’s acceptance of change, willingness to learn and their ability to interpret, process and absorb new information. When transitioning from a Goods-Dominant logic to an Integrated logic, the CIFs must be considered and catered for to allow the progression from one stage of the process to the next as they directly affect the inputs and outputs of each phase.

CIF Headings	
Awareness of the current dominant logic	4.3.1 Lack of awareness of dominant culture
	4.3.8 Product-orientated approach to measuring success
	4.4.1 ‘Mistake’ avoidance mindset
Knowledge management	4.3.3 Product orientated concept of Value Proposition
	4.3.5 Product-orientated customer relationship management
	4.3.6 Product-orientated knowledge management
	4.3.9 Lack of Value Network management
Communication	4.3.4 Undefined PSS strategy
	4.3.7 Product-orientated communication management
	4.3.9 Lack of Value Network management
	4.4.2 No knowledge/ understanding of change rationale

Table 5.3: Summary of CIF headings

The CIFs will be represented within the TIPSS model between each of the development phases (as illustrated in Figure 5.4).

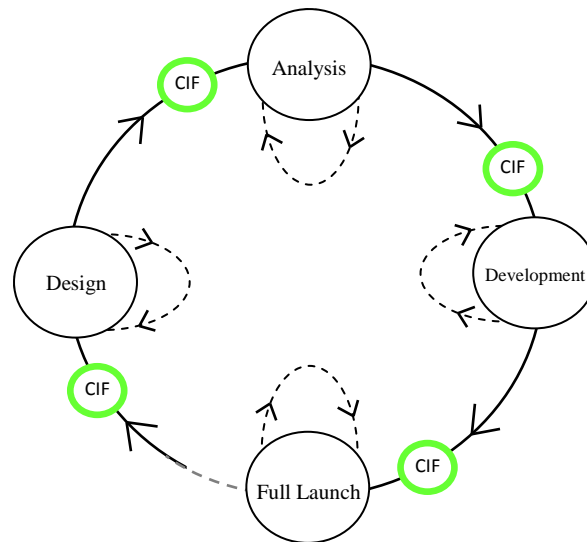


Figure 5.4: Influencing Factors (IF) for TIPSS model

Reviewed research argues that the organisational culture is inherent in the people operating within it (as discussed in section 4.2). Therefore, this author contends that in order to successfully transition from a product-orientated culture to a PSS culture, fundamental changes must be made on both a broad company level, and on an individual level. Each CIF is intrinsically linked to each other and therefore must be approached collectively. For example, simply providing the information required for the transition is not sufficient to change the mindset of staff and management. Instead, information which is justified, clearly communicated, tailored to suit the predominant learning styles and presented in a familiar context would have a greater impact on changing the dominant regime.

5.3.5 Information and Knowledge Transition Representation

In Chapter Two, the differences in the methodologies and approaches between product, service and product/ service development were studied. The following key findings in Chapter Two in relation to the implementation of PSS models were made:

- Due to the radical differences between NPD and NSD there is a lack of understanding and knowledge of PSS processes.
- As a result, intuitive and reactive approaches to service development are still predominately applied in industry.

- This intuitive approach does not sufficiently take into consideration the mutual influences of products and services. This results in PSS which are not fully integrated or optimised. Therefore, they do not perform as expected and deter companies from instantiating any further PSS.

Additionally, as cited in Chapter Four, dominant logic influences the manner in which companies conceptualise and make critical resource allocation decisions. These then develop into mental maps, business models and processes which become company norms.

Knowledge and culture are heavily interlinked as individuals acquire information to facilitate problem solving and decision making. Individual knowledge is central in how and what information is acquired, how it is organised, assimilated and used within an organisation (Lemon and Sahota, 2004). As PSS information is acquired, assimilated and applied, companies gain a deeper understanding of PSS, and broaden their concept of value. This broader context of value will require a new method with which to measure success beyond traditional product-orientated methods. This must also be communicated, understood and applied. Therefore, this author contends that information/ knowledge of the PSS processes, and understanding of the integrations of them with existing processes is a significant factor in the transition from a Goods-dominant logic to an Integrated logic. It is proposed that the TIPSS Process model represent the relationship between information, knowledge and understanding of PSS in the context of cultural transition.

Škerlavaj *et al.* (2010) consider the relation between organisation learning and innovation. Their research highlights the link between key competitive advantage of organisations and the ability to learn and respond to challenges from both internal and external business environments. They emphasise the need for companies to cultivate an environment in which the employees can and should continually learn and share their knowledge. This creates a culture which is open to and willingly seeking innovative change. This openness to change is a key factor in changing dominant logics as it requires staff to break norms and ritualistic habits. Škerlavaj *et al.* break the organisational learning process into a sequence of four points: Acquire information; Interpret information; Understand information; Transfer into knowledge; and Implement behavioural and cognitive changes to convert words into action. Using the author's own understanding of Škerlavaj *et al.*'s learning process, it is proposed that the TIPSS Process model represents the transformation of information into knowledge in the

context of the PSS design and development process. This conversion of information to knowledge can be broken into four points:

- I1: New information.
- I2: Understood information.
- K1: Understood knowledge.
- K2: Actionable knowledge.

Within the TIPSS Process model, these points of information/ knowledge sit between the PSS development phases (see Figure 5.5). As companies progress through the development phases, information is converted to knowledge by being collected, understood and applied.

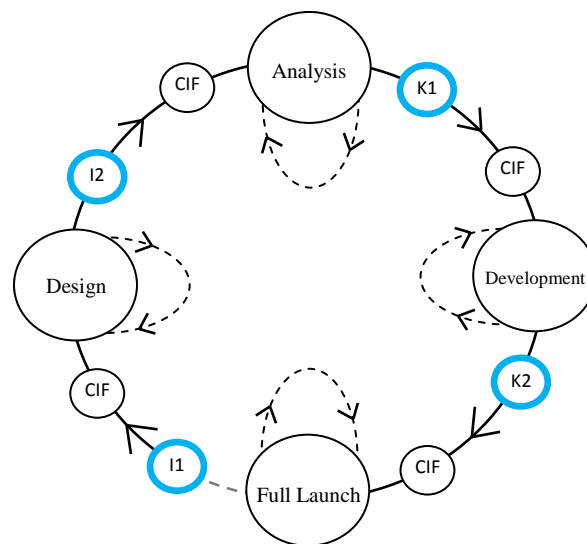


Figure 5.5: Information and Knowledge transition for TIPSS model

Information is the key input within the process and knowledge the key output. The PSS process and activity phases both drive and require this information/ knowledge. As companies progress through each phase, existing information/ knowledge is used as a base on which to build and expand learning. Additional information in relation to PSS can then be gathered, absorbed and applied in the context of existing knowledge and processes.

5.4 TIPSS Process Model Summary

The TIPSS Process model is a prescriptive transition model. The model specifications are summarised in Table 5.4.

No.	Specification	Comment	TIPSS Model Symbol	Supporting References
1.	Systematic representation	Established NPD, NSD & PSS models adopt a systematic approach to design/ development activities. TIPSS is a systematic approach to PSS transition.		Grönfeldt and Strother, 2006; Tidd and Bodley, 2002; Ernst, 2002
2.	Representation of Transition Process	Transitioning from product to PSS requires changes in the business culture. As the culture adapts, the emphasis on service will increase. TIPSS will represent cultural change as a function of service emphasis.		Correa et al, 2007; Graves and Ward, 2007; Brax, 2005; Mathieu, 2001; Edvardsson et al 2005; Aurajo and Spring, 2009; Cooper et al, 2007; Beltagui et al, 2009
3.	PSS Process & Activities Representation	Models studied identify progress through similar activities along a similar progression line. These activities can be categorised into phases within their processes. TIPSS will be phase based, based on Chase et al. (2000): Development, Design, Analysis & Full Launch as phases.		Sakao and Shimomura, 2007; Aurich et al, 2006; Aurich et al, 2009; Grönfeldt and Strother, 2006; McAdam, 2004; Foxall et al, 2002; Ozer, 2003; Bitner and Zeithaml, 2005; Chen & Lee, 2007; Eppinger and Ulrich, 2003; Grübacher et al., 2007
4.	Cultural Influencing Factors Representation	Existing factors on both a companywide and individual level greatly affect the transition process. To facilitate change, they must be catered for within the transition process. TIPSS will highlight & expedite: <ul style="list-style-type: none"> • Awareness of the current dominant logic & practices. • Knowledge management. • Communication. 		Love and Roper, 2009; Chen and Lee, 2007; Chase et al., 2000; Dimitriadis & Stevens, 2005; Ahuja & Lampert, 2001; Möller, 2006; Alavi and Leidner, 2001; de Long and Fahey, 2000; Nonaka et al., 2000
5.	Information Transition Representation	There is a lack of understanding & knowledge of PSS, which limits its application & effectiveness. Knowledge is a key factor in culture as learning TIPSS will represent the four key stages of knowledge: <ul style="list-style-type: none"> <i>I1</i>: New information. <i>I2</i>: Understood information. <i>K1</i>: Understood knowledge. <i>K2</i>: Actionable knowledge. 		Gebauer & Friedli, 2005; Friedli et al. 2005; Salonen, 2011; Kowalkowski, 2010; Ahuja and Lampert, 2001; Windahl & Lakemond, 2010; Salonen, 2011; de Long & Fahey, 2000; Hara et al., 2009; Matthyssens & Vandenbempt, 2008; Stevens and Dimitriadis, 2005; Dağ and Geçer, 2009

Table 5.4: Specification of the TIPSS Process model.

5.5 TIPSS Process Model Representation

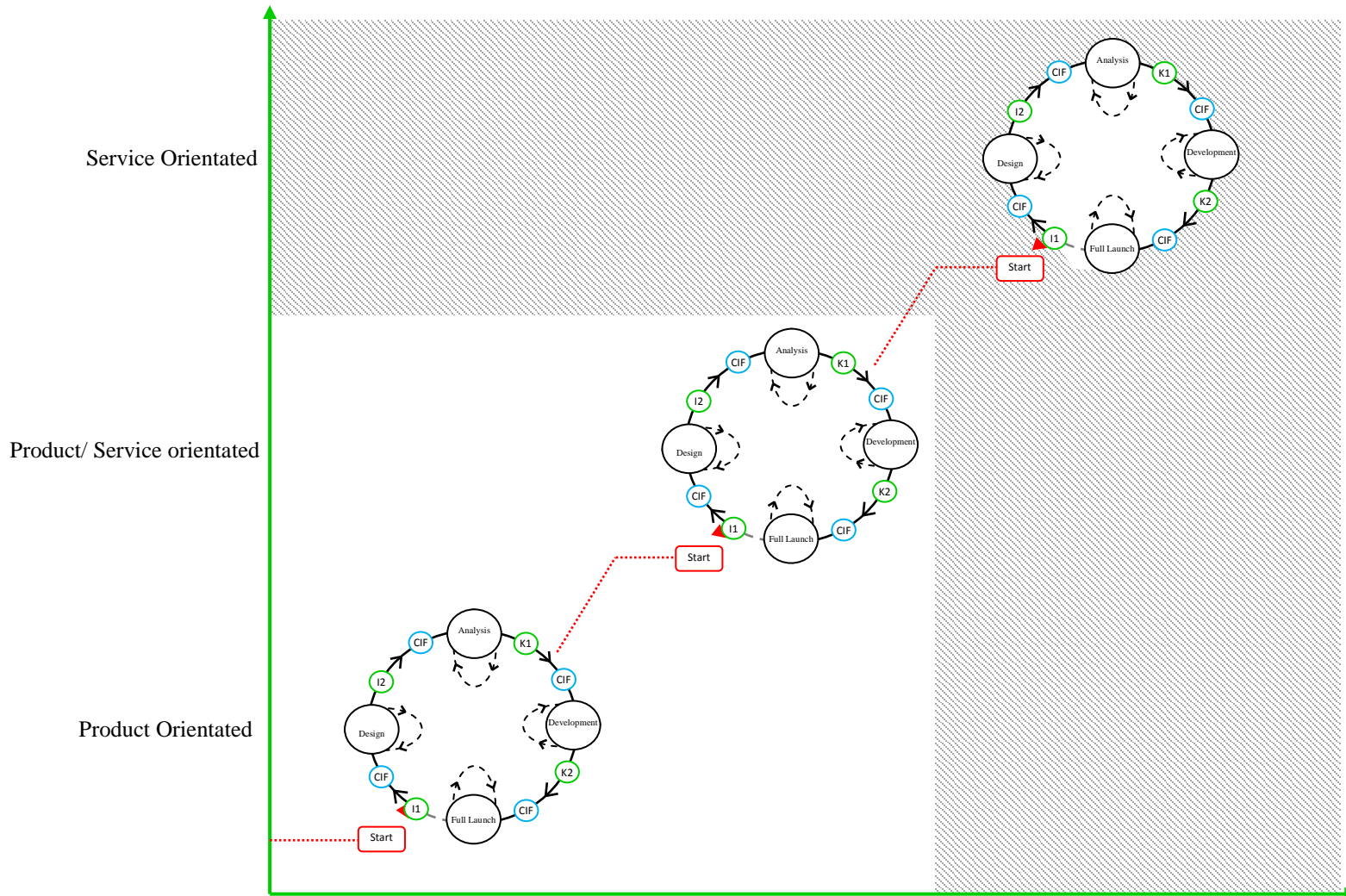
The key components of the TIPSS Process model have been explained and justified through primary (Chapter Four) and secondary research (Chapter Two and Chapter Four). Chapter Two reviewed PSS models designed for application within product-orientated companies. These models do not take into account the existing cultural context in which they propose to operate. Chapter Four reviewed existing cultural barriers which directly affect the transition process. Therefore, a clear problem was established. From this research, the TIPSS Process model has been developed which provides an important contribution in relation to:

- Representing the cultural change process from a Goods-dominant to an Integrated logic.
- Provides a prescriptive reference model from which specifications can be derived for developing and implementing a process which supports the transition of cultures.

As discussed, the intention of TIPSS is not to replace Goods-dominant with Service-dominant logic. Rather, it is to facilitate the transition to an integrated logic with an appropriate balance of product and service offerings for the company involved. In addition, the rate of transition is dependent on the knowledge, skill, resources and willingness of staff within the company. Therefore, the number of repetitions of TIPSS to transition from a Goods-dominant logic to an Integrated logic cannot be specifically defined. It is dependent on the context of the company in which it is being applied. For illustrative purposes, the model representation shows the TIPSS model at three specific cultures:

- Product-orientated culture: No service component is provided. The value offering is purely focused on the product.
- Product Service orientated culture: There is an even balance between product and services in the value offering.
- Service-orientated culture: No product component is provided. The value offering is purely focused on the service.

The complete representation of the TIPSS Process model can be seen in Figure 5.6.



CIF: Cultural Influencing Factors
 I1: New info.
 I2: Understood info.
 K1: Understand knowledge.
 K2: Actionable knowledge.
 ▨: Excluded research area.

Figure 5.6: TIPSS Process Model Representation

A simple scenario can be used to illustrate a company's progression through the TIPSS Process model. Let us use an example of a traditional manufacturing company, employing twelve people. Mapped on the TIPSS Process model axis, they would sit in the lower left hand corner (as shown in Figure 5.7). This company produces solar panels for use on residential housing. They provide limited services which facilitate the use of their products (e.g. maintenance, repair). These services are separate to the product so customers can chose to avail of them if they wish i.e. products are not on guarantee so maintenance/ repair is charged on an as-need basis. The company has been in operation for eight years, has a strong base of engineers who are experts in their field and prides itself on being a leader in solar technologies. The market is becoming increasingly competitive so the company wishes to expand their value offering and regain/ grow its competitive advantage. In the TIPSS Process model, as indicated by the green circle, the company sits on the lower left hand corner (Product orientated, limited service offering). Staff are technology focused and have no/ limited interaction with customers. Both management and staff are supportive of change but are unsure of how to progress.

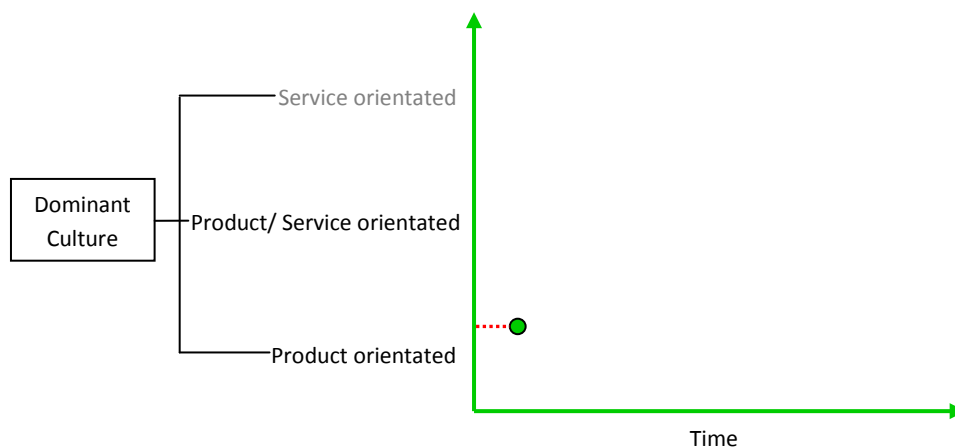


Figure 5.7: Scenario company placement in the TIPSS Process model

To facilitate discussion, within the scenario the TIPSS Process is illustrated as a linear process (shown in figure 5.8a, 5.8b and 5.8c). Each development phase, Cultural Influencing Factor and knowledge transition points are discussed in sequence. It is important to note that the prevalence of each CIF is dependent on the company in which the model is being applied. For the scenario, the relevant CIF will be highlighted and discussed at the appropriate point.

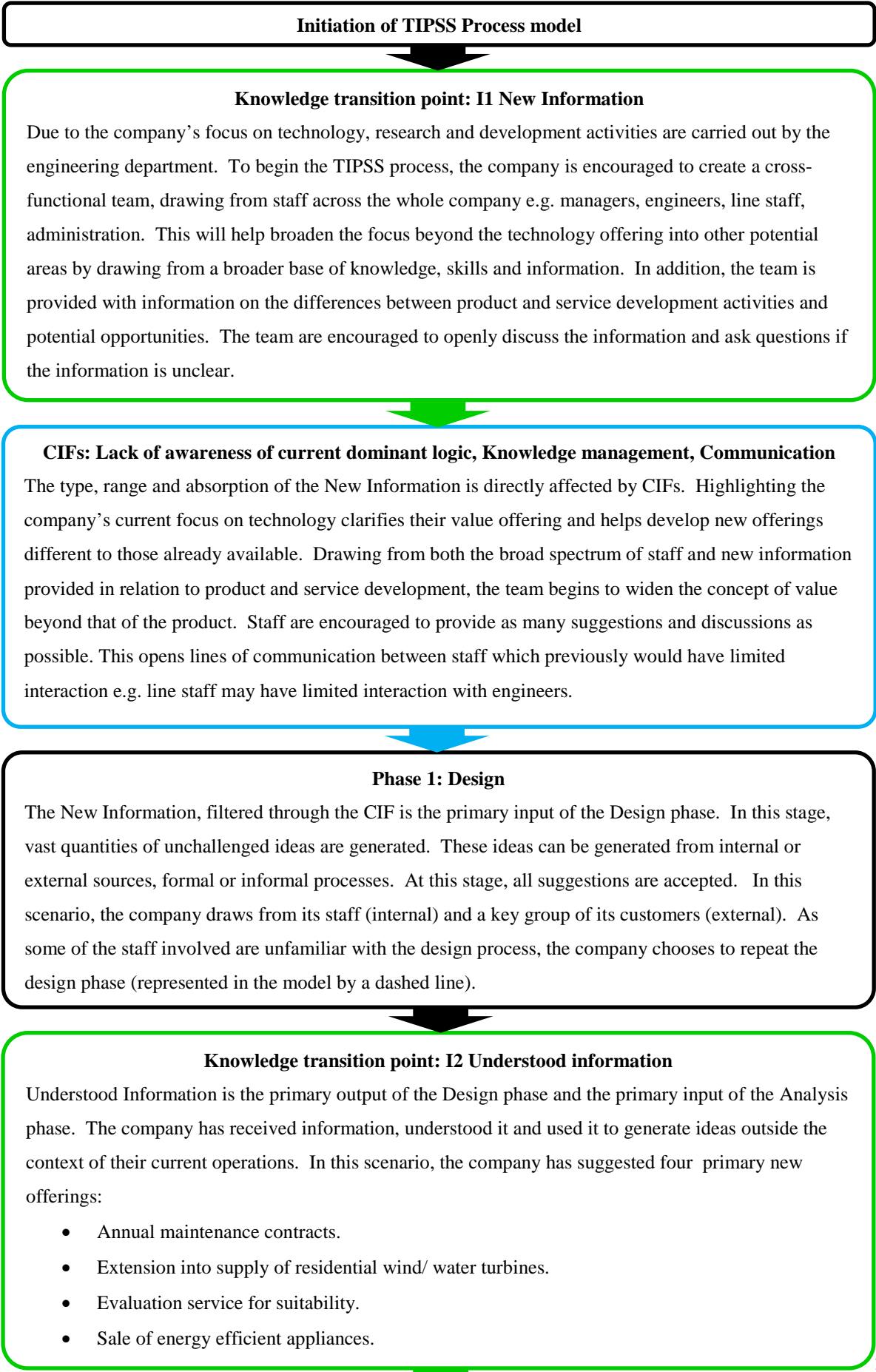


Figure 5.8a: Scenario illustration of TIPSS

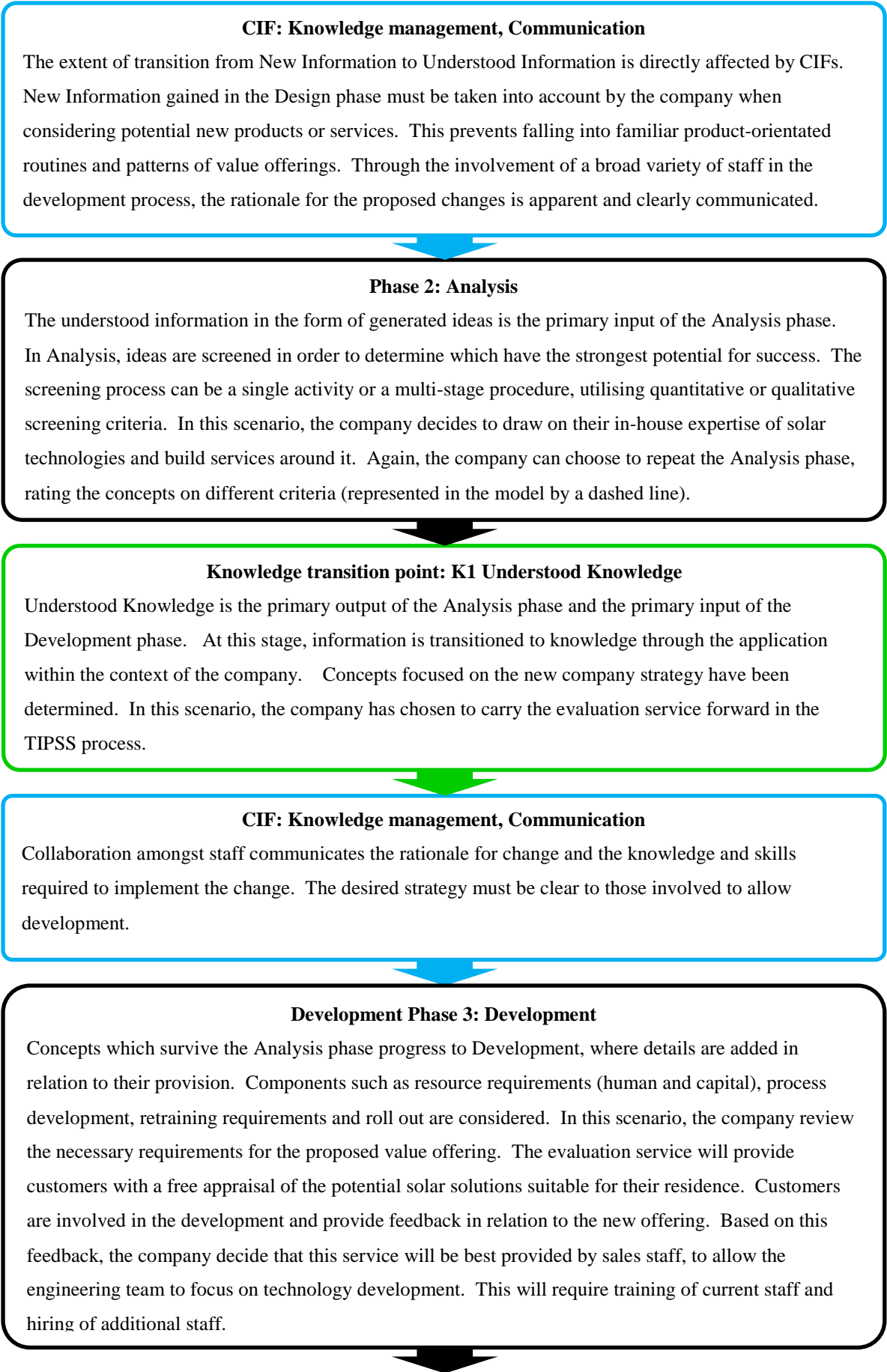


Figure 5.8b: Scenario illustration of TIPSS (continued)

