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Business Innovation and Process Transformation for Hi-tech  
Industries

A Dissertation

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And the Committee on Graduate Studies of Tokyo Institute of Technology  
In Partial Fulfillment of the Requirements for the Degree of Doctor of  
Philosophy

Submitted by

Ahamed Zahir

Academic Advisor: Professor Takehiro Inohara

February 12, 2014

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# Abstract

It has been recognized that in today's highly competitive industrial markets, servitization is one of the key strategic choices for many leading manufacturers to gain differentiation from competitors by offering value-added services. To do so, however, requires a service-oriented strategy and the active implementation of this strategy, which comprise a significant shift in the underlying business model, management philosophy, processes and approach. Due to the very unique and different natures of service, many companies experience problems identifying the service propeller and surviving to find the right way of transforming their business model from not only producing goods to offering an integrated package of goods and services, i.e., servitization. However, the integration of services into manufacturing, inherent challenges, major barriers – and indeed the varied drivers – to servitization have been relatively ignored. It has been our attempt to analyze and describe how companies can transform from being a “product-centered” organization to being a “servitized” organization by conducting interviews and by reading relevant literature.

The dissertation aims to comprehend the claims and counterclaims in the literature, and provide more realistic guidance and articulated perspective on the transformation process. It also examines the influence of organizational factors on the effectiveness of implementing servitization strategy. Extrapolation of findings from interviews and supplementary research expose the multiple hurdles littered throughout the transformational path and strategic implementation process.

Our findings and subsequent analysis excavated a number of change residuals that is required to complete the process of servitization. One of our main findings showed that in order to shift the firm from “product-centric” to a “service-centric” organization, they need to transform its process from technology and resources base to knowledge and skills base operations. Nonetheless, we found, on the basis of our interviews and relevant literature, that the most important factors for implementing servitization strategy are leadership, vision, and marketing.

The dissertation furnishes an original perspective to provide the notion of firm operational process transformation from manufacturing to servitization, extends existing research, and aims to bridge the gap between services and manufacturing. Summarizing the



research, the study concludes with the identification of implications for managers and policy makers, practical limitations from findings, trends, and areas for future research.

# Dedication

This thesis is dedicated to my family for their endless love, support and encouragement. A special feeling of gratitude to my loving parents, Razia Begum and Mohamed Ullah who always pray to almighty Allah for my success in every step of my life.

Also, this thesis is dedicated to my brother, Murad Hossain who has been a great source of motivation and inspiration.

Finally, this thesis is dedicated to my loving kid, Iiara Zahir Yuki who's coming make me more enthusiasm and keen on study during Ph.D. period.

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February 12, 2014

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# List of Abbreviation

- [1] HI-TECH: High technology
- [2] ICT: Information and communications technology
- [3] AMS: After-market Services
- [4] CSF: Critical success factor
- [5] KCD: Key change drivers
- [6] FDI: Foreign direct investment
- [7] GDP: Gross domestic product
- [8] HRM: Human resources management
- [9] IBS: Installed base services
- [10] M&A: Merger and acquisition
- [11] LDC: Less-developed country
- [12] MNC: Multi-national corporation
- [13] NSD: New service development
- [14] OECD: Organization for economic co-operation and development
- [15] OEM: Original equipment manufacturer
- [16] PSS: Product service systems
- [17] R&D: Research and development
- [18] SCA: Sustainable competitive advantage
- [19] SCM: Supply chain management
- [20] SP: Service Provider
- [21] IfM: Institute for manufacturing
- [22] JV: Joint venture