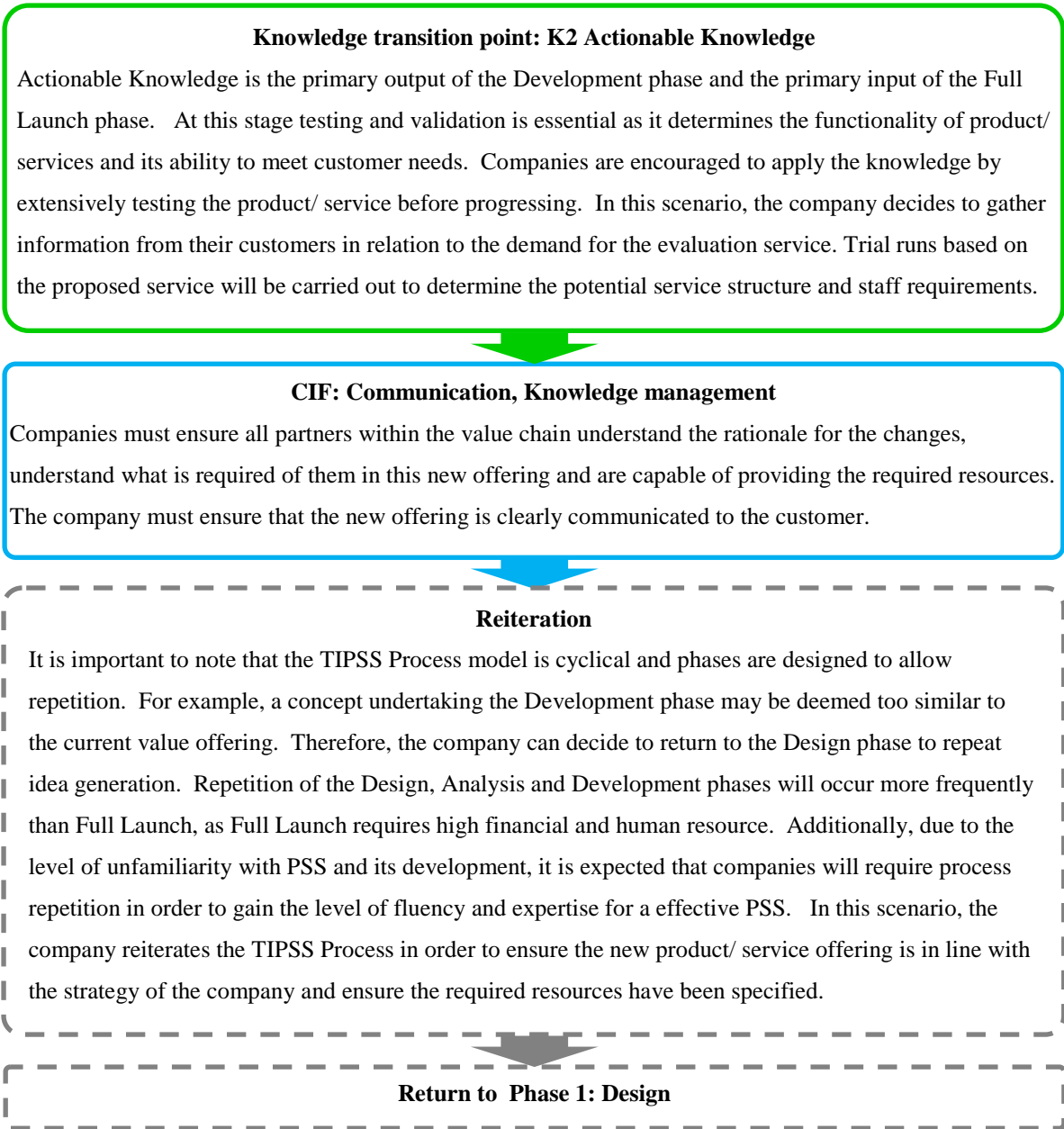


Figure 5.8c: Scenario illustration of TIPSS (continued)

To summarise, the TIPSS Process model represents the cultural transition prior to the implementation of a PSS strategy. The primary statement conveyed by the model is that in order to initiate a PSS strategy, companies must be aware of the potential offered by a PSS. In order to achieve this, they require a level of PSS knowledge (I1, I2, K1, K2) presented in a logical manner (Design, Analysis, Development, Full Launch) which accounts for cultural influencing factors (CIFs).

5.6 TIPSS Process Model Application

As discussed, there are significant cultural barriers to the application of PSS models. Companies operating under a Goods-dominant logic must transition to an Integrated logic which takes into account both product and service requirements. This author contends that in order to initiate the required cultural transition within a company, a tailored delivery system is necessary. Therefore, the TIPSS workshop was developed. This workshop is completely informed by, and initiates the transition process as defined by the TIPSS Process model. Once the initiation is complete, cultural change can then be evaluated over time. The workshop requires a single work day and participants from a range of departments. Of particular importance is the presence and participation of high level management e.g. CEO, Department Manager for, as discussed in Section 4.3.2, in order to transition cultures high level support is required. Directly participating in the Workshop will help ensure management support and illustrate to staff their willingness for change.

5.6.1 TIPSS Process Model Initiation: The TIPSS Workshop

The TIPSS workshop is a delivery method explicitly designed for the specifications as identified by the TIPSS Process model. It is used to benchmark the company and initiate the transition process. The workshop is broken into four main activities, corresponding with the phases defined in the model (see Figure 5.9).

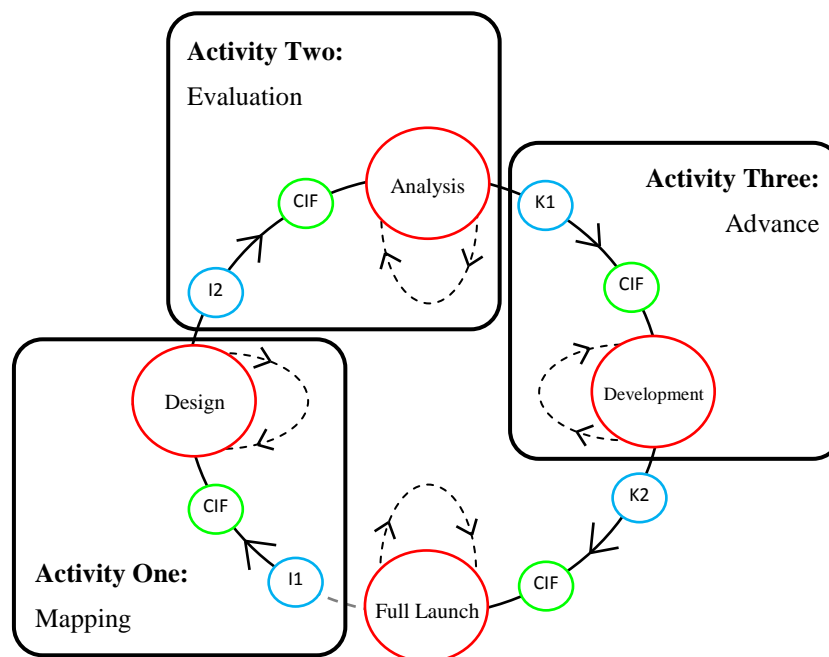


Figure 5.9: TIPSS Process Model Specification summary

The Mapping activity establishes the structure of the current business and value proposition through a mapping tool. The Evaluation activity contains a series of questions for each section of the map which highlights areas of weakness, strength, opportunities and threats within the current offering. The Advance activity develops and exploits customer knowledge to advance the offering through the provision of PSS. Proposed concepts are then projected and evaluated within the context of the company by reiterating the Mapping stage. As with the TIPSS Process model, the workshop is not a linear structure but cyclical. Cultural Influencing Factors are highlighted during the duration of the Workshop. To facilitate the transition from a Goods-dominant logic to an Integrated logic, documents generated form the basis of a 'live' process which is regularly updated. This maintains a level of cultural awareness, captures the knowledge generated and provides a reference document to facilitate discussion and communication. In addition, a TIPSS Workbook tool was developed by the author to facilitate company participation in the workshop and provide supportive information outside the context of the workshop itself. A copy of the Workshop tool can be found in Appendix E. The workshop and its initiation of the TIPSS Process are discussed in more detail in the following sections.

5.6.2 Mapping Activity

Mapping is the first activity of the TIPSS Workshop which initiates the Design phase of the TIPSS Process model. Knowledge transition point I1: New Information acts as the primary input to the Design phase so is a significant factor in the Mapping activity. The objective of the Mapping Activity is to facilitate the Design phase by:

- Solidifying the business into the context of the transition process.
- Clarifying the current business layout, its activities and processes.
- Removing any ambiguity between departments of the value proposition and their role within it.
- Defining the necessary resources needed to supply the value proposition.
- Facilitating discussion for potential PSS developments.
- Providing a platform on which to trace changes needed to implement the proposed PSS.

As mentioned, I1: New Information acts as significant driver in the Mapping activity. As the company progresses through Mapping, a case study is used to provide new information in

relation to the requirements of services versus products, different approaches to value proposition and the importance of the customer in the PSS development process. Participants are encouraged to ask questions if any information is unclear. Through the Design phase, New information is converted into Understood information.

In the Mapping Activity, companies define their current business model. Business models provide a map from which entities, situations and processes within the business can be viewed. Diagrams are useful as they often help explain concepts and complement/ clarify spoken responses (Stevens and Moultrie, 2011). The particular set of choices an organisation makes about policies, assets, governance and their associated consequences are the organisation's business model, as they determine the logic of the company, the way it operates and how it creates value for its stakeholders (Casadesus-Masanell & Ricart, 2010). Therefore, business process models can be seen as cognitive mapping tools (Siau and Tan, 2008). The use of appropriate cognitive mapping tools have been shown to overcome cognitive and behavioural biases, namely change the dominant culture (Kock, 2009). As discussed in detail in Chapter Four, this is a significant barrier in transitioning from product-orientated to PSS. Mapping serves to address several CIFs by creating awareness of the current dominant logic, defining the Value Network and highlighting the product-orientated concept of value. It also provides a base on which to design a new value offering and illustrate the transition requirements. Providing a clear map allows staff to understand their position in the company and the rationale for any changes.

The Business Model Template developed is based on the "Business Model Canvas" by Osterwalder and Pigneur (2010). The business is broken into eleven interrelated building blocks (see Figure 5.10). As each block is considered and deliberated, the differences in product and PSS approaches, methodologies and focus are discussed. It is important to note that, although illustrated as individual blocks, all components of the model are interlinked and have direct and indirect effects on each other.

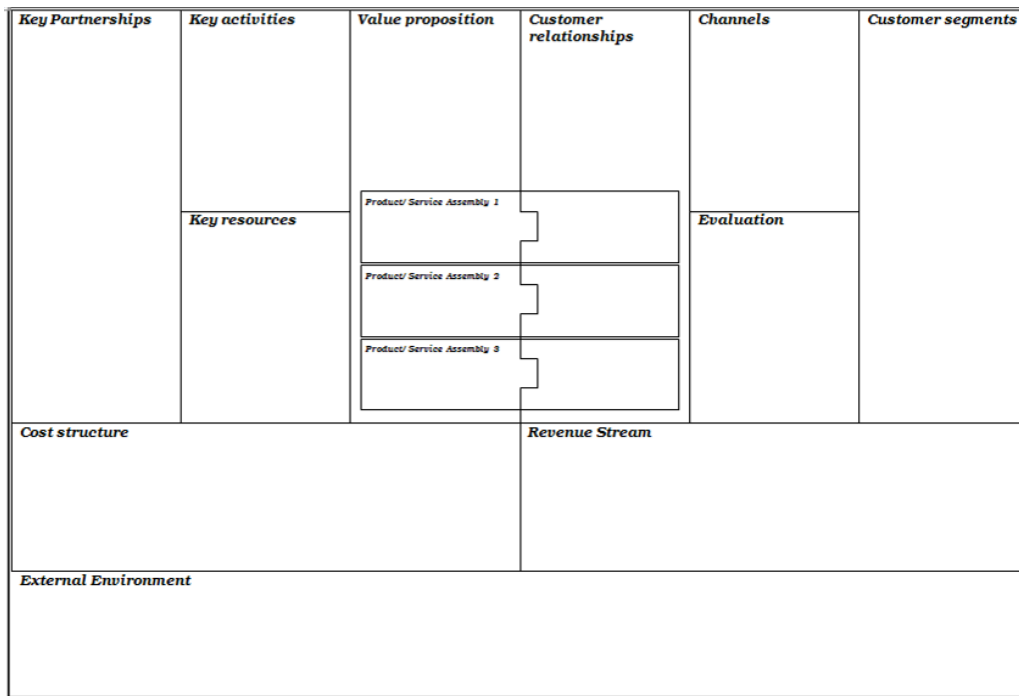


Figure 5.10: Business Model template (Adapted from Osterwalder and Pigneur, 2010).

As mentioned, there are eleven building blocks within the canvas. The progression sequence through the canvas is dependent on the company. An example of a typical sequence is given and questions used (provided in italics) to facilitate progression through each block is provided:

- **Value Proposition:** The value proposition is the value offered to the Customer Segments. *What value do you deliver to the customer? Which one of your customer's problems are you helping to solve?*
- **Customer segments:** Knowing the different intended target customer is vital for a business in order to make decisions profitably (Khajvand and Tarokh, 2011). *Who do you provide this value proposition to? Which segment is most important?*
- **Channels:** The means by which the Value Proposition is delivered to the Customer Segments. *Through which Channels do your Customer Segments want to be reached? How are you reaching them now?*
- **Customer relationships:** Developed through interaction between the company and Customer Segments. *What type of relationship does each of your Customer Segments expect you to establish and maintain with them?*
- **Evaluation:** Indicates the performance of the Value Proposition. *What key factors are you measuring? How are they measured?*

- **Revenue Stream:** Pricing strategy of the Value Proposition determines the revenue streams of a company. *For what value are your customers really willing to pay? For what do they currently pay?*
- **Key resources:** The total resources needed to provide the value proposition. *What Key Resources do your Value Propositions / Distribution Channels/ Customer relationships/ Revenue Streams require?*
- **Key Activities:** All the actions needed to provide a product, service or PSS. *What Key Activities do your Value Propositions/ Our Distribution Channels/ Customer relationships/ Revenue Streams require?*
- **Key Partners:** Any external contributors who provide Key Resources or Key Activities. *Who are your Key Partners/ Suppliers? Which Key Resources/ Activities are you acquiring from partners?*
- **Cost Structure block:** All costs inherent in the provision of the PSS. *What are the most important costs inherent in your business model? Which Key Resources/ Activities are most expensive?*
- **External Environment:** Factors which occur outside of the business which, typically, cannot be affected, changed or controlled by the business. *Who are your main/ emerging competitors? Where are they positioned in relation to your Value Proposition?*

Companies are encouraged to engage and question all components of the PSS to ensure clarity of information and the necessary changes. Mapping is used to generate a singular, agreed company structure, highlight any areas of confusion or ambiguity and illustrate examples of the new information in a relevant format. Through the Design phase, this New Information is converted into Understood Information which forms the input for the Evaluation Activity.

5.6.3 Evaluation Activity

Evaluation is the second activity of the TIPSS Workshop which initiates the Analysis phase. Knowledge transition point I2: Understood Information acts as the primary input into the Analysis phase of the TIPSS Process model and therefore drives the Evaluation Activity. The objective of the Evaluation Activity is to facilitate the Analysis phase by:

- Querying and rationalising the current business layout.

- Generating an overview of strengths to be exploited and weaknesses to be improved.
- Considering their business in the context of the case study discussed.

As discussed, I2: Understood Information acts as a driver for the Analysis activity by:

- Allowing information gathered in at the Mapping phase to be utilised in the generation of new ideas based on an understanding of service requirements and PSS approaches.
- Facilitating the company in the generation of potential PSS developments within the context of their own operations.

The Evaluation activity is designed to address the CIF of Awareness of current dominant logic and Knowledge management. Evaluation questions highlight the need for service-orientated approaches to measuring success and new lines of communication with the customer. The Evaluation activity is a self-assessment audit consisting of ten sets of statements for each business block (See Table 5.5 for sample and Appendix F for a complete list of questions). Questions were derived from transition differences and difficulties, uncovered through primary and secondary research.

Customer Segments						
Customer churn rates are low.	5	4	3	2	1	Customer churn rates are high.
Customer base is well segmented.	5	4	3	2	1	Customer base is unsegmented.
Our customer segments are prioritised.	5	4	3	2	1	Our customer segments are not prioritised.
We are aware of each segment's needs.	5	4	3	2	1	Our offerings are not targeted to specific segment needs.
We know the motivators of each segment.	5	4	3	2	1	We do not know what motivates each segment.
We are aware of trends within each Customer Segment.	5	4	3	2	1	We are unaware of trends within Customer Segments.
Segment needs are prioritised.	5	4	3	2	1	Segment needs are given equal weighting.
Information on customer segments is readily available to staff.	5	4	3	2	1	Staff do not have information on customer segments.
We are continually acquiring new customers	5	4	3	2	1	We are failing to acquire new customers.
The Customer Segments we serve are growing in size.	5	4	3	2	1	The Customer Segments are shrinking.

Table 5.5: Sample of Evaluation questions for Customer Segments.

In Evaluation, using the audit questionnaire discussed and the Business Model map created in activity one, participants are asked to indicate which statement best describes their company. Participants work as a team and objectively discuss each question. Collaboratively they assign a rating between one and five to indicate which statement best describes their company. Ratings are added to provide a score for each heading. This score indicates areas of strength or areas of weakness in relation to PSS. Areas of strength highlight potential areas of Value

Proposition expansion. Areas of weakness highlight potential areas of Value Proposition improvement. These strengths and weaknesses are used as a starting point for the following Advance activity.

5.6.4 Advance Activity

Advance is the third activity of the TIPSS Workshop which initiates the Development phase of the TIPSS Process model. Knowledge transition point K1: Understood Knowledge acts as the primary input into the Development phase so is a significant factor in the Advance Activity.

The objective of the Advance Activity is to facilitate the Development phase by:

- Transitioning focus from product-orientated to PSS orientated value offering.
- Highlighting the role of the customer in the value offering.
- Highlight the additional resources/ skills required for the new value proposition.

K1: Understood Knowledge acts as a driver for the Advance activity by:

- Creating an awareness of the company's strong and weak components in relation to PSS.
- Applying new knowledge of PSS in the context of the current business.
- Allowing expansion of strengths and reduction of weakness through the application of PSS knowledge.

The Evaluation activity is designed to address the Cultural Influencing Factors of Knowledge management and Communication. PSS is affected by customer co-creation and requires a shift away from transactional forms of business to that based on long-term relationships. Therefore, in order to provide an effective PSS, companies transitioning from Goods-dominant to Integrated logic must become more customer-focused. Directly focusing on the customer and their role within the PSS will clarify existing lines of customer communication or gaps in customer communication. In addition it will define the customer relationships required by the proposed PSS and the necessary relationship management processes.

The Advance activity encourages companies to reconsider their customers in relation to their value offering and the customer role within it. This is achieved through the use of two tools:

- **Personas:** Personas are abstractions of groups of real consumers who share common characteristics and needs (Miaskiewicz and Kozar, 2011). They allow the company to consider their Value Proposition from the perspective of their current and potential Customer Segments, to determine customers' main motivation for using and remaining with the company, and to help predict future potential needs and demands.
- **Brainstorming:** A popular tool to generate creative solutions to a problem, brainstorming is useful when a company or team is seeking to break established patterns of thinking and develop new perspectives. This is of particular importance in the context of this research as it motivates and develops multidisciplinary teams, therefore opening communication across departments.