# Chapter 1

## Introduction

### 1.1 Background of the Research

Nowadays, manufacturing in developed economies is under massive pressure as the rapid technological development has commoditized product differentiation and squeezed products margins. In these circumstances, companies are shifting their business from not only producing goods to offering an integrated package of goods and services. This movement has been termed as 'servitization of business'. The concept first introduced by Vandermerwe and Rada [1], is now widely recognized as the process of creating value by adding services to products. Since the late 1980s, the adoption of this concept as a competitive business strategy of manufacturing firm has been studied by range of authors [2,3,4,5] who have highly focused on developing the process and its implications in product saturated market. This literature indicates a growing interest in this topic by academia, business and government [6], much of which is based on a belief that a move towards servitization is a means to create additional value adding capabilities for traditional manufacturers. As a result, today many leading companies, such as, GE, IBM, Rolls Royce, Siemens, Fujitsu, Hitachi, Toshiba, NEC and so on embrace this concept as a service-led competitive strategy, environmental sustainability, and the basis to differentiate them from competitors who simply offer lower priced products.

Traditionally services provided by manufacturing organizations have typically been in the form of after-sales. Services, such as, installation, maintenance and repair have therefore generally been viewed as complementary to the primary business focus on selling products [7]. Hence, services have conventionally been considered as necessary add-ons to the core product portfolio. The more contemporary view is that manufacturing companies need to move towards a more extensive provision of services to remain its competitiveness in the current marketplace [3, 8]. Wise and Baumgartner [2], for example, argue that companies in mature industries should be looking for service opportunities to achieve new growth and profitability.

However, servitization is not an easy strategic choice that a manufacturer needs to carefully design its services. In order to succeed with servitization, manufacturer is likely to need some new and alternative organizational principles, structures, and processes. Wise and Baumgartner [2], Oliva and Kallenberg [3], and Weeks [9, 10] claimed that to implement a servitization strategy successfully, organizations are required to change their strategies, operations and value chains, technologies, peoples for supporting cultural shifts in the organizational blueprint, and system integration capabilities. Consequently, commentators have strongly recommended that companies need to maintain a constant flow of innovation, not only in terms of what is offered to the customer, but also in how products and services are designed, produced, delivered, and marketed [11]. Hence, when engineers design products try to design services, they encounter difficulties such as a lack of organizational resources. Thus, the transformation from a product-centric vision to a product-service-centric or customer-centric vision is still poorly understood and remains a new and complex concept.

More recently, a study have introduced the theory of enterprise transformation, which concerns change, not just routine change but fundamental change that substantially alters an organization's relationships with one or more key constituencies, such as, customers, employees, suppliers, and investors [12]. Basically, the organizational transformation is happened for proposing new value through products and services offerings or old value propositions provided in fundamentally new ways. More specifically, enterprise transformation is driven by perceived value deficiencies relative to customer needs and expectations. Consequently, enterprises increasingly need to consider and pursue fundamental change-transformation-to maintain or gain competitive advantages. Because, enterprises realize the declining of revenues and profit, failing to achieve anticipated enterprise growth, and exploitation of market and technological opportunities. These reasons are forcing them to change and often beliefs that it will enable remediation of such value deficiencies. But, the concern is how these value deficiencies will be approach? According to Rouse [12], generally, there are three broad ways to approach value deficiencies: (1) improve how work is currently performed, e.g., reduce variability, (2) perform current work differently, e.g., web-en-able customer service, and (3) perform different work, e.g., outsource manufacturing and focus on service. In all of these choices, the third choice is most likely to result in transforming the enterprise, which is motivated

this research to seek and explain the notion of organization's operational process transformation from manufacturing to services that form in two interdisciplinary areas.

In this dissertation, we have discussed the overall concept of servitization and provided the notion of firm's operational process transformation "how" a pure manufacturing company can engage in product-service operations even there is no actual journey process for achieving those opportunities. However, there are many literatures and theoretical discussion available in the general field of strategic organizational change, but there are no models specific to the issue of servitization as a change process.

Therefore, the main purpose of this research is to investigate the firm operational process transformation from being a "product-centered" organization to being a "servitized" organization and identifying the key drivers that lead to change successfully. Under this objective, we first develop a conceptual model of firm process transformation from the viewpoint of research and development, procurement, production, sales and marketing, and after sales services. We then validate this model by using empirical data collected from International Business Machine (IBM) Corporation, and describe how an effective change process make the firm's successful transformation. The findings reveal that while the pure manufacturing firm race to innovate new technology or product development for penetrating the market and achieve quick return, the servitized firm focuses on developing "customer-centric" business operations and increasing capability toward value proposition. The research also found five key drivers of successful change process toward servitization that are vision creation, mindset and strategy development, leadership and teaming, value sharing and communication, and anchoring a new service culture.

Second, this research aims to examine the influence of organization factors on the effectiveness of implementing servitization strategy. Under this objective, we first hypothesize five key organizational factors based on literature review and our observation that are influencing servitization. We then analyze these factors by using data collection from three Japanese high technology (hi-tech) multinational firms, respectively, Fujitsu, Toshiba, and Hitachi limited. The most important key factors were identified under this objective is leadership, vision, and marketing, which have significantly positive influence on the effectiveness of implementing servitization strategy.

## 1.2 Purpose of the Research

The main purpose of this research is to make a contribution to the development of servitization theory and practice in the real business world. Accordingly, there is need for further research in order to help companies on the brink of servitizing. Although servitization offers alluring benefits, not only for the provider, but logically so also for the customer, the servitization concept has been and still is difficult for most established manufacturers to grasp a handle on. It is therefore our ambition to make an attempt to increase the understanding of the concept and introducing the processes how manufacturers can step-up this servitization journey. Hence, the purposes of this research is breakdown as follows:

1. To provide a brief description of manufacturing, service, and servitization and state the necessity of product-service-system (PSS) in today's high competitive market.
2. To analyze and describe how a pure manufacturing firm can transform their business from being a "product-centered" organization to a "servitized" organization.
3. To identify the key drivers of change process that makes the firm's transformation from manufacturing to servitization is successful.
4. To investigate the organizational factors that has significantly positive influence on the effectiveness of implementing servitization strategy.
5. Finally, to analyze the challenges, obstacles and organizational barriers faced the firm during transition and service orchestration.

In this research, we put the importance on describing the notion of firm process transformation from pure manufacturing to service-oriented total offering. The existing theory was so far have explained the firm transformation from general viewpoint, referred to as 'enterprise transformation' [12]. In contrast, this research is investigating the firm operational process transformation focusing on the specific issue of servitization under the viewpoint of research and development, procurement, production, sales and marketing, and after sales services. The change process and identifying key elements will then discuss for firm transforming from manufacturing to servitization successfully. The result will help

companies for mitigating transformation risks especially related to organizational process and behaviors.

Furthermore, we find the most significant factors of organization that have positive influence on implementing servitization strategy. This will help enterprise managers and decision makers to make the correct tactics for implementing this strategy successfully.

Finally, we validate all of our hypothesis, models and results based on the empirical data collection from number of giant hi-tech manufacturing firms, respectively, IBM, Fujitsu, Toshiba, and Hitachi limited.

### 1.3 Defining the Problem

In order to provide the purpose of the research, we have set out to first define the research problem that are as follows:

*[“How does a product based hi-tech firm strategically transform its operational process and/or extend business towards higher margin service provision?”]*

After long-term study, observation and cursory reading of the cost and benefits of services offering, we found that most of the manufacturing companies today realizes and agree that offering services is an attractive strategic option. However, the complicated issue is how to proceed with the transformation. To help understand this process we address the following questions as support to our main problem:

1. How does a company transform its operational process from a manufacturing platform offering products to one that places and emphasis both products and services as a single value package?
2. What organizational factors are significantly influencing to the effectiveness of implementing firm’s servitization strategy?