5.6.5 Reiteration

As discussed in Section 5.3.3, reflecting the models researched, the TIPSS Process model is designed to be cyclical allowing repetition of phases if required. When companies have completed the initial Mapping, Evaluation and Advance activities, a second round of Mapping occurs. This takes the PSS concept generated during the Advance activity which displays the highest potential (as determined by the participants), and maps the resources required to deliver it. This forces participants to consider the necessary resources and changes needed to deliver this new value offering. In addition, it offers a simple comparison in relation to the current structure of the company. Weaknesses and areas requiring high levels of change are easily highlighted so companies are aware of the work required to implement the new strategy.

The workshop is designed to facilitate repetition of all activities if required. This allows adaption for specific participant requirements. New concepts which have been mapped can be taken through the Evaluation and Advance activities to gauge their potential. Documents generated through the workshop are intended to be live, and therefore reused and updated as the company progresses through the transition process. This helps maintain an awareness of culture within the company and helps prevent return to familiar, comfortable processes which do not progress the transition.

As discussed, the workshop is designed to provide the initial catalyst for the TIPSS transition process. Once the workshop has been completed, the company expands and implements the new knowledge through the development of PSS concept offerings. It is important to reiterate

that it is not the intention of the TIPSS Process model to transition companies completely from product to service. Rather, the balance between product and service offerings is determined by proposed value proposition. It is intended that through the application of the TIPSS Process model, over time the integration of product and service offerings will become the cultural norm, completing the transition from a Goods-dominant logic to an Integrate logic.

5.6.6 Full Launch Activity

The workshop is only the initiation of the TIPSS Process. Therefore, the Full Launch phase and K2: Actionable Knowledge are not included as both transition and product/ service development require time. Therefore, Full Launch is outside of the workshop remit. The Full launch stage of the TIPSS Process will become evident over the time as companies begin to transition logics and changes to the value offering and company strategy are applied. Full Launch is discussed in relation to the case studies in Chapter Six.

5.7 Conclusions

The reviewed models in Chapter Two do not account for lack of PSS skills, knowledge or awareness which effects the transition from a product-orientated to a PSS orientated. In addition, as discussed in Chapter Four, they do not account for cultural barriers which directly affect the transition from Goods-dominant logic to an Integrated logic which accounts for both product and service requirements. Therefore, a clear failing in the current PSS models has been identified. In this chapter a new model is proposed, the TIPSS Process model, which prescribes the transition of a company from a Goods-dominant logic to an Integrated logic. The model implies that the fundamental requirements of this transition are the knowledge process (discussed in section 5.3.5) and overcoming existing cultural barriers (discussed in section 5.3.4). The model is in a cyclical format to allow repetition for gradual transition. This author contends that this model is an important contribution to the research area as it prescribes the transition process of existing companies while overcoming cultural barriers to change. Accordingly, the TIPSS Workshop was derived as a means to initiate the transition process from the TIPSS Process model perspective.

The TIPSS Workshop proposes to initiate the transition process by coupling information/ knowledge of PSS with identified cultural barriers specified in the TIPSS Process model. Each

stage is designed to allow iteration to both facilitate the learning process i.e. repetition increases familiarity with the process and improve performance; and allow the development of scenarios e.g. a proposed PSS can be taken through the process to determine the effect on the company. A range of tools and methodologies have been used to implement the workshop prototype (i.e. Mapping, Score cards, Personas, Brainstorming). These tools are highly adaptive to allow for the Cultural Influencing Factors which can adversely affect the transition process. The following chapter will discuss the testing and validation of the TIPSS Process model and the results obtained.

CHAPTER SIX

VALIDATION OF THE TIPSS PROCESS MODEL

CHAPTER ABSTRACT:

The purpose of this chapter is to detail, justify and discuss the results of the validation process for the TIPSS Process model. Details of the companies involved in the validation process are given and the results of the case studies discussed.

- 6.1 Introduction**
- 6.2 Case study company overviews**
- 6.3 Data collection methods**
- 6.4 Validation criteria: Cultural indicators**
- 6.5 Company A**
- 6.6 Company B**
- 6.7 Case Study comparison**
- 6.8 Conclusions**

6.1 Introduction

This chapter details the validation of the TIPSS Process Model. The choice of validation methodology largely depends on the nature of the questions being asked. Quantitative research aims to test experimental hypothesis from existing theories and collect data on predetermined instruments, which are then quantified and statistically analysed. In the scope of this research, the chosen method must account for the variable nature of services (as discussed in Chapter Two), people and organisational culture (as discussed in section 3.2). Therefore qualitative methods were best suited to validate the TIPSS Process Model. As discussed in Chapter three, qualitative research facilitates an understanding of social phenomena in the natural setting, often from the perspectives of the participants (Thomson *et al.*, 2011). It has been developed to allow a systematic investigation of how individual participants ‘make sense’ of the world and how they interpret and experience events (Riley and Love, 2000). In the context of this research, qualitative methods can take into account both tacit and explicit information e.g. documentation, opinion or intuitive approaches. This provides insight into the overt human component of the process from staff and customer perspectives which can be overlooked by quantitative methods. More specifically, the qualitative method of case studies was used to validate the TIPSS Process Model. Qualitative data was collected at three points in the research, benchmarking (at the close of the TIPSS Workshop), at the end of the seven month study and at the closing interview (for future plans and feedback). Details of the companies studied, key findings and results from the case study analysis are summarised and presented in this chapter. To begin the discussion, background information for each company studied will be provided.

6.2 Case study company overviews

The methodology used to validate of the TIPSS Process Model was case studies of two companies, selected through a staged review process (as discussed in section 3.3). To initiate the transition process each company undertook the TIPSS workshop (as discussed in Chapter Five) over a single day, facilitated by the author. This initiated the transition process which was monitored over a seven month time period. Both companies fit the basic criteria as developers of Class I Medical Device and were highly product-orientated. When asked, neither company considered themselves to provide any service components. A basic overview of the companies can be found in Table 6.1. The companies will be discussed in more detail in the following section.

Name	Contact	Industry	Size
Company A	VP of Business Development	Medical Device Class I	SME
Company B	Managing Director	Medical Device Class I	SME

Table 6.1: Basic profile of companies used as case studies.

6.2.1 Case Study Company A

Company A is a sub-organisation within a larger manufacturing company. Its strategic focus is to develop new, innovative products separate to those offered by the parent company. Currently, it develops and manufactures wearable health monitoring units which can operate in connected and wireless environments. It is considered to be the leading provider of wearable wireless sensors in the world, shipping to over forty countries worldwide. Initially focusing on assisted living solutions, the company developed their product into an open platform format. This platform allows the product to be tailored to the users' specific requirements, whilst being designed to easily integrate and interact with existing technologies and systems. As a result, the technology can facilitate a broad range of applications e.g. healthcare, rehabilitation, remote patient monitoring and biomechanics. The success of this approach has resulted in the company being predominately technology led.

The company structure consists of a small, tight knit team. Staff roles are diverse, e.g. engineers and developers are also front line staff with direct contact with customers; and the working environment is dynamic, e.g. staff are energetic and enthusiastic, new ideas are welcomed and encouraged. Customers are involved in the early stages of the development process to generate specifications, and after launch to provide informal feedback after product use. As the customer specifies the requirements of the product and the team determine how this is achieved, customer input is an essential prerequisite for the product offering. Conversely, staff feel there is limited systemisation in their current operation. Due to the size of the current team and customer base, this has not yet caused any issues. Staff feel the current approach cannot be maintained if the customer base is to grow. In addition, they feel in order to maintain their current leadership status in wearable wireless sensors, they must find additional value to expand their current offering. They are aware of increasing competition within their market segment and are eager to develop new offerings. Based on changes within the market, the Department Manager is eager to begin the development of integrated products

and services within the company's offering. Additionally, although the company is an entity in itself, changes being implemented must also be verified by the parent company. Therefore, Company A must take into account the culture of the parent company.

6.2.2 Case Study Company B

Company B designs and manufactures custom-made prescription foot orthoses using a combination of manual (e.g. plaster castings) and automated processes (e.g. CNC milling equipment). In addition, the company is the sole provider of a small number of certain over-the-counter (OTC) braces in Ireland. Their primary customers are Orthotic Practitioners who supply the foot casting on which the orthotic unit will be based. An online technical catalogue is used to outline the standard product descriptions and optional shell materials available. A printed form, listing the full range of products and alterations, is used by the Practitioner to select the correct combination for the wearer's individual case. To do this, it is essential that the practitioner is familiar with the manufacturing protocols and the available product range. The casting, along with the completed paper form, is sent to the company, where it is used as a base for the final orthotic. The company strives to provide standard functional orthoses in ten days or less. The company gathers undocumented informal feedback from the practitioners regarding the performance of the product. End users i.e. end wearers of the orthoses, are not involved in the process as they are considered clients of the Practitioner and unrelated to the manufacturing company.

Again, the company structure consists of a small, tight-knit team, operating within a dynamic working environment. The Managing Director provides the technical support and expertise in relation to the product offering. In addition, he runs a private practice which utilises the company's products. This provides firsthand experience in relation to the functionality of the products, direct contact with the end user and an insight into customer needs. The other members of the team are the primary contact for customers. They process orders, alter/ refine products, carry out administrative duties and work hard to establish a strong relationship of trust with customers. Previously, the company could rely on both this strong customer relationships and exclusive supply of products to the Irish market to maintain market share. However, increasing competition and rising costs have meant the company is looking for additional value in an increasingly competitive market.

As can be seen from the previous sections, on a basic level each company meets the same criteria of Class I medical device manufacturer, are of a similar size and are operating in a competitive market. In addition, both companies are product focused and eager to provide additional value offering to their customers. They also represent both extremes of the innovation survey (detailed in section 3.3.2). Therefore, they were considered suitable for inclusion in the case study. In order to accurately and coherently collect data during the duration of a case study, a suitable method must be developed and defined. The data collection method used in this study is detailed in the following section.

6.3 Data collection methods

To create a strong case study, data must be triangulated i.e. collected from several sources. Using multiple data sources provides increased reliability of data and stronger substantiation of constructs and propositions (Barratt *et al.*, 2011). Equally crucial is the investigator-as-instrument because only the human instrument can grasp the interactions of context and the multiple realities that are known through tacit understanding (Riley and Love, 2000). Data collection methods can be structured interviews (interview tool remains fixed), semi-structured interviews (interview tool is updated based on emerging data), observations (e.g. plant tour, attendance at meetings), and archival sources (e.g., documents, historical records, organisational charts, and production statistics). An overview of their strengths and weaknesses are discussed in Table 6.2.

Method	Strengths	Weaknesses
Participant observation	Can obtain a first-hand account and an in-depth understanding. Provides detailed assessment of interpersonal activities.	Not appropriate in many situations. Hard to gain access. Time consuming. Difficulty in assessing objectivity. Potential for Hawthorne effects*.
Observation	First-hand account of events and the context of those events.	Time consuming. Hard to gain access. Potential for Hawthorne effects*.
Interviews	Focus directly on the case study topic. Provides perceived casual inferences.	Interview questions must be systematically developed. Inaccuracies from poor recall. Potential for interviewees to provide interviewers with the answers they want to hear, or to provide socially acceptable answers.
Documentary evidence	Produced outside of the research (objectivity). Electronic communication has created numerous forms of documentation. Precise and consistent. May allow for a review across several years. Can be obtained unobtrusively.	Must be carefully scrutinised for objectivity (what was the purpose of the document's author). May be difficult to access or access may be deliberately blocked.

*A term referring to the tendency of some people to work harder and perform better when they are participants in an experiment.

Table 6.2: Data collection methods for Case Study Development (Johnston *et al.*, 1999).

For the purpose of this research, two primary methods of qualitative research were chosen: Interviews and Documentary evidence. Due to the high IP sensitivity within the companies, it was difficult to gain permission for observation. Instead, semi-structured interviews were conducted through a primary contact within the companies on a regular monthly basis. Additional interviews were held after significant events such as workshops held by the companies, conferences and webinars. Interviewees were asked to discuss activities being undertaken, the rationale for these activities, use of tools presented in the workshop, attitudes of staff, areas of difficulty and future plans. Although a higher level of contact was preferred by this researcher, IP sensitivity and time pressure on staff limited the level of contact. In addition, participants were asked to provide any documentation given to new customers and to forward any documentation (printed and digital) being distributed to existing customers over the duration of the study. This was used to gain insight into documented communication with the customer base. In addition participants were asked to notify of any public messages being provided during the course of the study (e.g. newspaper articles, magazine interviews, blogs).

This author recognises that the majority of information gathered was subjective (based on the opinions of the interviewees and the perception of the reviewer). However, subjective information has been successfully used in a range of studies (Cloutier-Fisher *et al.*, 2011; Schultz *et al.*, 2009; Koehler *et al.* 2009; Herath and Rao, 2009; Schepers and Wetzels, 2007; Soyer *et al.*, 2007). When assessing developments within the company under the cultural indicators (discussed in 5.3.2), data was viewed as objectively as possible, with ratings based on actions taken. Once a data collection methodology suitable to the research had been established, a validation criteria was defined. This specified a series of focused areas with which the companies could be compared over the duration of the study. These validation criteria are discussed in the following section.

6.4 Validation criteria: Cultural indicators

Organisational culture has many dimensions and variations. When organisations wish to provide competitive advantage through service, a shift from a Goods-dominant logic to a Service-dominant or Integrated logic must occur (as discussed in detail in Chapter Four). Transition of manufacturing organisations to service-orientated organisations is a multifaceted effort in which multiple business logics must co-exist (Windahl & Lakemond, 2010; Day *et al.*, 2004). Therefore the intention is not to substitute Goods-dominant logic with Service-

dominant logic. Instead the intention is to transition from a Goods-dominant logic to an Integrated logic where the balance of goods- and service-based offerings differs based on the strategy implemented by the providing company. When transitioning from a Goods-dominant logic to an Integrated logic, regardless of the level of importance of service within the product offering, the organisational culture must adapt/ change to allow the provision of service to occur. Cultural indicators illustrate the degree and extent of these cultural changes. As discussed in Chapter Five (section 5.3.2), Lusch *et al.* (2006) identified eight fundamental differences between a product- and service-orientated culture. These eight fundamental differences provide a list of cultural indicators, and will be used as the validation criteria for the TIPSS Process Model. The methodology for the application of these criteria is discussed below.

6.4.1 Application of Validation criteria

The validation criteria descriptions discuss companies operating solely under a Goods- or Service-dominant logic. As previously stated the intention is not to substitute one logic with another but instead propose an Integrated-logic which offers a value best suited to the company's strategy. In order to determine if a change within the dominant logic has occurred, the case studies were compared against a validation criteria (as detailed in 5.3.2). The companies value offerings were reviewed at three stages over the duration of the study: Benchmarking (at the close of the TIPSS Workshop), at the end of the seven month study and at the closing interview (for future plans and feedback). At the end of each stage, companies were assigned a rating in relation to the extent of transition from a Goods-dominant logic to a Service-dominant logic. Definitions for Rating 1 and Rating 4 are provided by Lusch *et al.* (2006). In order to quantify incremental changes between these ratings, this author expanded the criteria to include two additional ratings (see Table 6.3 for rating summary). This accounts for PSS offerings which offer a combination of products and services and so do fit into Lusch *et al.*'s exclusive product and service definitions.

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Goods vs. Services	Provision of goods only.	Limited services, heavily dependent on goods (e.g. repair, distribution).	Some value added services.	Predominately service based. Products may be tools of service delivery.
Tangible vs. Intangible	Emphasis is placed on the functionality of the product.	Functionality is the predominant focus. Solutions are secondary.	Functionality & solutions are both considered.	Emphasis is placed on the solution provided by the service.
Operant Resources vs. Operand Resources	Value is placed in static resources e.g. machinery, premises, raw materials.	Dynamic resources are considered but value is predominantly static.	Static resources are considered but value is predominantly dynamic.	Value is placed in dynamic resources e.g. customer relationships, staff knowledge.
Asymmetric Info vs. Symmetric Info	Company has strict restrictions on the flow of information.	Flow of information is unrestricted within the company.	Flow of information is unrestricted within the company & select partners.	Information is readily shared/ exchanged amongst trading partners.
Propaganda vs. Conversation	Communication is predominantly done through a third party medium e.g. website, printed media.	Communication is predominantly done through third party media with supporting direct contact.	Communication is done through a combination of third party media & direct communication.	Communication is predominantly done through direct conversation between staff, customers and relevant stakeholders.
Value Added vs. Value Proposition	Value is added to the product through the manufacturing process.	Value is predominantly created through product/ process refinement & supported by customer co-creation.	Value is predominantly created through a co-creation, & supported by product/ process refinement.	Value is created through customer co-creation.
Transactional vs. Relational	Customer interaction is predominantly transactional based. Contact after transaction is minimal/ non-existent.	Customer interaction is predominantly transactional, within moderate contact.	Customer interaction is a combination of transactional and relational.	Customer contact is high. Relational or social contracts are used to created and maintained.
Profit Maximisation vs. Financial Feedback	Profit is maximised through altering of product & processes e.g. improved functionality, process optimisation.	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.	Feedback is actively sought but application is limited.	Companies learn from financial outcomes as it attempts to better serve customers & obtain cash flows for the company.

Table 6.3: Criteria rating summary.

This rating system provides traceability of changes being implemented within each company. The intention is not for companies to transition entirely to a Service-dominant logic (i.e. rate highly across each criteria) but rather to show some changes in relation to Service-dominant logic which are suitable to their own business strategy. Due to the duration of the study, incremental changes to the dominant logic are expected. In the following section, each company is discussed in turn in relation to the validation criteria.

6.5 Company A

The following sections detail the observations made as the company progressed through the TIPSS Process in relation to PSS related developments at the benchmarking stage, over the duration of the study and the PSS related future plans of the company.

6.5.1 Company A Initial Observations

As Company A progressed through the initiation of the TIPSS Process, the TIPSS Workshop, notes were taken in relation to strengths and weaknesses of the workshop, and areas of focus as determined by the company. Observations at each stage of the Workshop (summarised in Figure 6.1) are discussed in the following sections.

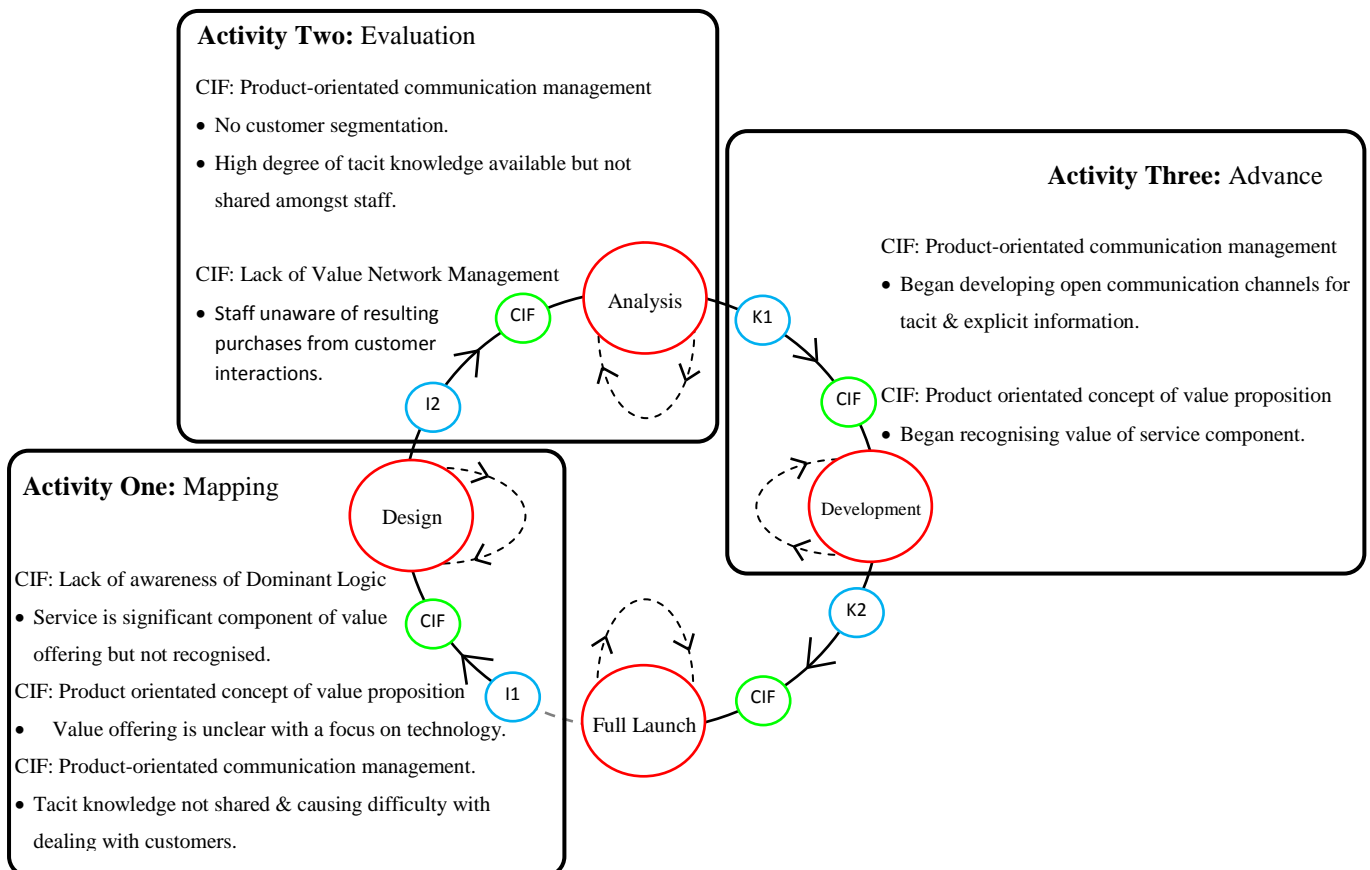


Figure 6.1: Company A TIPSS Process/ Workshop summary

Mapping Activity

As discussed in section 5.6.2, the Mapping activity typically begins with the Value Proposition. During initial trials, this area was undisputed by participants and acted well as an introduction to the overall mapping process. However, with Company A this quickly caused difficulty. The company's products are assemblies of off-the-shelf components combined to meet specific client requirements. Staff claimed that due to the range of function capability, it would be impossible to list them all within the duration of the exercise. This author suggested that, as the components were off-the-shelf, the true Value Proposition was not the functionality of the

units themselves, but the knowledge and skill required to tailor the units to meet customer specifications. This opened discussion in relation to tangible versus intangible value and was facilitated by *new information* (I1 in the TIPSS Process) provided through a case study example. Once this new information was *understood* (I2 in the TIPSS process model), the MD argued that the true value was in the assembly service as, if this was not the case, any unskilled person would be capable of providing the same offering. After discussion, focus changed from product functionality to services being provided within the company.