We will keep these two key questions in our mind throughout the entire dissertation. However, the following sub questions related to the issue will also be consider for constructive discussion and preparing a valued dissertation paper:

- a. What change drivers can make the firm transformation from manufacturing to servitization is successful?
- b. What are the underlying challenges that a manufacturing firm faces while they making a shift from being a product-dependent company to increase the emphasis on and implementing servitization strategy?

## 1.4 Contribution to the Theory and Practice

This research is intended to be of use to both the academic and practitioner community. As the concept of servitization and/or its implications is still under development, it is hoped that the initial findings of this research will open a debate around the particular issues of firm's operational process transformation and challenges faced by organizations undergoing servitization, and beginning to build a body of theory that addresses the current gap in the literature.

For practitioners, the experiences of the case study companies presented here, including, transformational process, change drivers, and organizational factors, will help enterprise managers and decision makers to make the correct tactics for implementing servitization strategy successfully. It will also help the managers to promote awareness of what the potential "roadblocks" on the transformation journey could be when the firm servitizing.

## 1.5 Thesis Outline

At this juncture we have described the research background, purpose of the research, research problem and provided a synopsis of our contribution to the theory and practice. In order to shed some light on our thesis procession, we have portrayed a brief outline in the following Figure 1.1.



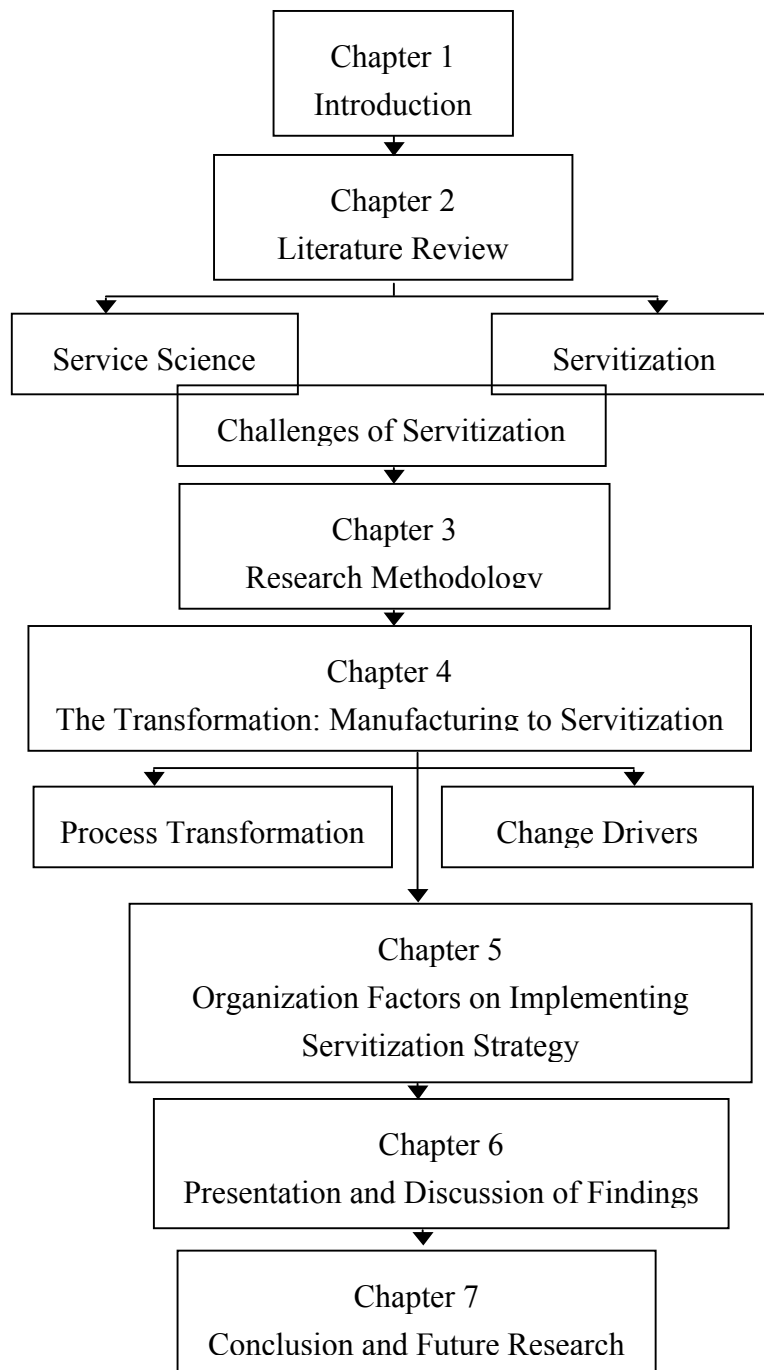


Figure 1.1. Outline of the Thesis

The rest of the thesis is described as follows. Chapter 2 represents a brief description literature, including, service science and servitization of manufacturing required to the development of theoretical framework for this dissertation. It also describes the key challenges most frequently face by organization when it attempts to implement servitization strategy.

In Chapter 3, we show the research methodology used in this dissertation. The main approaches of research method are exploratory and explanatory that we used for achieving the thesis objectives. An exploratory approach attempts to explore a subject or phenomenon for which no or limited prior information exists. The other approach, i.e., explanatory attempts to explain the reasons for a certain phenomenon.

The Chapter 4, we mainly discuss the firm's process transformation and key drivers for successful change process. We first develop a conceptual model of firm's operational process transformation under the viewpoint research and development, procurement, production, sales and marketing, and after sales services. Then, we validate our model by using empirical data collection from IBMers and identify the key drivers of IBM successful change process towards servbitization.

In Chapter 5, we explore the organizational factors that are important and have significantly positive influence on implementing servitization strategy. In order to analyze and identifying the most influential factors of organization, a path model linking vision, organization, human resource management, marketing, and leadership with servitization is tested using a series of regression analysis in SPSS.

In Chapter 6, we present the relationship found between researches output, and provide an overall discussion about the research topic and key findings. We then provide the lesson learnt and/or implications of this research in academy and real-life business world.

Finally, the Chapter 7 is addressed for concluding the dissertation with summary and providing appropriate suggestions for the future research in the field of servitization.

# Chapter 2

## Literature Review

This chapter provides an overview of the relevant literature including manufacturing, services and servitization by which this dissertation is build on. After introduction and an overview of service economy, we tried to define the service in Section 2.2.1 and respectively provided the nature of services in Section 2.2.2, service triangle in Section 2.2.3, Service dominant logic in Section 2.2.4 and the importance of services in Section 2.2.5. In Section 2.3 will then discuss about servitization of manufacturing and orderly provides the definition of servitization in Section 2.3.1, related study in Section 2.3.2, development stages in Section 2.3.3, rationale of servitization in Section 2.3.4, advantages in Section 2.3.5 and disadvantages of servitization in Section 2.3.6. The final Section 2.4 in this chapter discusses about the challenges associated with the implementation of servitization strategy.

### 2.1 Introduction

Manufacturing and services have always been viewed as two distinct concepts where manufacturing paved the way and services followed suit. Many studies distinguish the term ‘service’ from goods by describing it as the alternative product form in sectors such as insurance, law, marketing, catering, banking and so on. For decades, services have been viewed as parochial and provincial in nature, as they were cumbersome to trade and export - making it difficult to serve foreign markets. They had a limited reach due to regulatory, cultural and linguistic barriers, and the latent need for local adaptation. However, most services now are no longer bound to manufacturing expansion and reach of the service sector is expanding due to increased service trade and service-led Foreign Direct Investment (FDI) [13], these patterns can be seen in Figure 3. Despite the widespread differentiation between manufacturing and services, analysts claim the boundary between them to be blurring and barriers being broken down [14, 15].