Once the Value Proposition was determined and agreed upon, discussion began in relation to Customer Segments. This again caused difficulty. Although the core team was small (five core members) and worked in close proximity to each other, communication was fractured. The company endeavoured to have customers serviced by a single staff member. The vast majority of customer information was tacit and as a result staff had little or no knowledge of customers which they did not directly communicate with. This caused significant difficulty and disruption in relation to service provision during staff absence e.g. training, illness, vacation time.

Evaluation Activity

This lack of communication became particularly apparent during Evaluation. Staff became aware that the same level of service was provided to all customers regardless of the financial return. One participant stated '*Anything with customer segment, just give zero. We don't really know who our customers are.*' Staff were provided with little information in relation to transactions e.g. significant portions of time could be spent tailoring a unit for a single low level purchase. This lack of information was further reflected in Revenue Stream. Staff designed the units but were unaware of their relationship of the overall cost/ benefit to the company. In contrast, they were aware of and clear on the inputs required to produce the products e.g. Key Resources, Key Activities, Key Partnerships.

Advance Activity

At this stage of the process, Company A was asked to apply the *understood information* in relation to their own company by using the Persona tool to create an Evangelist (a customer who believes the company provides the ideal products and service), an Average (customers who make up the bulk of the customer base but do not cause any particular difficulties) and a

Hater (a customer who is particularly difficult to please and continuously finds fault with the offering). Initially, participants struggled. As the MD stated *'We're very engineering focused. Sometimes we can forget the customer and focus only on the technology.'* Based on the strengths and weaknesses highlighted by Evaluation, Company A was then asked to brainstorm ideas on how to transform a Hater to an Evangelist, and provide the Evangelist with the same level of product/ service while reducing the cost to the company itself.

Of particular focus was the shift to softer components of the value offering e.g. knowledge and skill required to tailor the unit, established customer relationships, tacit customer knowledge. Staff began to use *understood knowledge* (K1 in the TIPSS Process) to brainstorm ideas on how to share customer knowledge as efficiently and effectively as possible. This would allow another member of staff to serve a customer if the assigned staff was unavailable. This became the primary focus for the duration of the brainstorming session.

On completion of the workshop, the MD asked to retain the completed documents as he wished to continue the session the following day. He was eager to continue the process in-house as he was concerned the engineering focus held by the staff limited the potential for value offering but felt progress had been made during the initial session. In the following section, the position of Company A at the initiation point (Benchmarking) of the TIPSS Process Model is discussed and ranked against the validation criteria.

6.5.2 Company A Part 1/3: Benchmarking

This is the position of the company at the initiation of the TIPSS Process, as commenced by the workshop. This provides the company's position prior to instigating any changes to the value offering. As discussed in Chapter Five, the TIPSS Process model aims to create self-awareness i.e. to establish clearly what they are doing, and rationale why they are doing it. This initial stage of benchmarking provides a base against which changes can be measured and recorded.

'Goods vs. Services' Benchmarking

Company A consider themselves a producer of goods. The interviewee affirmed that *'the view of innovation with the (parent company) is much more about service delivery. Whereas the view of innovation in terms of (this company) is very much more a product innovation stage...'*. Although the company intends to move into service, this has only reached high level discussion at managerial level. It had not yet been finalised as a strategy or discussed with staff. The

interviewee stated that *‘Like everything else, the money is not going to be in the hardware. It probably is for another few years, and from a research point of view it probably is because there is always the next wizziest thing.’* Although the parent company has service components, due to the radical difference in product offering and positioning of Company A as a separate operation, in-house service experience and expertise has been deemed unsuitable for Company A’s applications. Therefore, Company A must determine and develop service components independently. This has caused delay due to staff reluctance, and a lack of knowledge and confidence in relation to how to progress. It was noted during benchmarking that Company A does provide service components which are:

- Low level, heavily product orientated services e.g. maintenance, distribution etc.
- Value added service components e.g. determination of customer requirements and customisation of the units to meet these specific needs.

These were perceived as holding no value. As a result, customers paid for the end product, not the process through which it was tailored. Therefore, as services are predominantly limited and heavily dependent on goods, in relation to the criteria of ‘Goods vs. Services’ Benchmarking, Company A was given a rating of two (see Table 6.4).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Goods vs. Services	Provision of goods only.	Limited services, heavily dependent on goods (e.g. repair, distribution).	Some value added services.	Predominately service based. Products may be tools of service delivery.

Table 6.4: Company A Goods vs. Services benchmark rating.

‘Tangible vs. Intangible’ Benchmarking

Reflecting the company’s perception as a producer of goods, value is placed on the tangible components produced. The company purchases off-the-shelf components from a third party supplier and adapts them to suit the requirements of the customer. The company perceives the true value of their offering to be contained in the combination of the hardware with facilitating software components. The interviewee confirmed that *‘Most of the technology smarts are in this base unit, so we take it that that’s set. Most of our innovation will come from that, be it an ECG or a motion sensing board or something like that. So because 80% of it is set, the innovation is around the last 20% of the smarts.’* This view is further reflected in their

competitor analysis. Competitor kits are bought and analysed in order to determine the functionality of the internal components, *'From a competitor watch point of view we're tend to buy whatever kit comes out and see who's doing what better and different.'* Competitor services are not considered to hold value and therefore are not included in market analysis. As can be seen from the above, the company focuses on the functionality of the product. Therefore, in relation to the criteria of 'Tangible vs. Intangible' Benchmarking, Company A was given a rating of one (see Table 6.5).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Tangible vs. Intangible	Emphasis is placed on the functionality of the product.	Functionality is the predominant focus. Solutions are secondary.	Functionality & solutions are both considered.	Emphasis is placed on the solution provided by the service.

Table 6.5: Company A Tangible vs. Intangible benchmark rating.

'Operand vs. Operant Resources' Benchmarking

Prior to the study, Company A places value on *operand* resources. As discussed earlier, off-the-shelf components are combined together to create tailored value for the customer. The customer pays for the value of the components themselves, not the tailoring of the unit. The interviewee stated that *'The engineering team would go and start disseminating it and start saying ok, that translates to the 5 pieces of wizzy technology we have ... It's going to be roughly like this because again we're not inventing something completely brand new. We're probably just putting something together in a different way.'*

The manager is aware of the high level of Goods-dominant *operant* resources currently available within the body of staff. As the team is predominantly engineers, there is a tendency to focus on technology development rather than customer needs. High workloads make innovation difficult as staff are focused on serving current clients basic needs. The manager contended *'Everyone here is kind of at 110% capacity as it is. It's always, you've got to serve the existing customers. You have to do the innovation piece in your free time almost.'*

Therefore, as the company considers value to be contained in the company's static, tangible resources, in relation to the criteria of 'Operand Resources vs. Operant Resources' Benchmarking, Company A was given a rating of two (see Table 6.6).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Operand Resources vs. Operant Resources	Value is placed in static resources e.g. machinery, premises, raw materials.	Dynamic resources are considered but value is predominantly static.	Static resources are considered but value is predominantly dynamic.	Value is placed in dynamic resources e.g. customer relationships, staff knowledge.

Table 6.6: Company A Operand resources vs. Operant resources benchmark rating.

‘Asymmetric vs. Symmetric Information’ Benchmarking

Company A utilises the in-house manufacturing expertise of the parent company to reduce the number of partners within their network. This is considered a competitive advantage, *‘They don’t then have to go look for someone to manufacture. If something goes wrong or there’s more questions to be asked they talk to us. They don’t have to manage two or three different people. Even if we were subcontracting that out it gets very messy’*. Third party off-the-shelf components are used to provide standard functions. Several components are combined together and coupled with in-house software to meet specific customer needs. Customers are provided with units which provide the desired information but are not provided with *how* the information is produced. This tailored communication retains the majority of sensitive and non-sensitive information within the company and creates an asymmetric flow of information. Therefore, in relation to the criteria of ‘Asymmetric Information vs. Symmetric Information’ Benchmarking, Company A was given a rating of one (see Table 6.7).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Asymmetric Info vs. Symmetric Info	Company has strict restrictions on the flow of information.	Flow of information is unrestricted within the company.	Flow of information is unrestricted within the company & select partners.	Information is readily shared/ exchanged amongst trading partners.

Table 6.7: Company A Asymmetric vs. Symmetric benchmark rating.

‘Propaganda vs. Conversation’ Benchmarking

Company A utilises a combination of media; *‘We would do maybe some PR announcements, or a training course or we’re doing a lot on the multimedia side at the moment where we have stuff on YouTube and Facebook and all that jazz’*, and conversation, *‘We’d usually try to get a couple of reference customers to talk about it.... I suppose no more than everyone else, you kind of follow what the cool people are doing. In research, Harvard, Barclays, those guys, for obvious reasons, people go, ‘Oh if they’re using it, it must be good.’ Just by being held in their*

hand we must be good. The optics of that are very powerful. Company A utilises these high ranking contacts as an introduction to their offering. Information about the product is then provided through the various media channels. Therefore, as communication is done through a combination of direct and third party media, in relation to the criteria of ‘Propaganda vs. Conversation’ Benchmarking, Company A was given a rating of three (see Table 6.8).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Propaganda vs. Conversation	Communication is predominantly done through a third party medium e.g. website, printed media.	Communication is predominantly done through third party media with supporting direct contact.	Communication is done through a combination of third party media & direct communication.	Communication is predominantly done through direct conversation between staff, customers and relevant stakeholders.

Table 6.8: Company A Propaganda vs. Conversation benchmark rating.

‘Value Added vs. Value Proposition’ Benchmarking

The Product Development Manager within Company A raised a concern that the development team is focused on value added, *‘So I think the hardest part at the moment is convincing the engineering team that just because we can do something really wizzy, and we think it’s the best thing in the world, it’s no good if people aren’t going to buy it.’* This is an ongoing difficulty within the team. Instead, value is added through the developments of product functionality and redesign for manufacture i.e. designed for lowest production cost possible. Therefore, in relation to the criteria of ‘Value Added vs. Value Proposition’ Benchmarking, Company A was given a rating of one (see Table 6.9).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Value Added vs. Value Proposition	Value is added to the product through the manufacturing process.	Value is predominantly created through product/ process refinement & supported by customer co-creation.	Value is predominantly created through a co-creation, & supported by product/ process refinement.	Value is created through customer co-creation.

Table 6.9: Company A Value added vs. Value proposition benchmark rating.

‘Transactional vs. Relational’ Benchmarking

A discussed in Propaganda vs. Conversation, Company A has several strong relational ties with key customers, which are used to develop and promote the product, *‘Again we’d be lucky in the relationship we have with these folks that they take these in and they give us great feedback. A*

lot of people pay a lot of money to get access to these folks but for various reasons we've great relations with these folks.' However, in relation to ongoing sale of the product, for the majority of customers contact is limited, 'Probably as you see it there, it's too late to talk about our end customers but that's realistically how it's been happening.' After purchase, a selection of customers are contacted for information regarding the functionality of the product. The manager believes that staff are too focused on the technical side of the business and need to focus on the wants of customers more. Therefore, as the majority of customer contact is through the transactional process, in the criteria of 'Transactional vs. Relational' Benchmarking, Company A was given a rating of two (see Table 6.10).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Transactional vs. Relational	Customer interaction is predominantly transactional based. Contact after transaction is minimal/ non-existent.	Customer interaction is predominantly transactional, within moderate contact.	Customer interaction is a combination of transactional and relational.	Customer contact is high. Relational or social contracts are used to created and maintained.

Table 6.10: Company A Transactional vs. Relational benchmark rating.

'Profit Maximisation vs. Financial Feedback' Benchmarking

Focus within Company A is on profit maximisation as value is placed on the sale of the tangible units, 'I think innovation to us still comes down to brass tacks, revenue.... It has to sell more units to more people.' In addition, Company A was set up to create innovative products which were radically different to that of the parent company. Due to the high risk factor associated with this strategy, financial projections were required to justify the proposed directions, 'We would typically have a range of price points. We'd know what kind of margin we could make. We'd have answered all the technology questions as well as the commercial questions.' Therefore, due to the focus on profit, in relation to the criteria of 'Profit Maximisation vs. Financial Feedback' Benchmarking, Company A was given a rating of two (see Table 6.11).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Profit Maximisation vs. Financial Feedback	Profit is maximised through altering of product & processes e.g. improved functionality, process optimisation.	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.	Feedback is actively sought but application is limited.	Companies learn from financial outcomes as it attempts to better serve customers & obtain cash flows for the company.

Table 6.11: Company A Profit Maximisation vs. Financial Feedback benchmark rating.

Company A Part Benchmarking Summary

For the majority of criteria considered, Company A is primarily Goods-dominant (see Table 6.12 for summary of results). This provides a measurable position of the company prior to the implementation of the process model. In the following section, Company A was studied after initiation of the process model for a period of seven months. The final rating was assigned at the end of the seven month period. The changes seen in relation to the criteria are discussed below.

Goods-dominant vs. Service-dominant	Rating 1-4	Rating Description
Goods vs. Services	2	Limited services, heavily dependent on goods (e.g. repair, distribution).
Tangible vs. Intangible	1	Emphasis is placed on the functionality of the product.
Operand Resources vs. Operant Resources	2	Dynamic resources are considered but value is predominantly static.
Asymmetric Info vs. Symmetric Info	1	Company has strict restrictions on the flow of information.
Propaganda vs. Conversation	3	Communication is done through a combination of third party media & direct communication.
Value Added vs. Value Proposition	1	Value is added to the product through the manufacturing process.
Transactional vs. Relational	2	Customer interaction is predominantly transactional, within moderate contact.
Profit Maximisation vs. Financial Feedback	2	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.

Table 6.12: Company A benchmark summary

6.5.3 Company A Part 2/3: PSS Transition Process

This section details the PSS activities which took place over the duration of the study. Companies were studied for over a seven month period, through monthly interviews and analysis of documentation. An overview of the sequence of activities over the duration of the seven month study as discussed at the scheduled interviews is given in Figure 6.2. A criteria rating was awarded for Company A's degree of transition at the close of the seven month study. Information gathered at these three points were used to explain the changes (or lack thereof) in relation to the studied criteria. The rationale and criteria rating for the PSS development undertaken by Company A are discussed in more detail in the following section.

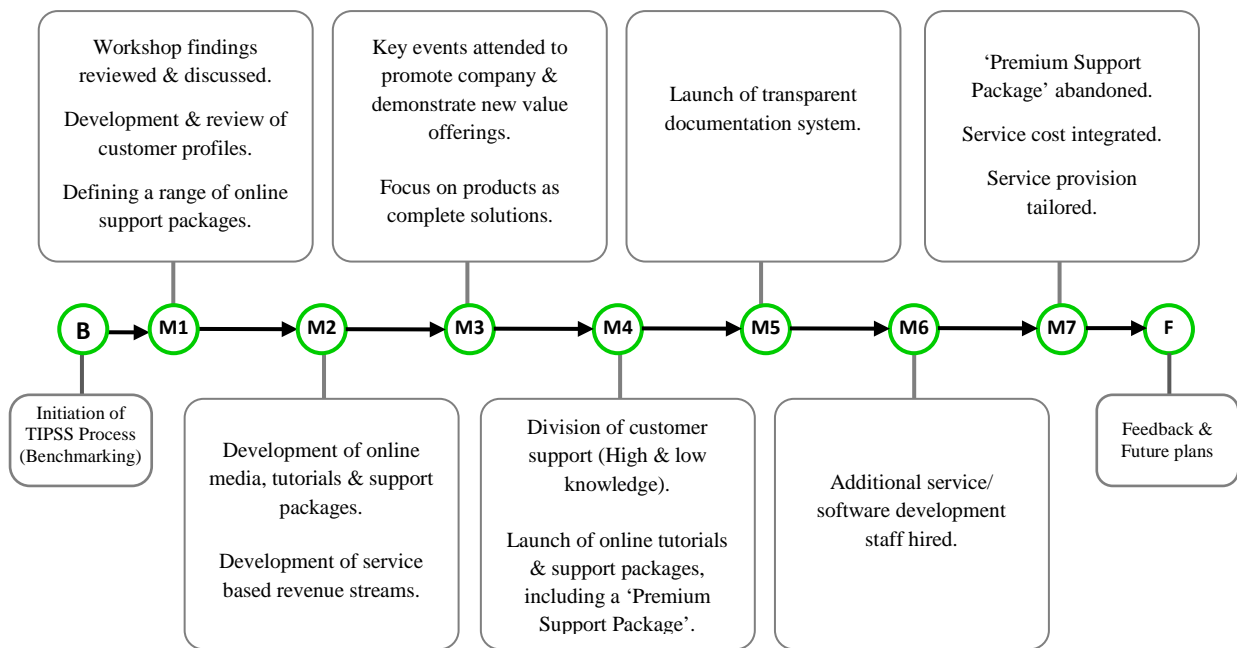


Figure 6.2: Company A monthly report summary

'Goods vs. Services' PSS Transition Process

On initiation of the process, Company A determined that the service component currently provided was a significant factor in their value offering. In response, development of a service based revenue stream began which would complement the product offering. Due to the strong manufacturing background of the parent company, short term financial return pressures, and the small body of staff available, initial focus remained on the tangible products. As service components were refined and supporting software developed, focus began to shift to a combination of product and services. This indicated a transition from the original Goods-dominant culture which considered the services provided to hold no value to a perception of added value services. Therefore, in relation to the criteria of 'Good-dominant vs. Service-dominant' PSS transition process, Company A's rating increased from two to three (see Table 6.13).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Goods vs. Services	Provision of goods only.	Limited services, heavily dependent on goods (e.g. repair, distribution).	Some value added services.	Predominately service based. Products may be tools of service delivery.

Table 6.13: Company A Goods vs. Services PSS transition process rating.

‘Tangible vs. Intangible’ PSS Transition Process

As the study progressed, Company A increasingly focused on the solutions provided through the customisability of their products. As the suite of products (hardware and software) were developed and launched, the ability to provide tailor-made comprehensive units increased. Prior to the study, customers were predominantly supplied with functional product specifications. Highlighted by the customer personas used in the workshop, a division between high and low technological knowledge customers could be seen. As the study continued, customers were increasingly provided with information on potential solutions (e.g. how the company’s technology can deliver their product to market entry point, while substantially cutting development cost and time). This was found to ease communication with customers with lower levels of technological knowledge, while also providing high knowledge customers with additional potential applications. This indicated a transition in the company’s focus from product functionality towards a combination of functionality and solutions. Therefore, in relation to the criteria of ‘Tangible vs. Intangible’ PSS transition process, Company A’s rating was increased from one to three (see Table 6.14).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Tangible vs. Intangible	Emphasis is placed on the functionality of the product.	Functionality is the predominant focus. Solutions are secondary.	Functionality & solutions are both considered.	Emphasis is placed on the solution provided by the service.

Table 6.14: Company A Tangible vs. Intangible PSS transition process rating.

‘Operand vs. Operant Resources’ PSS Transition Process

On initiation of the process, the manager concluded that the company was not charging for the true value offering i.e. customers were charged for the product, not the knowledge and skill utilised in determining and assembling a unit capable of delivering a tailored result. This became particularly apparent when the number of front line staff began to limit the number of potential customers. In response, development of a more efficient and effective service component began. Customers were divided into two groups: high knowledge demand and low knowledge demand. Customers of low demand (i.e. low technical requirements) operated under a ‘building block’ system, using pre-assembled blocks or assembling simple units themselves. This acted as an introductory product for the more sophisticated product offerings.

In addition, a suite of supplementary software products were created which allowed the customer to maximise and tailor information to their requirements. This approach reduced time lost to low level knowledge queries and freed staff to deal with more complex product assemblies and key customers. As the study progressed, the value placed on the service components increased. Three additional staff with expertise in service and application development were hired. These worked in conjunction with the technical engineers to create coherent product/ service combinations. This indicated a significant transition of focus from static resources (i.e. machinery, hardware) to dynamic resources (i.e. staff experience, customer relationships). Therefore, in relation to the criteria of ‘*Operand* vs. *Operant* Resources’ PSS transition process, Company A’s rating was increased from two to three (see Table 6.15).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
<i>Operand</i> Resources vs. <i>Operant</i> Resources	Value is placed in static resources e.g. machinery, premises, raw materials.	Dynamic resources are considered but value is predominantly static.	Static resources are considered but value is predominantly dynamic.	Value is placed in dynamic resources e.g. customer relationships, staff knowledge.

Table 6.15: Company A *Operand* resources vs. *Operant* resources PSS transition process rating.

‘Asymmetric vs. Symmetric Information’ PSS Transition Process

Previously, Company A had difficulty communicating the adaptability and applicability of their units to customers. This was particularly prevalent in customers with low levels of technical knowledge and as a result, low knowledge users consumed a substantial quantity of staff contact time. As *operant* resources gained focus, an online reference library for low level questions was created. As the products are designed to operate with a wide range of outsourced hardware and software, links to commonly used products were also provided. Customers were encouraged to join the company’s online community to discuss applications and results. In addition, an online newsletter was developed. This aimed to keep the customer informed of new product developments (hardware and software) and new areas of application and results gained by current users.

Despite the relatively small customer base, customer information was not readily available to staff. Instead this information was tacit, with staff members dealing with specific customers. As customer numbers increased over the course of the study, this began to cause difficulty. Work began on creating files for customers which contained a synopsis of the user’s research,

product purchases and interactions with the company. Although staff strived to serve specific customers on a repeat basis, the availability of information prevented delays when this was not achievable. This was supported through a transparent documentation system (e.g. schedules, calendars, common documents onto a single shared platform). Therefore, due to this dual increase in information availability, in relation to the criteria of ‘*Operand vs. Operant Resources*’ PSS transition process, Company A’s rating was increased from one to three (see Table 6.16).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Asymmetric Info vs. Symmetric Info	Company has strict restrictions on the flow of information.	Flow of information is unrestricted within the company.	Flow of information is unrestricted within the company & select partners.	Information is readily shared/ exchanged amongst trading partners.

Table 6.16: Company A Asymmetric info vs. Symmetric info PSS transition process rating.

‘Propaganda vs. Conversation’ PSS Transition Process

As discussed in Asymmetric Information vs. Symmetric Information, Company A refined their online media to overcome previous communication difficulties. The online newsletter was sent to all customers, while staff directly contacted key customers. It was used to promote new product developments (hardware and software), strategic partnerships, strategic sponsorship and new developments in the research field.

As done previously, Company A presented at several conferences across a broad range of areas (e.g. Health care, wearable technologies, art and sculpture) over the duration of the study to demonstrate the adaptability of their units. A combination of live demonstrations, customer endorsements and case studies were used to illustrate the benefits of the units. This was combined with several strategic partnerships (i.e. two large universities, Irish and international; and a large international health care company) which received significant media attention (e.g. featured in a BBC news coverage segment). Company A utilised these conferences and partnerships to raise the profile of their company in new geographical markets (e.g. Australia). Although effective, these conferences had a limited audience and were intended to promote the company as a whole rather than open communication with individual customers. Therefore, the increased use of online media for mass communication, coupled with restricted individual customer communication (as discussed in ‘*Operand vs. Operant Resources*’ PSS Developments) resulted in an overall reduction in *conversational* communication.

Accordingly, in relation to the criteria of ‘Propaganda vs. Conversation’ PSS transition process, Company As rating was reduced from three to two (see Table 6.17).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Propaganda vs. Conversation	Communication is predominantly done through a third party medium e.g. website, printed media.	Communication is predominantly done through third party media with supporting direct contact.	Communication is done through a combination of third party media & direct communication.	Communication is predominantly done through direct conversation between staff, customers and relevant stakeholders.

Table 6.17: Company A Propaganda vs. Conversation PSS transition process rating.

‘Value Added vs. Value Proposition’ PSS Transition Process

As the *operant* resources began to increase in importance, emphasis began to shift from functionality to solutions. The development of the software suite allowed customers to create tailored information under several criteria from a single unit and tackle small scale problems first hand. Through this approach Company A aimed to facilitate customers with a deeper understanding of the product to maximise its effectiveness, while reducing the pressure on front line staff. The concept of ‘*giving the customer higher levels of control*’ became a driving force and was a significant marketing tool. This was particularly evident when attending conferences. Products were promoted as potential solutions for a wide number of areas ranging from output of test results, to shortening the time to market. Therefore, due to this significant change in approach, in relation to the criteria of ‘Value Added vs. Value Proposition’ PSS transition process, Company A’s rating was increased from one to three (see Table 6.18).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Value Added vs. Value Proposition	Value is added to the product through the manufacturing process.	Value is predominantly created through product/ process refinement & supported by customer co-creation.	Value is predominantly created through a co-creation, & supported by product/ process refinement.	Value is created through customer co-creation.

Table 6.18: Company A Value added vs. Value proposition PSS transition process rating.

‘Transactional vs. Relational’ PSS Transition Process

Following the process initiation, Company A reviewed their customer base. As discussed in Asymmetric Information vs. Symmetric Information, customer files were created which tracked the items purchased and the level of technical support used. Significant portions of

staff time were consumed by low level questions which required no technical expertise, *'We were having customers phoning up with questions like 'What page of the manual is that on?'* *It was a ridiculous waste of staff time.'* A suite of supplementary products was created to reduce these types of questions (as discussed in *Operand Resources vs. Operant Resources*). This was found to have a significant gain in customer relations as customers had a better grasp of the value offering and staff could provide more substantial support for larger projects.

As a result of this positive response, Company A began development of a 'Premium Support Package'. This separated product and service components (Technical support) into two separate revenue streams. A basic support package which would be provided free of charge as standard and high level support which could be purchased as an additional item. However, as the study progressed this concept was dismissed. Staff feared it would act as a deterrent for potential customers, create a communication barrier, prevent customer relationships forming and limit potential strategic partnerships. Instead, the cost of service provision was incorporated into the overall cost of the unit. This was a significant transition indicator as, previously, the cost of service had not been considered. Staff were made aware of the importance of the customer (based on the percentage revenue provided by the customer) and provided service accordingly. Customers with low level financial return or were overdue on payment received no/ reduced technical support. Small scale questions were redirected to the company site and supporting software. Key customers received uninterrupted support.

Although this approach risked alienating some customers due to a reduction in staff contact, it was felt that the value to be gained through tailored, high value customer contact outweighed the risks. Identifying priority customers prevented waste of staff time on trivial information to low level customers who provided little or no financial return. This allowed staff to build customer relations with individual key customers based on their previous transactions.

Although individual low level customers provided the minority of the financial return, they composed the majority of the total customer number. In addition, the high ratio of customers to staff meant the company relied on the customer to initiate the majority of contact.

Therefore, when rating Company A in relation to 'Transactional vs. Relational' the rating given at Benchmarking was unchanged and remained at a rating of two (see Table 6.19).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Transactional vs. Relational	Customer interaction is predominantly transactional based. Contact after transaction is minimal/ non-existent.	Customer interaction is predominantly transactional, with moderate contact.	Customer interaction is a combination of transactional and relational.	Customer contact is high. Relational or social contracts are used to created and maintained.

Table 6.19: Company A Transactional vs. Financial feedback PSS transition process rating.

‘Profit Maximisation vs. Financial Feedback’ PSS Transition Process

Due to the high risks associated with the development of new products which are radically different to those offered by the parent company, Company A is required to provide scheduled financial reports. Although over the duration of the study it was recognised that the core value was contained in the *operant* resources, it was difficult to justify this through financial traceability. As discussed in ‘Transactional vs. Relational’ PSS Developments, a finite financial charge for services was discussed and dismissed. Instead the company prioritised development of software applications which would both provide an independent revenue stream (i.e. priced software) and increase the effectiveness and efficiency of technical support (e.g. free support software, priority customers). This allowed the customer base to expand and increase revenue. In addition, the focused contact with key customers provided feedback on current offerings and potential product/ service expansion. Therefore, in relation to the criteria of ‘Profit Maximisation vs. Financial Feedback’ PSS transition process, Company A’s rating given at Benchmarking was unchanged and remained at a rating of two (see Table 6.20).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Profit Maximisation vs. Financial Feedback	Profit is maximised through altering of product & processes e.g. improved functionality, process optimisation.	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.	Feedback is actively sought but application of findings are limited.	Companies learn from financial outcomes as it attempts to better serve customers & obtain cash flows for the company.

Table 6.20: Company A Profit maximisation vs. Financial Feedback PSS transition process rating.

Company A PSS Transition Process Summary

As can be seen from Table 6.21, based on the author’s observations, Company A increased its rating in five of the eight validation criteria. This is understandable as these indicators often overlap. For example, as a company becomes more service-orientated, focus on intangibles will increase. The purpose of Company A is to develop innovative products, different to those

already offered by the parent company. As a result of this high-risk position, financial justification is required. Therefore, transactional and profit focus is necessary and the validation criteria for these related factors remain unchanged.

	Benchmarking			PSS Transition	
Goods-dominant vs. Service-dominant	Rating 1-4	Description		Rating 1-4	Description
Goods vs. Services	2	Limited services, heavily dependent on goods (e.g. repair, distribution).	➤	3	Some value added services.
Tangible vs. Intangible	1	Emphasis is placed on the functionality of the product.	➤	3	Functionality & solutions are both considered.
Operant Resources vs. Operand Resources	2	Dynamic resources are considered but value is predominantly static.	➤	3	Static resources are considered but value is predominantly dynamic.
Asymmetric Info vs. Symmetric Info	1	Company has strict restrictions on the flow of information.	➤	3	Flow of information is unrestricted within the company & select partners.
Propaganda vs. Conversation	3	Communication is done through a combination of third party media & direct communication.	➤	2	Communication is predominantly done through third party media with supporting direct contact.
Value Added vs. Value Proposition	1	Value is added to the product through the manufacturing process.	➤	3	Value is predominantly created through a co-creation, & supported by product/ process refinement.
Transactional vs. Relational	2	Customer interaction is predominantly transactional, within moderate contact.	➤	2	Customer interaction is predominantly transactional, within moderate contact.
Profit Maximisation vs. Financial Feedback	2	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.	➤	2	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.

Table 6.21: Company A Position PSS Transition process summary.

What is most significant in the criteria studied is the decrease in rating of the Propaganda vs. Relational criteria. At benchmarking, product tailoring and technical support were provided equally and free of charge to all customers. Over the course of the study, Company A determined that their true value offering was in these services e.g. value was placed on the operant resources within the company. As a result, third party media was developed (i.e. online newsletter, supporting software) and service provision became discriminatory (e.g. low knowledge questions were redirected to the online information and staff directly dealt with high knowledge queries). This is indicative of the worth being attributed to the services (reflected in the increased value placed on operant resources), and so were retained for key customers with high level requirements. This is a significant indicator in the establishment of a PSS culture.

As discussed in Chapter Five, the TIPSS Process model is cyclical. Transition from Good-dominant to Service-dominant logic is a process, with the seven month study as indicative of the initial stage. Therefore, in order for the model to be considered successful, additional changes must be implemented beyond the duration of the study. The following section discusses Company A’s future plans for change.

6.5.4 Company A 3/3: Future plans

Changing dominant culture is a slow and complex process. The duration of this study only indicates the initial changes implemented. For that reason, in the closing interview Company A was asked to indicate its future plans e.g. intentions to extend current offerings, implement new changes or offering. These intentions are detailed below.

‘Goods vs. Services’ future plans

Company A has received positive financial and customer based results in relation to their new approach. In response, the company intends to focus their strategy on software and service development. This will be achieved through a combination of outsourced base components, in-house manufacturing capabilities of the parent company, highly trained staff with expertise in engineering, service and app development. Therefore, due to this significant change in focus, in relation to the criteria of ‘Goods vs. Services’ future plans Company A’s rating was increased from three to four (see Table 6.22).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Goods vs. Services	Provision of goods only.	Limited services, heavily dependent on goods (e.g. repair, distribution).	Some value added services.	Predominately service based. Products may be tools of service delivery.

Table 6.22: Company A Goods vs. Services future plans.

‘Tangible vs. Intangible’ future plans

Currently Company A has launched eleven base products, which can be tailored through the addition of supporting units, and one fee based software platform, with an additional three in development. With the change in company focus to *operant* resources, the company intends to move further into service, software and application development. However, the fundamental functionality of the base products provides the base on which the services can tailor the unit.

Therefore, due to this coupling of functionality and solution, in relation to the criteria of ‘Tangible vs. Intangible’ future plans Company A’s rating remains at three (see Table 6.23).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Tangible vs. Intangible	Emphasis is placed on the functionality of the product.	Functionality is the predominant focus. Solutions are secondary.	Functionality & solutions are both considered.	Emphasis is placed on the solution provided by the service.

Table 6.23: Company A Tangible vs. Intangible future plans.

‘Operand vs. Operant Resources’ future plans

Currently there are eight engineering staff and three software/ service developers. The company intends to hire additional software/ service developers (eventually equalising the number of staff in each discipline) to ensure a cohesive balance of knowledge for their tangible and intangible offerings. Although value in *operant* knowledge is increasing (reflected in the hiring of specialised staff), this is coupled with the functionality of the base units. Therefore, in relation to the criteria of ‘Operand Resources vs. Operant Resources’ future plans Company A’s rating remains at three (see Table 6.24).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Operand Resources vs. Operant Resources	Value is placed in static resources e.g. machinery, premises, raw materials.	Dynamic resources are considered but value is predominantly static.	Static resources are considered but value is predominantly dynamic.	Value is placed in dynamic resources e.g. customer relationships, staff knowledge.

Table 6.24: Company A Operand vs. Operant future plans

‘Asymmetric vs. Symmetric Information’ future plans

The company is satisfied that the shared platform allows staff to effectively capture, transfer and communicate data. As the company and its customer base grows, this will be reviewed to ensure a transparent customer information system. As manufacturing capabilities are also provided in-house by the parent company, Company A must maintain a level of information retention in order to protect IP. Therefore, due to this balance of information availability, in relation to the criteria of ‘Asymmetric Information vs. Symmetric Information’ future plans Company A’s rating remains at three (see Table 6.25).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Asymmetric Info vs. Symmetric Info	Company has strict restrictions on the flow of information.	Flow of information is unrestricted within the company.	Flow of information is unrestricted within the company & select partners.	Information is readily shared/ exchanged amongst trading partners.

Table 6.25: Company A Asymmetric info vs. Symmetric Info future plans.

‘Propaganda vs. Conversation’ future plans

Company A is moving into new geographical markets with indicate significant market potential. However, the company is relatively unknown there. Prior projects have shown that strategic partners and conferences (which provide opportunities to meet customers face-to-face) have proven to be most effective when trying to break into new markets. Therefore, the company has begun discussions with leading researchers in high ranking universities and booked several conferences in target locations. For existing customers, Company A plans to further refine their current support service based on customer expenditure and strategic potential. Therefore, in relation to the criteria of ‘Propaganda vs. Conversation’ future plans Company A’s rating remains at two (see Table 6.26).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Propaganda vs. Conversation	Communication is predominantly done through a third party medium e.g. website, printed media.	Communication is predominantly done through third party media with supporting direct contact.	Communication is done through a combination of third party media & direct communication.	Communication is predominantly done through direct conversation between staff, customers and relevant stakeholders.

Table 6.26: Company A Propaganda vs. Conversation future plans.

‘Value Added vs. Value Proposition’ future plans

Through the provision of supporting software and increased customer control, Company A discovered a wider range of applications and results than anticipated. It intends to review these new applications and the resulting benefits for potential product and service concepts and promotional material. Due to the strong in-house manufacturing capabilities, Company A prides itself on providing quality products at low prices. This refinement of manufacture is a staple of their development process and is intended to remain. Therefore, due to a continuation of current strategic plans, in relation to the criteria of ‘Value Added vs. Value Proposition’ future plans Company A’s rating remains at three (see Table 6.27).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Value Added vs. Value Proposition	Value is added to the product through the manufacturing process.	Value is predominantly created through product/ process refinement & supported by customer co-creation.	Value is predominantly created through a co-creation, & supported by product/ process refinement.	Value is created through customer co-creation.

Table 6.27: Company A Value added vs. Value proposition future plans.

‘Transactional vs. Relational’ future plans

Company A aims to continue its segregation of customers and products into high and low service requirements/ demand. Previously support was given without discretion. As the technical service is now seen as a key component in the value offering, the company aims to further develop the service offering. Based on the success of its current service approach, it intends to maximise its service output through tailored contact. Products (i.e. standalone software components) are also planned for development. This will create a separate revenue stream and allow staff to focus on key customers. Therefore, in relation to the criteria of ‘Transactional vs. Relational’ future plans Company A’s rating remains at two (see Table 6.28).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Transactional vs. Relational	Customer interaction is predominantly transactional based. Contact after transaction is minimal/ non-existent.	Customer interaction is predominantly transactional, within moderate contact.	Customer interaction is a combination of transactional and relational.	Customer contact is high. Relational or social contracts are used to created and maintained.

Table 6.28: Company A Transactional vs. Relational future plans.

‘Profit Maximisation vs. Financial Feedback’ future plans

As discussed in ‘Transactional vs. Relational’ and ‘Value Added vs. Value Proposition’, Company A are adapting their value offering to maximise profit (e.g. streamlining service provision for key customers) and financial feedback (e.g. information gathered through customer interaction is used to gather market feedback, promotional information and generate new concepts). By integrating the gathered information into new product/ service development, the company aim to supply coherent and highly organised product/ service combinations which can be applied to future offerings.

The company are aware that, due to the intangible nature of services, they are difficult to quantify. Additionally, as the current product and manufacturing processes are established, Company A is eager to illustrate the direct (financial return) and indirect (customer satisfaction and retention) gains offered by the new product/ service to strengthen their position within the parent company. As a result, the company intends to take a more proactive role in customer feedback. Therefore, in relation to the criteria of ‘Profit Maximisation vs. Financial Feedback’ future plans Company A’s rating increase from two to four (see Table 6.29).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Profit Maximisation vs. Financial Feedback	Profit is maximised through altering of product & processes e.g. improved functionality, process optimisation.	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.	Feedback is actively sought but application is limited.	Companies learn from financial outcomes as it attempts to better serve customers & obtain cash flows for the company.

Table 6.29: Company A Profit maximisation vs. Financial Feedback future plans.

Company A future plans summary

When considering future plans, seven of the eight validation ratings remain unchanged (see Table 6.30 for summary). This is understandable as the new strategy is at a preliminary stage. Changes have not been implemented for sufficient length of time to determine if they have achieved a significant positive result. Therefore, Company A was reluctant to consider any additional changes in relation to its value offering or business strategy. This is further reflected in the increase of the ‘Profit Maximisation vs. Financial Feedback’ rating. Company A intends to focus on gathering feedback on its current offering and idea generation for future projects. As discussed previously, Company A is a subset in a larger parent company. It must justify and validate any change in direction/ strategy through financial projections and return. As a result, future plans for additional changes are modest as feedback and data are collected to advocate the changes already made.

Goods-dominant vs. Service-dominant	PSS Transition			Future	
	Rating 1-4	Description		Rating 1-4	Description
Goods vs. Services	3	Some value added services.	➤	4	Predominately service based. Products may be tools of service delivery.
Tangible vs. Intangible	3	Functionality & solutions are both considered.	➤	3	Functionality & solutions are both considered.
Operand Resources vs. Operant Resources	3	Static resources are considered but value is predominantly dynamic.	➤	3	Static resources are considered but value is predominantly dynamic.
Asymmetric Info vs. Symmetric Info	3	Flow of information is unrestricted within the company & select partners.	➤	3	Flow of information is unrestricted within the company & select partners.
Propaganda vs. Conversation	2	Communication is predominantly done through third party media with supporting direct contact.	➤	2	Communication is predominantly done through third party media with supporting direct contact.
Value Added vs. Value Proposition	3	Value is predominantly created through a co-creation, & supported by product/ process refinement.	➤	3	Value is predominantly created through a co-creation, & supported by product/ process refinement.
Transactional vs. Relational	2	Customer interaction is predominantly transactional, within moderate contact.	➤	2	Customer interaction is predominantly transactional, within moderate contact.
Profit Maximisation vs. Financial Feedback	2	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.	➤	4	Companies learn from financial outcomes as it attempts to better serve customers & obtain cash flows for the company.

Table 6.30: Company A Position future plans summary

The three sections above break the case study research into three distinct areas. However, the transition from one dominant-culture to another is an interlinking process. Therefore, it is beneficial to consider the each stage as a step within a single process. In the following section a short summary of the transition across the three stages is given.

6.5.5 Company A case study overview

As can be seen from the summary (shown in Table 6.31), Company A has implemented significant changes in relation to transitioning from a Goods- to a Service-dominant culture. At Benchmarking, ratings (validated by staff themselves) clearly indicate that Company A was product focused. Although management was eager to implement service components into the offering, they were unsure how to progress. On initiation of the TIPSS Process, changes were quickly implemented as it provided the direction and knowledge for the provision of service components. The most significant change was the recognition of service as being a significant component of the value offering. Service was taken into consideration in the costings of the units and service provision tailored for high/ low priority customers. This is still a new strategy for Company A. This approach had not previously been applied and the company lacks experience to quickly gain an understanding of the success/ failure of the new service strategy. Therefore, intended future plans were modest in relation to earlier changes. Instead of

considering further changes, the company focused on quantifying the success of the current product/ service offering. This is reflected in the increased rating of the ‘Profit Maximisation vs. Financial Feedback’ criteria.

As discussed previously, the intention is not to substitute one dominant logic for another but to find a balance between each factor suitable for the business strategy. As discussed above, the balance of goods and service components is individual to the company strategy. In the following section, the transition process of Company B is discussed.

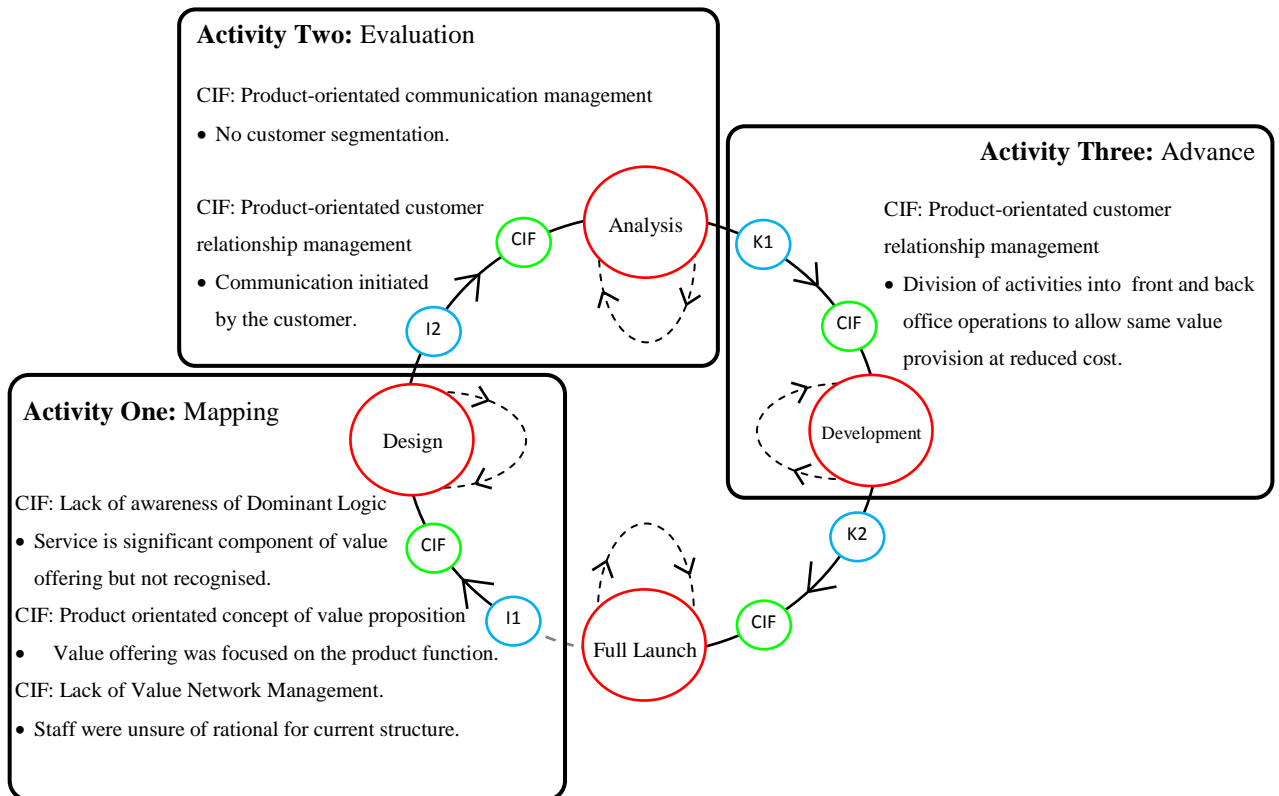
Goods-dominant vs. Service-dominant	Benchmarking		PSS Transition		Future	
	Rating 1-4	Description	Rating 1-4	Description	Rating 1-4	Description
Goods vs. Services	2	Limited services, heavily dependent on goods (e.g. repair, distribution).	3	Some value added services.	4	Predominately service based. Products may be tools of service delivery.
Tangible vs. Intangible	1	Emphasis is placed on the functionality of the product.	3	Functionality & solutions are both considered.	3	Functionality & solutions are both considered.
Operant Resources vs. Operand Resources	2	Dynamic resources are considered but value is predominantly static.	3	Static resources are considered but value is predominantly dynamic.	3	Static resources are considered but value is predominantly dynamic.
Asymmetric Info vs. Symmetric Info	1	Company has strict restrictions on the flow of information.	3	Flow of information is unrestricted within the company & select partners.	3	Flow of information is unrestricted within the company & select partners.
Propaganda vs. Conversation	3	Communication is done through a combination of third party media & direct communication.	2	Communication is predominantly done through third party media with supporting direct contact.	2	Communication is predominantly done through third party media with supporting direct contact.
Value Added vs. Value Proposition	1	Value is added to the product through the manufacturing process.	3	Value is predominantly created through a co-creation, & supported by product/ process refinement.	3	Value is predominantly created through a co-creation, & supported by product/ process refinement.
Transactional vs. Relational	2	Customer interaction is predominantly transactional, within moderate contact.	2	Customer interaction is predominantly transactional, within moderate contact.	2	Customer interaction is predominantly transactional, within moderate contact.
Profit Maximisation vs. Financial Feedback	2	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.	2	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.	4	Companies learn from financial outcomes as it attempts to better serve customers & obtain cash flows for the company.

Table 6.31: Company A Validation Criteria summary

6.6 Company B

6.6.1 Company B Initial observations

As Company B progressed through the TIPSS Workshop, several observations were noted. These relate to the use of the workshop tools, and the particular areas of interest and focus highlighted by the company. Observations are discussed under each workshop stage in the following section and summarised in Figure .



6.3: Company B TIPSS Process/ Workshop summary

Mapping Activity

On the initial mapping, Company B focused on the tangible offerings provided to customers. As the activity continued, utilising *New information* (I1 in the TIPSS Process) provided through case studies, staff became increasingly comfortable with service terminology and the canvas itself. Using Post-its to place information onto the canvas provided a tactile tool which was easily changed (e.g. Post-its moved from one block to another), was highly visible (e.g. different colour Post-its for current and proposed components) and allowed all staff to contribute (e.g. each participant was provided with Post-its and pens).

Referencing back to the example used to illustrate a traditional product-orientated company transitioning to PSS, staff increasingly *understood the information* (I2 in the TIPSS Process) and discussion moved towards intangibles. The MD stated that *'That trust we've built up, I really think we have something we can build on there.'* As mapping continued, Value Proposition and Customer relationships became the primary focus. This was of particular interest as the company had previously experienced difficulty with several customers e.g. late payment, high time demand for low financial return. As the company progressed through the activity, discussion was facilitated by this author by querying the reason/ rationale behind the current structure. This highlighted discrepancies as some staff were unaware of rationales (processes were already established when they began working for the company) or held different views and understandings of reasoning behind processes and approaches.

As the mapping activity continued, the number and frequency of new concept ideas increased. When mapping was complete, several new and under-utilised Value Propositions were highlighted. In addition concepts for improving/ expanding the current offering had also been generated. In order to evaluate the current company offering, participants were asked to consider only those currently being provided for the Evaluation stage of the Workshop i.e. new concepts generated were parked until later in the workshop.

Evaluation Activity

This stage of the process proved difficult at times, due to some unfamiliar terminology and a high number of questions and disagreements between participants in relation to the company's rating. In order to provide a true evaluation of the current company, discussion/ debate of ratings were welcomed. In order for a rating to be accepted, all participants had to agree. The map, created in the Mapping activity, was particularly useful during these discussions, as it provided an agreed illustration of the current company structure. Finalised ratings were entered into a reference sheet and placed beside the Mapping Canvas. This provided a simple illustration of the areas of weaknesses and strengths as defined by the staff themselves.

Evaluation further opened discussion in relation to the rationale for current products, approaches and processes. For example, when discussing Customer Segments, the MD believed that all customers could not be segmented as they all fit into the same category of Orthotic Practitioner. Staff argued that customers could be categorised into several segments e.g. mass consumers/ low consumers, high technical demand/ low technical demand, strategic

partners. This highlighted both the high degree of interaction between frontline staff and customers and customer knowledge being overlooked.

Of particular interest to Company B at the Evaluation stage were Customer Segments, Value Proposition, Customer Relations and Evaluation. Using the new *understood information* (I2 in the TIPSS Process), Company B recognised the value in their customer relationships but found it was not fully developed or utilised. Of particular concern was the lack of Value Proposition evaluation. Feedback was gained ad-hoc through informal phone conversations when customers placed new orders. There was no means of capturing any problems or new applications of products. Due to the time restriction on the workshop, Company B was asked to choose the most prominent concern and strength to take onto the Advance activity.

Advance Activity

As with Company A, Company B were asked to use the Persona tool to create an Evangelist, an Average and a Hater based customer. Strategic partners were quickly selected as Evangelists. These companies work with Company B in relation to product development and endorsement. A long term customer was selected for the Hater, *'I've gotten to the point that I avoid answering the phone to him'*.

To transition the *understood information* into *understood knowledge* (I2 and K1 in the TIPSS Process), Company B was asked to brainstorm ideas on how to transform a Hater to an Average, and how to provide the Evangelist with the same level of product/ service while reducing the cost to the company itself. This cost reduction exercise was of particular interest to Company B. Although it had previously undertaken cost reduction exercises, they had not considered it from the customer perspective, *'I hadn't considered it like that before. You always think the customer will have to lose something to bring costs down'*. This broke operations into two segments, customer facing operations and back office operations. Based on the Evaluation, Customer Relations were highlighted as a significant component in their value offering. As a result, in the initial Brainstorming, concepts focused on how the customer interaction process could increase its efficiency and effectiveness.

On completion of the TIPSS Workshop, Company B was enthused and eager to begin work on developing PSS concepts. They requested both the documents generated in their workshop and a soft copy to allow additional iterations involving the remainder of the staff. The following

section details the benchmarking of Company B gained at the initiation of the TIPSS process, the workshop. This provides a start point against which to measure changes over the course of the study.

6.6.2 Company B 1/3: Benchmarking

This section discusses the position of Company B at the initiation of the process. This provides a unified explanation of the structure, approach and priorities of current company operations.

‘Goods vs. Services’ Benchmarking

Prior to the workshop, Company B perceived itself to be a provider of product, *‘We’ve always maintained this position. We’re custom made. We realise now that people want them. They keep asking for them so while we have them, sell them.’* Using a plaster moulding of the foot supplied by the practitioner, a base insole is created. Utilising an ‘a la carte’ system, orthotic practitioners can then add additional components to the base unit creating a customised insole for the end user. In addition, the company is considering diversifying from their current primary product to increase profits, *‘We’re looking at an over-the-counter product, so mass produced rather than custom made. It’s something we want to introduce to our existing customer base.’* Therefore, due to the company’s own perception of its value offering, in relation to the criteria of ‘Goods vs. Services’ Benchmarking Company B was given a rating of two (see Table 6.32).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Goods Vv. Services	Provision of goods only.	Limited services, heavily dependent on goods (e.g. repair, distribution).	Some value added services.	Predominately service based. Products may be tools of service delivery.

Table 6.32: Company B Goods vs. Services Benchmarking rating

‘Tangible vs. Intangible’ Benchmarking

Company B’s primary customer is the practitioner, not the end user of the cast itself. The practitioner selects the construction of the cast to resolve the customer’s medical issue. Therefore, at this stage of the study, there is a gap between the direct beneficiary of the solution and the producing company. Instead, emphasis is placed on the tangible products being produced (e.g. accuracy of parts produced, quality of finish) rather than the benefits derived from the cast. The manager stated *‘We have a refurbishment, modification suite as part of*

what we do. We have all of the equipment, all of the materials.’ Therefore, due to the high focus on tangible resources, in relation to the criteria of ‘Tangible vs. Intangible’ Benchmarking, Company B was given a rating of one (see Table 6.33).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Tangible vs. Intangible	Emphasis is placed on the functionality of the product.	Functionality is the predominant focus. Solutions are secondary.	Functionality & solutions are both considered.	Emphasis is placed on the solution provided by the service.

Table 6.33: Company B Tangible vs. Intangible Benchmarking rating

‘Operand Resources vs. Operant Resources’ Benchmarking

Operant resources (the knowledge and skill used to produce, market and sell the product) are considered. Admin staff are positioned as information and knowledge touch points for available products, *‘A big part of our customer relationship is our technical support. They’re constantly calling us and saying “We’ve got this patient and I’ve done this. What would you recommend?”’* In addition, the MD utilises his expertise of orthotics to provide additional professional advice if required, *‘It’s building that loyalty. It’s getting them to have confidence in you as a producer, a supplier and seeking your professional opinion.’* However, these are considered only as channels through which to sell and promote the tangible products. Focus is still predominantly on the functionality and financial value of the product. Therefore, in relation to the criteria of ‘Operand resources vs. Operant resources’ Benchmarking, Company B was given a rating of two (see Table 6.34).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Operand Resources vs. Operant Resources	Value is placed in static resources e.g. machinery, premises, raw materials.	Dynamic resources are considered but value is predominantly static.	Static resources are considered but value is predominantly dynamic.	Value is placed in dynamic resources e.g. customer relationships, staff knowledge.

Table 6.34: Company B Operand vs. Operant Benchmarking rating

‘Asymmetric Information vs. Symmetric Information’ Benchmarking

Company B aims to have a free flow of information concerning their products to allow practitioners to create effective combinations of features. Although information from the company is steadily available, feedback regarding the application and effectiveness of the

products is limited, *‘We could do more. I think we could be talking to them more.... A lot of the time it’s the podiatrists coming to you between patients.’* The company believes that the lack of proactive communication and information gathering results in missed opportunities for customer relationship and product development. Therefore, due to the restricted communication with customers, in relation to the criteria of ‘Asymmetric vs. Symmetric’ Benchmarking, Company B was given a rating of two (see Table 6.35).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Asymmetric Info vs. Symmetric Info	Company has strict restrictions on the flow of information.	Flow of information is unrestricted within the company.	Flow of information is unrestricted within the company & select partners.	Information is readily shared/ exchanged amongst trading partners.

Table 6.35: Company B Asymmetric Info vs. Symmetric Info Benchmarking rating

‘Propaganda vs. Conversation’ Benchmarking

Company B utilises a combination of third party media and conversation. In order to establish new customers, Company B attends conferences, holds workshops and advertises in relevant media, *‘We could advertise in a professional journal to try to get new customers.’* As the company supplies clinics, single key contacts (e.g. large clinics with several practitioners, military bases, professional football clubs) can have significant yield in relation to product sales. Therefore, relationships with key customers are actively maintained and provided with free samples of any new products. As a result, due to the high level of speciality in this medical field, these contacts act as marketing for the company by spreading word of the new products available, *‘Most of the time they’ll be referred in some way. So they’ll either have heard someone else using the product or we will have approached them or they’ll have seen an advertisement or a conference or a workshop.’* In contrast, smaller customer communication is typically done online or through published media and communication with staff is limited. Therefore, due to the combination of direct and third party media, in relation to the criteria of ‘Propaganda vs. Conversation’ Benchmarking, Company B was given a rating of three (see Table 6.36).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Propaganda vs. Conversation	Communication is predominantly done through a third party medium e.g. website, printed media.	Communication is predominantly done through third party media with supporting direct contact.	Communication is done through a combination of third party media & direct communication.	Communication is predominantly done through direct conversation between staff, customers and relevant stakeholders.

Table 6.36: Company B Propaganda vs. Conversation Benchmarking rating

‘Value Added vs. Value Proposition’ Benchmarking

In order to convince key customers of the value of their products, Company B provide free samples which are worn by the practitioners themselves, ‘*A big part of our customer relationship is firsthand experience*’. This was found to be the most effective method of conveying the quality and functionality of the products as it provides an opportunity to demonstrate the adaptability of the product to individual requirements, ‘*You make that judgement based on the clinical evaluation. Do they need custom? Do they go over the counter?*’ The product is co-created with the practitioner as they provide the key information used to create the tangible product. Company B ensures that the product provided is of a high quality and finish. Therefore, due to the high level of customer co-creation, in relation to the criteria of ‘Value Added vs. Value Proposition’ Benchmarking, Company B was given a rating of three (see Table 6.37).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Value Added vs. Value Proposition	Value is added to the product through the manufacturing process.	Value is predominantly created through product/ process refinement & supported by customer co-creation.	Value is predominantly created through a co-creation, & supported by product/ process refinement.	Value is created through customer co-creation.

Table 6.37: Company B Value Added vs. Value Proposition Benchmarking rating

‘Transactional vs. Relational’ Benchmarking

The interaction between the company and the customer is dependent on the level of importance assigned to the customer. For example, a single practitioner with low volume sales will predominantly be transactional. With larger customers, for example military bases and football clubs, relationships are established, ‘*We have regular customers who we’ve built up strong relationships with. First name basis. They make up the bulk of our customers.... There’s*

confidence in that because there's a relationship there,' and maintained, 'It's a big part of what we do because they say when they phone us or email us we respond quickly'. For larger customers, Company B may go beyond its standard offering and offer bespoke products, 'That's where we can say "we can do that but we need to sell X amount at a time".' This further solidifies these key relationship and increases loyalty. These relationships are considered an essential part of the business operations. However, as discussed in 'Asymmetric Information vs. Symmetric Information' these relationships are reactive. Customers contact Company B with requests and receive a quick response. Communication with customers beyond the transactional are limited. Therefore, in relation to the criteria of 'Transactional vs. Relational' Benchmarking, Company B was given a rating of two (see Table 6.38).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Transactional vs. Relational	Customer interaction is predominantly transactional based. Contact after transaction is minimal/ non-existent.	Customer interaction is predominantly transactional, within moderate contact.	Customer interaction is a combination of transactional and relational.	Customer contact is high. Relational or social contracts are used to created and maintained.

Table 6.38: Company B Transactional vs. Relational Benchmarking rating

'Profit Maximisation vs. Financial Feedback' Benchmarking

Company B consciously develops customer relations to ensure repeat custom. Establishing themselves as providers of quality tailored products with strong technical and professional support has provided repeat custom. In addition to this, repeat revenue is generated from the end user through the sale of insurance, *'We have insurance on our custom made ones....Every two years they're given the option to renew it.'* However, it is felt that valuable information on how best to serve current customers and future wants/ needs of potential customers is being lost. The interviewee stated *'You could get feedback. You could be saying to them 'what is it you do? What do you want us to design? This is what we can do.'* As discussed in Transactional vs. Relational, communication beyond that required to complete a transaction is limited. Complaints are quickly dealt with, and informal feedback gathered through transactional communication but not recorded. In addition, the company is currently reviewing outgoings and actively trying to reduce process costs (e.g. delivery costs, reduce production times). Therefore, in relation to the criteria of 'Profit Maximisation vs. Financial Feedback' Benchmarking, Company B was given a rating of two (see Table 6.39).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Profit Maximisation vs. Financial Feedback	Profit is maximised through altering of product & processes e.g. improved functionality, process optimisation.	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.	Feedback is actively sought but application is limited.	Companies learn from financial outcomes as it attempts to better serve customers & obtain cash flows for the company.

Table 6.39: Company B Profit Maximisation vs. Financial Feedback Benchmarking rating

Company B Benchmarking summary

As can be seen from the above discussion, for the majority of criteria considered, Company B considers itself to be primarily Goods-dominant (see Table 6.40).

Goods-dominant vs. Service-dominant	Rating 1-4	Rating 2
Goods vs. Services	2	Limited services, heavily dependent on goods (e.g. repair, distribution).
Tangible vs. Intangible	1	Emphasis is placed on the functionality of the product.
Operant Resources vs. Operant Resources	2	Dynamic resources are considered but value is predominantly static.
Asymmetric Info vs. Symmetric Info	2	Flow of information is unrestricted within the company.
Propaganda vs. Conversation	3	Communication is done through a combination of third party media & direct communication.
Value Added vs. Value Proposition	3	Value is predominantly created through a co-creation, & supported by product/ process refinement.
Transactional vs. Relational	2	Customer interaction is predominantly transactional, within moderate contact.
Profit Maximisation vs. Financial Feedback	2	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.

Table 6.40: Company B benchmark summary

Company B also features several strong Service-dominant components such as customer co-creation and customer relationships. During the workshop, these were discussed as areas upon which to build new value offerings. In the following section, the transition of Company B over the period of the case study is discussed.

6.6.3 Company B 2/3: PSS Transition process

Company B created a list of actions and potential opportunities based on the work carried out in the workshop. This was then shared and developed further with the remainder of the staff in an inhouse summary meeting. The Business map was placed in a prominent area within the

main office and was used to facilitate discussion. An overview of the sequence of activities over the duration of the seven month study as discussed at the scheduled interviews is given in Figure 6.3. As with Company A, criteria rating for this section of analysis was awarded for Company B's position at the close of the seven month study. Information gathered was used to rationale any changes which occurred over the duration of the study. Developments throughout the seven month study are detailed in the following sections.

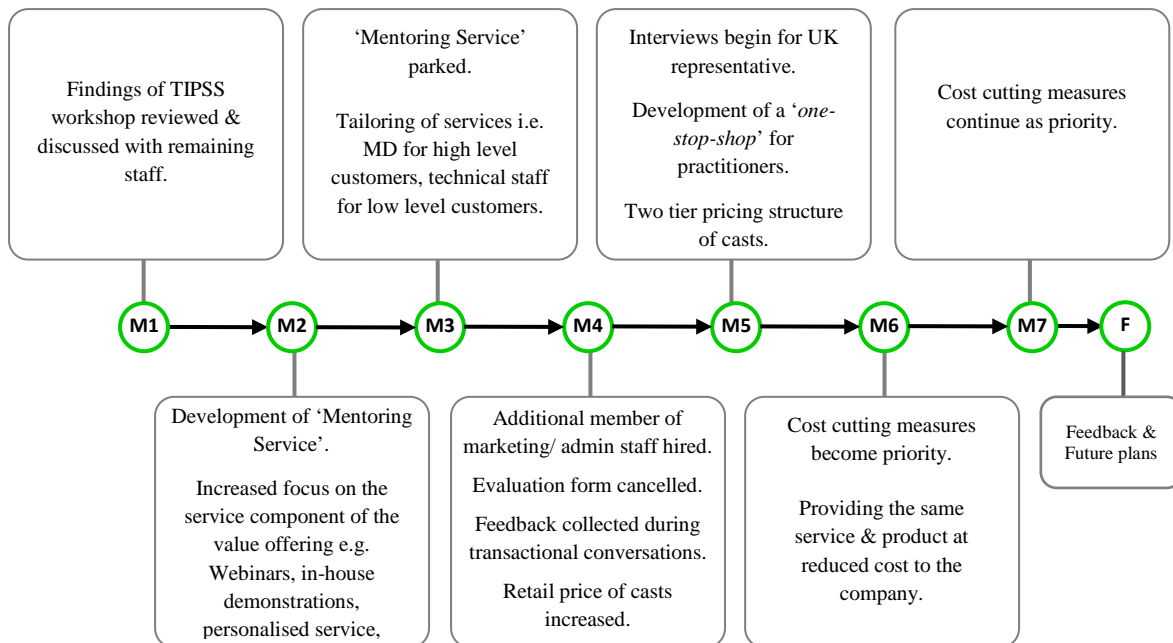


Figure 6.4: Company B monthly report summary

'Goods vs. Services' PSS Transition process

On completion of the workshop, participants realised they provided a service component (i.e. technical support and professional advice) which constitutes a significant component of the value offering. This had been disregarded as a standard part of company operations which held little value.

Early in the study, the company began to consider providing a mentoring service, which would be sold separate to that of the core product offering. This had the potential to provide an independent revenue stream by building on the professional knowledge of the MD, and increasing sales through product marketing. Initial research was begun in relation to developing this service. After review, it was determined that as a substantial part of the in-house expertise was provided by the MD, placing him offsite for mentoring would remove a substantial *operant* resource. Therefore, the mentoring service never came to fruition.

As the study progressed, Company B increasingly emphasised the service component of their value offering to potential customers. As discussed in further detail in Profit Maximisation vs. Financial Feedback, although services were considered to hold some value, they continued to be seen as secondary to the tangible product. Therefore, in relation to the criteria of ‘Goods vs. Services’ PSS Transition process, Company B’s rating remained at two (see Table 6.41).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Goods vs. Services	Provision of goods only.	Limited services, heavily dependent on goods (e.g. repair, distribution).	Some value added services.	Predominately service based. Products may be tools of service delivery.

Table 6.41: Company B Goods vs. Services PSS Transition process rating

‘Tangible vs. Intangible’ PSS Transition process

As discussed in section 6.6.2, initially the company placed emphasis on the tangible components of the product (e.g. accuracy, quality of the finished product). Following the initiation of the process, focus shifted to the intangible components of the value offering (e.g. professional advice, technical support). The value of this was further highlighted by the endorsement of key customers (e.g. military bases, football clubs). However, as the number of customers grew, staff workload to maintain these service components became unmanageable (discussed further in *Operand Resources vs. Operant Resources*). As the number of staff began to limit the provision of service, company focus began to return to the tangible product (discussed further in Profit Maximisation vs. Financial Feedback). Staff continued to provide knowledge and assistance, but as its provision could not be structured or guaranteed, it could not be marketed as a component of their value offering. Although solutions were offered to the customer (i.e. tailored products with professional service) it could not be the primary focus due to variability of service. Therefore, in relation to the criteria of ‘Tangible vs. Intangible’ PSS Transition process, Company B’s rating increased from one to two (see Table 6.42).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Tangible vs. Intangible	Emphasis is placed on the functionality of the product.	Functionality is the predominant focus. Solutions are secondary.	Functionality & solutions are both considered.	Emphasis is placed on the solution provided by the service.

Table 6.42: Company B Tangible vs. Intangible PSS Transition process rating

‘Operand Resources vs. Operant Resources’ PSS Transition process

Prior to TIPSS, Company B placed value on the *operant* resources within the company. Technical support and in-house expertise was available to customers if requested. Following the initiation of the process, the focus on *operant* resources increased. The company determined that in addition to product information and professional advice, their service offered reassurance and confidence to the customer. Due to a relatively low number of key customers providing high product sales, the company was able to actively provide personalised services. Additional effort was made to regularly contact customers for feedback on the products and the service itself.

As the study progressed, the pressure on staff to maintain such services began to become unmanageable. It was recognised that, as the only qualified orthotic member of staff, the MD was unable to cope with the quantity of customers seeking professional advice in addition to his other duties. Due to financial pressure, Company B was unable to hire a second professionally trained staff member. Instead, an additional member of staff was hired on a part-time basis to undertake marketing duties. This allowed the MD to focus on the components of the business which required his expertise e.g. key customer advice, expansion into new product ranges. However, the predominant focus remained on increasing the product range (see Value Added vs. Value Proposition). Therefore, due to the continuing focus on static resources, in relation to the criteria of ‘Operand Resources vs. Operant Resources’ PSS Transition process, Company B’s rating remains at two (see Table 6.43).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Operand Resources vs. Operant Resources	Value is placed in static resources e.g. machinery, premises, raw materials.	Dynamic resources are considered but value is predominantly static.	Static resources are considered but value is predominantly dynamic.	Value is placed in dynamic resources e.g. customer relationships, staff knowledge.

Table 6.43: Company B Operand Resources vs. Operant Resources PSS Transition process rating

‘Asymmetric Information vs. Symmetric Information’ PSS Transition process

Prior to TIPSS, Company B was aware of a unidirectional flow of information i.e. information concerning the products was provided by the company but minimal information from the customer was collected. They considered themselves to be passive in relation to complaints and performance measures. It was decided that a more active method of data collection was

needed. After completing the workshop, staff brainstormed potential methods for data collection. Initially, an evaluation card was developed which was distributed to all customers. This was considered unsuccessful as the information provided was limited, personal opinions were difficult to capture and speed and rate of return was slow.

As the study progressed and the use of services increased, contact with customers was used to gather information in relation to the performance of the product. This approach allowed lines of communication to remain open with key customers and create a free flow of information. As staff already operated with significant workloads, regular contact could not be scheduled. Due to the high level of repeat custom, staff utilised customer contact to gather information regarding product performance. This allowed an additional benefit to be derived from an already existing service. Feedback was gathered into a customer file which was made readily available to all staff. Due to the nature of the products (orthotics are consumable and are required on a relatively regular basis) repeat customer information could be gathered on a regular basis i.e. feedback on products and samples. Therefore, due to an increase in information availability, in relation to the criteria of ‘Asymmetric Information vs. Symmetric Information’ PSS Transition process, Company Bs rating was increased from two to three (see Table 6.44).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Asymmetric Info vs. Symmetric Info	Company has strict restrictions on the flow of information.	Flow of information is unrestricted within the company.	Flow of information is unrestricted within the company & select partners.	Information is readily shared/ exchanged amongst trading partners.

Table 6.44: Company B Asymmetric Info vs. Symmetric Info PSS Transition process rating

‘Propaganda vs. Conversation’ PSS Transition process

On completion of workshop, the company broke down the various methods with which they interact with their customers:

- Website (containing company details and catalogue of products).
- Journal advertising.
- Word-of-mouth (through key customers).
- Conferences/ Symposiums (Endorsements by key customers and company stand).

- New customer pack (printed media sent to potential customers who leave details through any of the above methods).

These were reviewed to determine their effectiveness. It was found that face-to-face customer interactions (whether from the company staff themselves or indirectly through their key customers) were significantly more effective than third party media. Therefore, Company B began to refocus efforts on maximising the effectiveness of this approach through established means. As discussed in *Operand vs. Operant*, where possible the company aimed to provide professional services for key customers through the MD. Staff focused on smaller customers which required lower levels of technical knowledge. This segregation was found to both improved customer relationships and conversational marketing (word-of-mouth). As discussed, efforts were made to capture product feedback and customer/ market knowledge through these interactions. In addition, in order to provide the same face-to-face service for their UK customers, Company B began interviews for a UK representative. Therefore, due to the increase in direct communication, in relation to the criteria of ‘Propaganda vs. Conversation’ PSS Transition process, Company B’s rating was increased from three to four (see Table 6.45).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Propaganda vs. Conversation	Communication is predominantly done through a third party medium e.g. website, printed media.	Communication is predominantly done through third party media with supporting direct contact.	Communication is done through a combination of third party media & direct communication.	Communication is predominantly done through direct conversation between staff, customers and relevant stakeholders.

Table 6.45: Company B Propaganda vs. Conversation PSS Transition process rating

‘Value Added vs. Value Proposition’ PSS Transition process

Company B recognised that the validity of their value offering was solidified through endorsements by their key customers. To build on this, work began on developing webinars, which would demonstrate the application of the products and some of the prominent case studies. Based on the activities carried out in the TIPSS workshop, Company B recognised a key offering was a trustworthy source of information. As a result, the company positioned their webinars as educational tools. Their main focus was to provide information on the range of products available, the range of ailments to which they can be applied, the benefits to the end user and the ease of use for the practitioner.

In addition, work began on creating a ‘one-stop-shop’ for practitioners. Consumable materials, commonly used by practitioners, were added to the company’s product offering. Alternate delivery methods were reviewed to shorten the time from order to delivery. Through these activities the company aimed to provide all requirements for custom and over-the-counter products through a single contact, therefore streamlining the process. This was intended to create additional value for the customer and increase customer loyalty. This built upon the existing co-creative components which refining the supply and demand process. Therefore, in relation to the criteria of ‘Value Added vs. Value Proposition’ PSS Transition process, Company B rating remained at three (see Table 6.46).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Value Added vs. Value Proposition	Value is added to the product through the manufacturing process.	Value is predominantly created through product/ process refinement & supported by customer co-creation.	Value is predominantly created through a co-creation, & supported by product/ process refinement.	Value is created through customer co-creation.

Table 6.46: Company B Value Added vs. Value Proposition PSS Transition process rating

‘Transactional vs. Relational’ PSS Transition process

The primary product offered by Company B was customer made orthotics, the sale of which was heavily driven by a close customer relationship. As discussed in *Operand Resources vs. Operant Resources*, as the number of customers increased, the small number of staff struggled to maintain these relationships. In response, the company began to review their total customer base and re-evaluate their value offering. The company began to develop/ expand a range of over-the-counter (OTC) insoles. This offered a cheaper alternative for milder cases and required a minimal service component in comparison to their primary offering. The OTCs provided a second revenue stream with low running costs, and were positioned as an introductory product to their primary value proposition. The MD stated ‘*The customer will think “If I feel this good with an off-the-shelf, imagine what a custom one will do.”*’ This allowed staff to focus on establishing and maintaining relationships with key customers, while offering quick alternatives for low priority customers.

In addition, development of an in-house demo began. Several key companies (existing and potential customers) would be invited on-site for a demonstration of the products. This offered the opportunity to showcase the premises, meet the MD (professional contact) and staff

(technical support). This aimed to ‘*put a face to the voice on the other end of the line*’ and create the personal links between staff and customers. Therefore, due to the segregation of customer contact, in relation to the criteria of ‘Transactional vs. Relational’ PSS Transition process, Company B’s rating was increased from two to three (see Table 6.47).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Transactional vs. Relational	Customer interaction is predominantly transactional based. Contact after transaction is minimal/ non-existent.	Customer interaction is predominantly transactional, within moderate contact.	Customer interaction is a combination of transactional and relational.	Customer contact is high. Relational or social contracts are used to created and maintained.

Table 6.47: Company B Transactional vs. Relational PSS Transition process rating

‘Profit Maximisation vs. Financial Feedback’ PSS Transition process

As the study continued, financial restrictions began to delay the implementation of changes. Although the company had a high level of repeat custom, the overall financial return was insufficient. Key customers were charged a standard base fee per cast, regardless of the number of additional features. To relieve financial pressure, the base fee per cast was increased. However, three of the largest key customers complained. As the company could not afford to lose their custom, instead it split the cost of the base fee into two levels, high ranking key customers (high numbers ordered on a repeat basis) and low ranking customers (low numbers ordered on a repeat basis). As discussed in Transactional vs. Relational, the company began supplying OTC products as they offered a new financial stream while requiring a minimal service component.

In addition, the company began to consider cost cutting measures which ‘*provided the same experience for the customer but at a lower cost to us. Is there anything we can stop doing for our customers?*’ Customers were contacted three months prior to the expiry of the insurance on their custom cast. Delivery and material costs were reviewed and an alternative supplier offering the same level of service was sourced. In previous years, the company had presented at several specialist conferences. Instead, based on the response levels of previous years, a single conference was selected. Therefore, due to the focus on cost cutting measures, in relation to the criteria of ‘Profit Maximisation vs. Financial Feedback’ PSS Transition process, Company B remains at a rating of two (see Table 6.48).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Profit Maximisation vs. Financial Feedback	Profit is maximised through altering of product & processes e.g. improved functionality, process optimisation.	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.	Feedback is actively sought but application is limited.	Companies learn from financial outcomes as it attempts to better serve customers & obtain cash flows for the company.

Table 6.48: Company B Profit Maximisation vs. Financial Feedback PSS Transition process rating

Company B PSS Transition process summary

On review, Company B increased in four of the eight validation criteria (see Table 6.49). After completing the TIPSS workshop, staff concluded that a significant component of their value offering was provided through service. This service element was heavily intertwined with the product and therefore could not be isolated e.g. separate charge for services. Newly developed services were still heavily reliant on products (e.g. workshops and demonstrations). Due to a lack of in-house expertise (i.e. a single professional practitioner on staff) specialised service options were limited. As the study progressed, financial strain increased and as a result, focus shifted away from radical change to incremental (i.e. employ small changes to increase efficiency and effectiveness of service components already present in the business operations). This is reflected in the non-movement of four of the eight validation criteria. The company focused on providing the same service to customers while reducing the cost to the company.

Goods-dominant vs. Service-dominant	Benchmarking			PSS Transition	
	Rating 1-4	Description		Rating 1-4	Description
Goods vs. Services	2	Limited services, heavily dependent on goods (e.g. repair, distribution).	➤	2	Some value added services.
Tangible vs. Intangible	1	Emphasis is placed on the functionality of the product.	➤	2	Functionality is the predominant focus. Solutions are secondary.
Operand Resources vs. Operant Resources	2	Dynamic resources are considered but value is predominantly static.	➤	3	Static resources are considered but value is predominantly dynamic.
Asymmetric Info vs. Symmetric Info	2	Flow of information is unrestricted within the company.	➤	3	Flow of information is unrestricted within the company & select partners.
Propaganda vs. Conversation	3	Communication is done through a combination of third party media & direct communication.	➤	3	Communication is done through a combination of third party media & direct communication.
Value Added vs. Value Proposition	3	Value is predominantly created through a co-creation, & supported by product/ process refinement.	➤	3	Value is predominantly created through a co-creation, & supported by product/ process refinement.
Transactional vs. Relational	2	Customer interaction is predominantly transactional, within moderate contact.	➤	3	Customer interaction is a combination of transactional and relational.
Profit Maximisation vs. Financial Feedback	2	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.	➤	2	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.

Table 6.49: Company B PSS Transition process summary

As discussed, Company B supplied service components prior to the workshop but they were disregarded as holding little value. During the study, several attempts to implement a wider range of higher value services was undertaken but were limited by financial and staffing restrictions. The following section discusses Company B's future plans for implementation of additional changes.

6.6.4 Company B 3/3: Future plans

As previously discussed, cultural change is a gradual process. Significant changes require time beyond the scope of this research. For that reason, Company B was asked to indicate future plans and intentions for the business strategy. These were reviewed in light of the validation criteria and discussed in the following section.

‘Goods vs. Services’ Future plans

Company B has considered developing a mentoring plan utilising in-house expertise and experience of orthotics. As this would require additional in-house orthotic practitioners, this is considered to be a long term future plan.

For the more immediate future, Company B plans to improve their current offering through streamlining and new management approaches. For example, priority customers will automatically be assigned a staff member who will consistently deal with their queries and orders. As services will continue to be heavily reliant on products, in relation to the criteria of ‘Goods vs. Services’ Future plans, Company B’s rating remains unchanged at two (see Table 6.50).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Goods vs. Services	Provision of goods only.	Limited services, heavily dependent on goods (e.g. repair, distribution).	Some value added services.	Predominately service based. Products may be tools of service delivery.

Table 6.50: Company B Goods vs. Services rating future plans

‘Tangible vs. Intangible’ Future plans

As discussed earlier, during the study Company B began to develop a ‘one-stop-shop’ for practitioners, providing both custom fit orthopaedic units and supplementary products e.g. strapping, plaster, OTC insoles. Staff have a high level of knowledge of the custom products being offered but are less familiar with the new supplementary products being sold. To offer a comprehensive ‘one-stop’ solution, Company B intends staff to gain a comprehensive knowledge of all product offerings, custom and supplementary. This will allow staff to suggest and provide complete list of requirements with a high level of technical knowledge over the whole product range through a single supplier. Although not offering any additional services then those already provided, the focus of the service offering has altered to a more solution based approach. Therefore, in relation to the criteria of ‘Tangible vs. Intangible’ Future plans, Company B’s rating increased from two to three (see Table 6.51).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Tangible vs. Intangible	Emphasis is placed on the functionality of the product.	Functionality is the predominant focus. Solutions are secondary.	Functionality & solutions are both considered.	Emphasis is placed on the solution provided by the service.

Table 6.51: Company B Tangible vs. Intangible rating future plans

‘Operand Resources vs. Operant Resources’ Future plans

During the study, Company B attempted to offer additional service elements as part of their value offering. Due to a limited number of staff, these additional service components could not be offered consistently. Although the company strongly feels there is potential in these extended services, they are currently unable to hire additional staff for the increased workload. Although they do intend to revisit this avenue in the future, they have prioritised UK sales staff (as discussed in ‘Propaganda vs. Conversation’ PSS Developments). This person would provide a face-to-face service (similar to that currently provided in their Irish business) which would allow their offering to be tailored for the UK market. This additional knowledge will allow the company to target two distinct markets with the intention to increase revenue with little change to current tangible resources. Therefore, due to the increased consideration of dynamic resources, in relation to the criteria of ‘Operand Resources vs. Operant Resources’ Future plans Company B was given an increased rating from two to three (see Table 6.52).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Operand Resources vs. Operant Resources	Value is placed in static resources e.g. machinery, premises, raw materials.	Dynamic resources are considered but value is predominantly static.	Static resources are considered but value is predominantly dynamic.	Value is placed in dynamic resources e.g. customer relationships, staff knowledge.

Table 6.52: Company B Operand Resources vs. Operant Resources rating future plans

‘Asymmetric Information vs. Symmetric Information’ Future plans

As discussed in ‘Transactional vs. Relational’ PSS Transition process (Pg 174), Company B began holding demonstrative workshops showcasing custom and over-the-counter products. Due to the strong positive response, these workshops will be continued. In addition, companies will be strategically chosen to allow dialogue between potential and established customers. Although staff knowledge and customer relationships are considered key within the companies processes, they are difficult to demonstrate. Company B hopes that by pairing potential and

established customers in an open format, this aspect of their offering will be highlighted.

Therefore, as Company B hopes to establish open dialogue between customers, in relation to the criteria of ‘Asymmetric Info vs. Symmetric Info’ Future plans, Company B was given an increased rating from three to four (see Table 6.53).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Asymmetric Info vs. Symmetric Info	Company has strict restrictions on the flow of information.	Flow of information is unrestricted within the company.	Flow of information is unrestricted within the company & select partners.	Information is readily shared/ exchanged amongst trading partners.

Table 6.53: Company B Asymmetrical vs. Symmetrical rating future plans

‘Propaganda vs. Conversation’ Future plans

As can be seen from ‘Asymmetric Information vs. Symmetric Information’ Future plans, Company B intends to increase the use of conversational interaction between customers as a key marketing tool. Due to the nature of the product (customised for individual cases), it was found this format of promotion revealed additional benefits (e.g. staff knowledge, high quality and finish of customised units) was difficult to communicate through third party media. However, due to the high level of staff time required for each workshop, third party media will remain as the predominant communication tool for low level customers and mass communication (new product launches, published papers). Therefore, in relation to the criteria of ‘Propaganda vs. Conversation’ Future plans Company B rating remains at three (see Table 6.54).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Propaganda vs. Conversation	Communication is predominantly done through a third party medium e.g. website, printed media.	Communication is predominantly done through third party media with supporting direct contact.	Communication is done through a combination of third party media & direct communication.	Communication is predominantly done through direct conversation between staff, customers and relevant stakeholders.

Table 6.54: Company B Propaganda vs. Conversation rating future plans

‘Value Added vs. Value Proposition’ Future plans

Company B has extended their product offerings (over-the-counter insoles, supplementary products) and services (webinars, in-house workshops) and have received positive feedback.

There are no immediate future plans to extend these offerings. Due to financial and staff restrictions, the company intends to refocus its efforts on refining its offering to reduce overall costs e.g. streamlining/ reducing documentation, sourcing cheaper suppliers and delivery methods. Therefore, due to the increased focus on cost cutting measures, in relation to the criteria of ‘Value Added vs. Value Proposition’ Future plans Company B’s rating was reduced from three to two (see Table 6.55).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Value Added vs. Value Proposition	Value is added to the product through the manufacturing process.	Value is predominantly created through product/ process refinement & supported by customer co-creation.	Value is predominantly created through a co-creation, & supported by product/ process refinement.	Value is created through customer co-creation.

Table 6.55: Company B Value Added vs. Value Proposition rating future plans

‘Transactional vs. Relational’ Future plans

Although Company B recognises customer relations as a strong component of the value offering, they are concerned that this will limited the potential size of the customer base due to the small number of staff. Therefore, communication will continue to be based on the relative size of the customer (as discussed in ‘Goods vs. Services’ and ‘Propaganda vs. Conversation’ Future plans). This will be further supported by communication between relevant companies, encouraged to interact through the in-house demonstrations (as discussed in ‘Propaganda vs. Conversation’ Future plans). Therefore, in relation to the criteria of ‘Transactional vs. Relational’ Future plans Company B remains at a rating of three (see Table 6.56).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Transactional vs. Relational	Customer interaction is predominantly transactional based. Contact after transaction is minimal/ non-existent.	Customer interaction is predominantly transactional, within moderate contact.	Customer interaction is a combination of transactional and relational.	Customer contact is high. Relational or social contracts are used to created and maintained.

Table 6.56: Company B Profit Transactional vs. Relational rating future plans

‘Profit Maximisation vs. Financial Feedback’ Future plans

For the duration of the study, profit maximisation was a continuous concern, ‘*It’s something that we always have to think about*’. As discussed in ‘Value Added vs. Value Proposition’

Future plans’, focus will remain on reducing the overall outgoings, while providing the same level of value offering to the customer. As staff already have a significant workload, Company B does not intend to actively contact customers in relation to feedback, but gather information during transactions. This is then used to keep an up-to-date customer file. Therefore, due to the ad hoc collection of customer feedback, in relation to the criteria of ‘Profit Maximisation vs. Financial Feedback’ Future plans Company B remains at a rating of two (see Table 6.57).

Goods-dominant vs. Service-dominant	Rating 1	Rating 2	Rating 3	Rating 4
Profit Maximisation vs. Financial Feedback	Profit is maximised through altering of product & processes e.g. improved functionality, process optimisation.	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.	Feedback is actively sought but application is limited.	Companies learn from financial outcomes as it attempts to better serve customers & obtain cash flows for the company.

Table 6.57: Company B Profit Maximisation vs. Financial rating future plans

Company B future plans summary

As can be seen from Table 6.58, Company B increased its ratings in three of the eight validation criteria. The company had already initiated several changes based on the TIPSS initiation findings, and services became recognise as a substantial part of their value offering. However, due to increasing financial pressure, it focused future plans on internal processes. They were satisfied with their current value offering and did not wish to expand into new areas. Instead, future activities prioritised cost reduction activities to reduce financial outgoings while providing the same product/ service offering to the customer. This is most evident in ‘Value added vs. Value Proposition’ Future Plans which received a lower criteria rating then that awarded at the PSS Transition point. As a result, future plans for changes are low as any radical developments require financial investment. This reflects the changing and potentially unstable economic environment in which the company operates.

Goods-dominant vs. Service-dominant	PSS Transition			Future	
	Rating 1-4	Description		Rating 1-4	Description
Goods vs. Services	2	Some value added services.	➤	2	Limited services, heavily dependent on goods (e.g. repair, distribution).
Tangible vs. Intangible	2	Functionality is the predominant focus. Solutions are secondary.	➤	3	Functionality & solutions are both considered.
Operand Resources vs. Operant Resources	3	Static resources are considered but value is predominantly dynamic.	➤	3	Static resources are considered but value is predominantly dynamic.
Asymmetric Info vs. Symmetric Info	3	Flow of information is unrestricted within the company & select partners.	➤	4	Information is readily shared/ exchanged amongst trading partners.
Propaganda vs. Conversation	3	Communication is done through a combination of third party media & direct communication.	➤	3	Communication is done through a combination of third party media & direct communication.
Value Added vs. Value Proposition	3	Value is predominantly created through a co-creation, & supported by product/ process refinement.	➤	2	Value is predominantly created through product/ process refinement & supported by customer co-creation.
Transactional vs. Relational	3	Customer interaction is a combination of transactional and relational.	➤	3	Customer interaction is a combination of transactional and relational.
Profit Maximisation vs. Financial Feedback	2	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.	➤	2	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.

Table 6.58: Company B Position future plans summary

In order to gain a cohesive overview of the transitions undergone in Company B, each section discussed will be considered as a stage within a single process. In the following section a short summary of the transition across the three stages is given.

6.6.5 Company B case study overview

As shown in the summary table 6.59, Company B has implemented moderate changes in relation to transitioning from a Goods- to a Service-dominant culture. At Benchmarking, Company B did not consider itself as a provider of any services. At initiation of the process, it recognised that staff knowledge and strong customer relations were factors of their value offering. Several efforts were made to expand these service factors (i.e. mentoring classes, webinars, workshops, professional/ technical advice). Services were still viewed as sale/ marketing channels for the tangible products. As the study progressed, the additional requirements on staff time to provide these services became unmanageable. Company B began a new approach, prioritising customers, refining and streamlining processes to maximise the efficiency of service components. The primary drive was to reduce the overall financial

outgoings while providing the same level of service/ products to the customer. As financial pressure accumulated, this became an increasing focus which carried through into future plans. Unlike Company A, Company B did not implement any radical changes to their value offering. Instead, changes were incremental over several areas. Although, this provided small improvements over a broad range of areas, it did not offer any extensive changes. This is reflected in the decreasing or unchanging rating across four of the validation criteria.

Goods-dominant vs. Service-dominant	Benchmarking		PSS Transition		Future	
	Rating 1-4	Description	Rating 1-4	Description	Rating 1-4	Description
Goods vs. Services	2	Limited services, heavily dependent on goods (e.g. repair, distribution).	2	Some value added services.	2	Limited services, heavily dependent on goods (e.g. repair, distribution).
Tangible vs. Intangible	1	Emphasis is placed on the functionality of the product.	2	Functionality is the predominant focus. Solutions are secondary.	3	Functionality & solutions are both considered.
Operand Resources vs. Operant Resources	2	Dynamic resources are considered but value is predominantly static.	3	Static resources are considered but value is predominantly dynamic.	3	Static resources are considered but value is predominantly dynamic.
Asymmetric Info vs. Symmetric Info	2	Flow of information is unrestricted within the company.	3	Flow of information is unrestricted within the company & select partners.	4	Information is readily shared/ exchanged amongst trading partners.
Propaganda vs. Conversation	3	Communication is done through a combination of third party media & direct communication.	3	Communication is done through a combination of third party media & direct communication.	3	Communication is done through a combination of third party media & direct communication.
Value Added vs. Value Proposition	3	Value is predominantly created through a co-creation, & supported by product/ process refinement.	3	Value is predominantly created through a co-creation, & supported by product/ process refinement.	2	Value is predominantly created through product/ process refinement & supported by customer co-creation.
Transactional vs. Relational	2	Customer interaction is predominantly transactional, within moderate contact.	3	Customer interaction is a combination of transactional and relational.	3	Customer interaction is a combination of transactional and relational.
Profit Maximisation vs. Financial Feedback	2	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.	2	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.	2	Profit is maximised through altering of product & processes. Feedback is gathered on an ad hoc basis.

Table 6.59: Company B Validation Criteria summary

As discussed above, the overall results from both case studies were positive. Companies felt they had a better grasp of service and were eager to proceed with its implementation. Further

conclusions drawn from a case study comparison will be discussed in detail in the following section.

6.7 Case Study comparison

A comparison of case studies undertaken can help reveal trends which can facilitate the application of the TIPSS process. When compared, five key similarities between the case studies can be seen (summarised in Table 6.60).

Case Study Similarities
Services were provided but not recognised as part of the value offering
Poor communication amongst staff
Service provision based on customer segmentation
Underestimation of service resource requirements
Customer perception of value offering

Table 6.60: Summary of Case Study similarities

6.7.1 Comparison finding one: Service perception

At benchmarking, when asked if they provided any services to their customers, both companies stated that they didn't. However, on review, both companies provided services which constituted a significant proportion of their value offering. Both companies held a traditional view of services (i.e. stand alone, charged separately). As a result, because products were tangible items which were exchanged for monetary value, services were overlooked and underrated. As the study progressed, the value of services were increasingly recognised and promoted to customers.

6.7.2 Comparison finding two: Poor communication amongst staff

Both companies had a small, close knit group of staff who worked together on a regular basis. Staff believed that information was open and available and each had an equal and unified grasp of company operations and offerings. However, when discussing customer relations, both companies discovered an uneven distribution of customer knowledge. Staff which dealt regularly with customers, or consistently with individual customers had a higher understanding of both the customer's background and prior history with the company. As the study progressed, both companies endeavoured to have a transparent knowledge base, with customer

information being consistently captured and made readily available to all staff. This aimed to allow a consistently high degree of customer service across all staff members.

6.7.3 Comparison finding three: Service provision based on customer segmentation

At the initiation of the process, both companies identified a lack of customer segment knowledge. In Company A, staff were unaware of which customers provided significant repeat business. As a result, the same level of service was equally provided to all customers regardless of knowledge requirements, repeat custom or financial return. Similarly, Company B struggled to segment customers in relation to their requirements. Staff disagreed on the division of needs between customers. As the study progressed, both companies increasingly segmented customers into high and low priority based on revenue generation. This allowed staff to easily and effectively improve current service offerings for high rating customers as services were consistent, effective and tailored to needs.

6.7.4 Comparison finding four: Under estimation of staff resource requirements

Over the duration of the study, both companies developed new service offerings (Company A: Premium Support Package; Company B: Mentoring services) and tailored current service offerings. Despite the segmentation of customers (as discussed above), both companies underestimated the human resources necessary to provide and maintain these services. Company B did not have sufficient inhouse expertise to provide consistent mentoring and so withdrew the service offering. To maintain the new service offering and continue new service development, Company A hired additional staff with service expertise.

6.7.5 Comparison finding five: Customer perception of value offering

With the increase in service provision, both companies altered their pricing strategy. However, both companies struggled to communicate the value of the new and extended services to their customers. As mentioned, Company A developed the 'Premium Support Package' where high level support was purchased separately. On review, this was dismissed due to fears that the potential customers would not understand the value of the service offering and be deterred. Alternatively, Company A accounted for/ integrated the additional cost of services in the product retail price. Company B attempted to increase the price of their custom products to account for the additional service costs. After complaints from some of their primary customers, a two tiered pricing system was implemented. This broke pricing into two bands:

lower prices for high volume, repeat customers, and higher prices for low volume, single purchase customers.

6.7.6 Case study comparison summary

As discussed above, several similarities can be drawn between the case studies. Both companies were product-orientated. Although services were provided, they were not considered as part of the value offering. As a result, tacit knowledge, which is of high importance in service provision, was overlooked and was not captured, shared or made readily available to staff. As services were seen to hold little or no value, they were provided freely to all customers. As the study progressed and the recognition of service value increased, both companies prioritised service provision for high ranking customers. Despite this controlled approach to service, the companies underestimated the human resources required to maintain these services. Additionally, both companies struggled to convey the value of the new and extended service offerings to their customer base. These key similarities can be used to distil areas of future development for the TIPSS process model.

6.8 Conclusions

The pervading argument of this thesis contends that in relation to the transition from product-orientated to PSS, the predominant barrier is the existing Goods-dominant culture. As a result of the Goods-dominant culture, many product-orientated companies are unable or unwilling to implement value-add service components into their offering. In response the TIPSS Process model was designed to facilitate the transition from a Goods-dominant to an Integrated culture in order to overcome cultural barriers to the implementation of a PSS strategy. This chapter has detailed the testing and evaluation of the TIPSS Process model through the use of two seven month case studies. Companies were reviewed under eight validation criteria which directly related to the dominant culture of the company. The following section summarises the main indicators for successful transition from product-orientated to PSS in relation to

Company A:

- Initially considering themselves as product producers only, work carried out at the initiation of the process revealed that a substantial portion of the value offering was provided through service. As the study progressed, the focus on the service component

of their offering increased. At the conclusion of the study, high value customers were prioritised in relation to service provision.

- Prior to the TIPSS Process, Company A struggled with customer communication. Information focused on the functionality of the product, containing high level technical data which was difficult for the customer to understand. As the study progressed, customer communication adapted to focus on the functionality of the products and services. Units were promoted as solutions capable of improving multiple stages of the R&D process e.g. high accuracy testing, shorting development time through parallel testing. This clarified the value offering and radically reduced difficulties in customer communication.
- Over the course of the study, as communication became more effective (as discussed in the previous point) the mantra of '*giving the customer higher levels of control*' developed. Additional customer co-creation avenues were facilitated through the development of online applications which provided information and means to tailor simple products. This allowed staff to focus their time on high demand customer services.
- Towards the end of the study, additional staff were hired to develop application and service constituents of the value offering. Their role was to work closely with engineering staff to ensure a high level of cohesion between product and service components.

The following section summarises the main indicators for successful transition from a product-orientated to PSS culture in relation to **Company B**:

- Initially, Company B considered themselves as providers of product. Over the course of the TIPSS Process, increased value was placed on the service component of their value offering. Work began on extending the service offering based on in-house professional knowledge but was aborted due to limited staff resources.
- Marketing of the value offering changed over the course of the study from the functionality of the product to a cohesive solution. This incorporated consumable and

custom products; professional, technical and sales support; webinars and in-house demonstrations.

- Although service provision was limited by staff resources, customers were prioritised based on potential/ actual financial feedback. Customers with low level enquiries interacted with administration staff. High ranking customers with medical based queries interacted with the in-house orthotic professional. In addition, customer contact was utilised to gather feedback and establish strong customer relationships.

Based on the case study comparison, five similarities can be seen:

- The product-orientated view of value held by the companies caused services to be overlooked. This further supports the cultural barrier 'Creating an awareness of dominant culture' discussed in section 4.3.1. Although both companies provided service components, they were disregarded when discussing the value offering.
- Both companies operated with small, close knit teams. Due to the size of the staff body, communication was assumed to be effective. Over the course of the study, both companies discovered communication gaps in relation to customer knowledge as tacit information was not captured and therefore could not be shared amongst staff.
- In order to facilitate the increasing importance of customer service, both companies segmented their customer base into high and low priority customers. This indicates a value on service provision as it is considered a key offering for key customers.
- Both case studies underestimated the human resources required to provide the additional service elements. This resulted in either the withdrawal of the service offering or the hiring of additional staff.
- Both companies struggled to convey the value of the additional/ expanded service offerings and therefore could not explicitly charge for their provision. Instead, service costs were accounted for in the tangible product

Based on the findings from the case studies, the following overall conclusions can be drawn:

- Overall the testing and evaluation of the TIPSS Process model has supported the fundamental thesis argument that the organisational culture is a significant barrier in the transition from product-orientated to PSS. The TIPSS Process model has provided a platform for analysing the effect of service knowledge, understanding and skill in the transition of a company from a Goods-dominant to an Integrated logic. This author contends that the results obtained from the testing and evaluation of TIPSS Process model, verify to an extent the associated theories derived from this research.
- The TIPSS Process model was successful in transitioning companies from product-orientated to PSS. Both companies have altered their perspectives in relation to their value offering to recognise, include and expand their service components; and implemented incremental changes. This is indicated in increased ratings in the validation criteria, indicating a growth in service focused activities.

CHAPTER SEVEN

CONCLUSION

CHAPTER ABSTRACT:

The purpose of Chapter Seven is to provide an overview of the research contained in this thesis, a synopsis of the key findings and recommendations for future research.

7.1 Introduction

7.2 Thesis summary

7.3 Overall conclusions

7.4 Key Contributions from research

7.5 Recommendations for future research

7.6 Conclusion

7.1 Introduction

This chapter summarises and presents the main findings of this research. Conclusions are summarised and areas for future research are identified.

7.2 Thesis summary

The aim of this research is to design, develop and validate a systematic and adaptable approach for facilitating the transition of companies from product-orientated to PSS by overcoming cultural barriers. To achieve this, a comprehensive literature review of existing PSS knowledge was undertaken (Chapter Two). This reviewed the development of PSS as a construct, and the current best practices in relation to its application within a business context. The review identified that many product-orientated companies struggle to successfully integrate product and service processes together. As a result PSS models, which combine product and service components into a single cohesive structure, have received significant attention. Yet the administration of these models by industry has been limited. Model developers do not take into account existing cultural barriers which will limit their application (Chapter Four). Based on these findings, an approach called the ‘**Transition to and Implementation of Product Service Systems**’ or ‘**TIPSS**’ Process model was designed, developed and tested. The TIPSS Process Model endeavours to account for the requirements of current PSS models, while adapting existing barriers within the participating company i.e. lack of relevant knowledge and skill, converse corporate culture. It focuses on increasing company PSS knowledge and skills to augment the application of PSS within the context of the business strategy. This is achieved through four key factors:

- Representation of the transition process: The fundamental theory of the TIPSS Process model is the relation between cultural change and the extent of PSS application. The higher the extent to which a company operates under a Goods-dominant logic, the less likely it is to consider implementing service components in its value offering. Therefore, in order to develop and provide a PSS strategy, the business culture must be altered. As the culture adapts, the extent of PSS operations will also increase.
- PSS process and activities: The TIPSS Process model breaks the process into four stages: *Design, Analysis, Development and Full Launch*. The processes in product and

service development are not exclusive to each other and can be broken into these main headings. This provides a clear, logical and consistent approach to PSS development which combines product and service development processes into a simple, single structure.

- **Cultural Influencing Factors (CIFs):** Dominant logics and organisational culture directly affect the direction, ease, extent and rate of change within a company. Therefore, they directly affect a company's transition from product-orientated to PSS orientated strategy. The TIPSS Process model highlights three predominant cultural influencing factors in the transition process: *Awareness of the current dominant logic, knowledge management and communication*. This awareness of cultural factors allows the model to adapt and overcome any cultural barriers to change.
- **Information transition:** Staff require information to facilitate problem solving and make informed decisions. Culture determines what information is sought, valued, assimilated and applied. In order to fully apply and exploit PSS, relevant information must be understood, adapted and applied. Therefore, the transition of relevant information into knowledge is represented and facilitated in the TIPSS Process model.

In order to validate the TIPSS Process model and its driving theories, two case studies were undertaken over a seven month period. A workshop was developed to initiate the transition process as prescribed by the TIPSS Process model. The two companies were contacted on a regular basis and the transition changes monitored and rated at points in the research, benchmarking (at the close of the TIPSS Workshop), at the end of the seven month study and at the closing interview (for future plans and feedback).

7.3 Overall conclusions

This section identifies and briefly discusses the overall conclusions that have emerged from the research carried out in this thesis. Conclusions are based on objectives as defined in Chapter One.

Research Question 1: What are the primary methodologies and approaches being utilised in current PSS strategies?

- PSS incorporates methodologies and approaches from two primary sources, NPD practices and NSD practices. Due to the inherent differences in the fundamental characteristics of products and services, PSS models focus on integrating development processes into a single cohesive model.
- In comparison to product provision, service provision is a highly dynamic process. Customer co-creation creates high variability and inputs/ outputs are difficult to quantify. In order to account for and manage these variable factors, open communication between all parties within the PSS is required. This allows up-to-date information to freely pass between each party and create a free-flowing PSS.
- Product development and provision traditionally use structured and systematic design processes with quantifiable inputs and outputs. As discussed in the previous point, services have a high degree of variability. PSS models aim to balance the quantifiable processes of product production while allowing adaptability for variable service components.
- It is important to account for both tacit and explicit information/ knowledge within the PSS process. For example, information gathered during customer co-creation offers significant insight into current and future offerings. Due to the high variability of service provision, intuitive processes are common. Documentation of these processes can reveal patterns, user insights and common problems with current processes.
- Qualitative methods are commonly used in PSS development and provision as they capture tacit and dynamic information which can be overlooked by quantitative methods.

Research Question 2: What are the key barriers that firms face in making the transition from a goods dominant logic to a PSS approach?

- Related research has shown that product-orientated companies struggle with understanding, providing and maintaining the ‘soft factors’ of service provision as they require different skills and knowledge to that of product development/ production. Soft factors require companies to adapt their organisational culture, process structures and managerial approaches. Current PSS models focus on process structures and

management but do not take into consideration the existing culture/ dominant logic of the company.

- Organisational culture/ dominant logic determines how managers conceptualise the business and make critical resource allocation decisions across all operations within the company. In order to provide an effective PSS, companies must operate under an integrated logic. This takes into account both product and service components. Changing organisational culture/ dominant logic can be difficult as it is ingrained in the company norms on a company and staff level.
- Organisational culture/ dominant logic determines what skills and knowledge are sought, available and applied within a company. Therefore, companies operating under a Goods-dominant logic will focus on skill/ knowledge required for product development and provision. As a result, companies that wish to transition from a product-orientated strategy to PSS strategy may not have the necessary resources.
- Organisational culture/ dominant logic also determines knowledge creation and management as it affects and determines how staff learn, acquire and share knowledge. Therefore, staff mindsets and learning processes must also be taken into account when transitioning from a product-orientated culture to a PSS culture. This can affect the adoption, absorption and application rates of the new strategy.

Research Question 3: How might companies overcome these barriers to transition from a goods dominant logic to a PSS approach?

- PSS models reviewed in this research, fail to take into consideration existing cultural barriers to PSS application and consequently assume companies are willing and capable of applying the developed model. As a result, they do not suggest or develop any methods with which to overcome cultural barriers to PSS transition. This gap in the understanding of PSS transition has been noted in related research and therefore the need for such a model can be seen.
- The TIPSS Process model is grounded on specifications derived from existing PSS and cultural theory. Drawing from these sources it provides an important contribution in prescribing and representing the transition of a company from a product-orientated

culture to a PSS orientated culture. Central to the models theory are cultural influencing factors which directly affect this transition process. Culture determines what information is available, sought, utilised and applied. By taking these cultural influencers into account, the TIPSS Process model adapts to overcome and accommodate cultural barriers to cultural change.

Research Value 4: How can the cultural/ learning theories and models derived from the research be validated?

- The TIPSS Process model and associated theories derived from this research were verified through qualitative methodologies i.e. case studies and documentation analysis.
- The validation process combined tacit evidence and activity changes, quantified against a set of cultural indicators, to gauge the extent of cultural change. This provides insight into the thinking of individual staff, and within the broader context of the business as a whole.
- The results from the validation process indicate that the transition of PSS information to knowledge was successful, thus overcoming the cultural barriers present in the participating companies. Company process and methodologies were adapted to include service components based on the initiation of the process and incrementally implemented over the duration of the study. This indicates that the transition from a Goods-dominant logic to an Integrated-logic was successful.
- The validation results verify the core argument of this research; that is as the dominant culture of a company changes, the range and extent of PSS application will be positively affected.

7.4 Key Contributions from research

From the realisation of the research objectives, this author presents the following key contributions:

- *Differentiated importance of the primary inhibitors to the transition to PSS strategy.* Prior research noted that manufacturing companies often struggled to implement PSS processes. Solutions focused on adapting the proposed PSS models to account for the

integration of product and service processes. Business and strategy focused research highlighted organisational culture and learning as barriers to transitioning strategies. However, it did not specifically focus on transitioning from a product-orientated logic to a PSS logic. As the demand for product/ service bundles grows in the manufacturing industry, this issue will become increasingly important. Therefore it can be concluded that the knowledge gained through primary research and extensive secondary research across several fields provides a further understanding of the PSS transition process not previously available.

- *The development of a new PSS orientated model, TIPSS Process Model, which prescribes the transition of a company from a product-orientated logic to a PSS/service orientated logic.* This author contends that the review of PSS models discussed in Chapter Two, highlighted a gap in the knowledge of their application. Therefore, there is a requirement for the TIPSS Process model which addresses the preliminary cultural barriers to the application of a PSS strategy. This model accounts for several cultural variables which act as significant cultural barriers to the transition from a Goods-dominant Logic to an Integrated Logic. This author suggests that the TIPSS Process model will benefit service developers as it provides a prescriptive process for the transition process; and tools and documentation with which to support it. In addition, this author contends that the TIPSS Process model will benefit service developers and product-orientated companies wishing to implement service components into their value offering as it facilitates the learning process in relation to the transition from a product-orientated culture to a PSS orientated culture.

7.5 Recommendations for future research

A number of issues related to this research were raised. Although it was not possible to fully explore or develop these areas within this body of research, they merit further investigation. These are discussed below:

- The TIPSS Process model was validated using case studies of two SMEs from the Medical Device industry. Teams worked closely and had frequent contact. Prior research has shown that small groups or teams (like project teams) develop learning cultures which gradually spread through an organisation (Austin and Hopkins, 2004 as

cited by Sense, 2011). It is recommended that future research examine the rate and extent of this culture change within larger organisations. This would highlight effective methods and approaches within a large scale organisation and potentially shorten the transition time.

- Communication between all partners within the PSS network is essential to provide a cohesive product/ service bundle. These networks can be complex, requiring large numbers of partners operating in tandem. In addition, as highlighted with the companies involved in this research, IP sensitivity is a primary concern. It is recommended that future research examine tools and methodologies through which communication can be easily tailored and maintained to provide efficient and effective correspondence with relevant partners within a PSS network.
- Virtual teams are increasingly being used in business. These are groups of workers who are geographically and temporally dispersed and are assembled via technology to accomplish an organisational task (Gupta *et al.*, 2009). Research has shown that the dispersed geographical location of numerous teams operating with the same organisation struggle to construct a shared identity (Sidhu and Volberda, 2011). As identity is a significant component in the construct of organisational culture, it is recommended that future research examine the affect of virtual teams on the transition from a product-orientated logic to a PSS logic. For example, an organisational learning culture requires individuals to have a “willingness to embrace the dynamic challenges to learn while they work and work while they learn” (Burghardt and Tolliver, 2010). How will the overall willingness to learn be affected by a reluctant virtual team within the dispersed network as a whole?
- Companies operating under a product-orientated culture are unfamiliar with the resources required for service provision. As illustrated in the case studies in this body of research, it can be particularly difficult to predict the human resources required for an effective PSS. Due to the co-creative nature of services, there is an onus on service developers to interact with the customers during the development process of a new service and also use front-office personnel as a source of new service ideas (Alam, 2006). It is recommended that future research consider methods and approaches to predict the necessary human resources required for new services from the perspective of product-orientated companies transitioning to PSS.

7.6 Conclusion

Chapter Seven provides an overview of the main findings of the research. A thesis summary was provided which briefly discusses the methodology to the TIPSS Process model. The overall objectives of the research and the resulting conclusions are also provided. Key contributions and recommended future areas for research are also summarised.

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