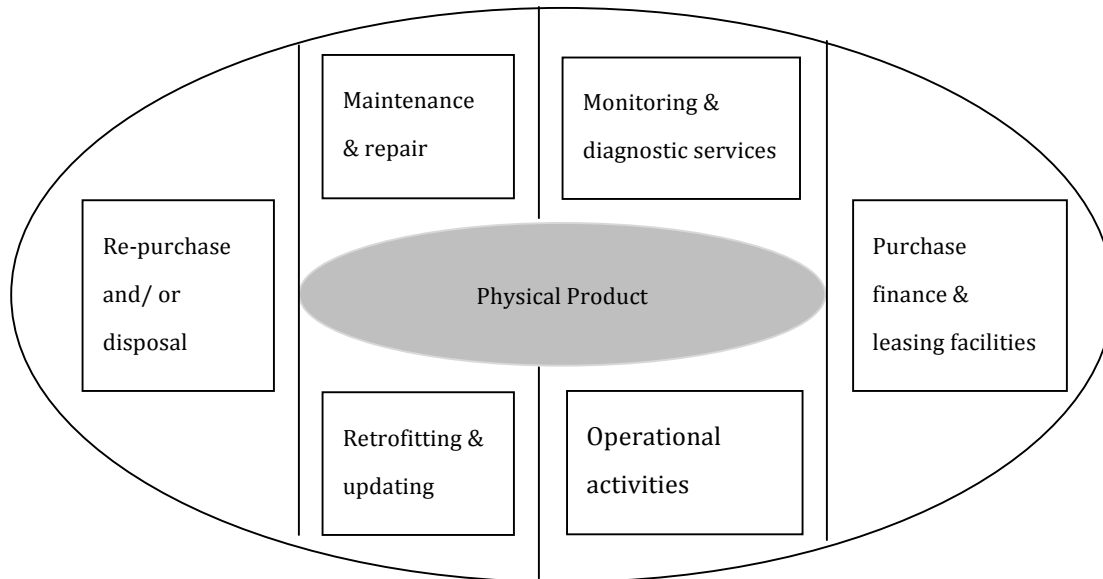


Figure 2.1. Patterns of consumption around a manufactured product [13]

The escalation of services is one of the key trends witnessed in recent years, and is observed in the changing economic landscape in the Europe, America and Asia where services constitute bulk of the national output and employ majority of the workforce [16]. The manufacturing-based and service-oriented industries do differ significantly due to the intricate, fragile and multi-faceted characteristics of service activities [15], but the increased juxtaposition of production and service activities has become a norm within these sectors [17]. Heskett et al. [18] describe services as being more labor dependent and less visible rendering them much more complex to duplicate. Gradually, services have achieved greater recognition at the internal level as they develop into a source of achieving sustainable competitive advantage [7], and affect long-term performance by determining customers' perception of product quality [19].

In this chapter, we provide a brief description of the relevant literature of service science and the trends of manufacturing firms aiming to construct a new service-dominated offering, i.e., servitization. There are minimal research has been carried out on the potential of servitization of manufacturing firms, and many studies simply assume that the transition is taking place and/or it should be happening. Only few studies actually demonstrating that a substantial trend is underway. However, the available literature is almost unanimous in suggesting to manufacturers that they should integrate services into their core product

offerings to remain its competitiveness in the highly commoditized market [2, 3, 7, 21]. In addition to these, this chapter also provides key challenges confronted by organization during the firm transits its business from only selling goods to offering a bundle of goods and services.

## 2.2 Service Science and Economy

Nowadays, services become an important and key element to the economic development. The size of this sector is increasing in virtually all countries around the world. Today, services industries are the largest contributors to employment and gross domestic product in most countries. Even in emerging economies, the service output is growing rapidly and often represents almost half of the gross domestic product (GDP). The following Figure 2.2 shows a relative size of the service sector in an array of both large and small economies as a percentage of GDP in selected countries 2008 [22].

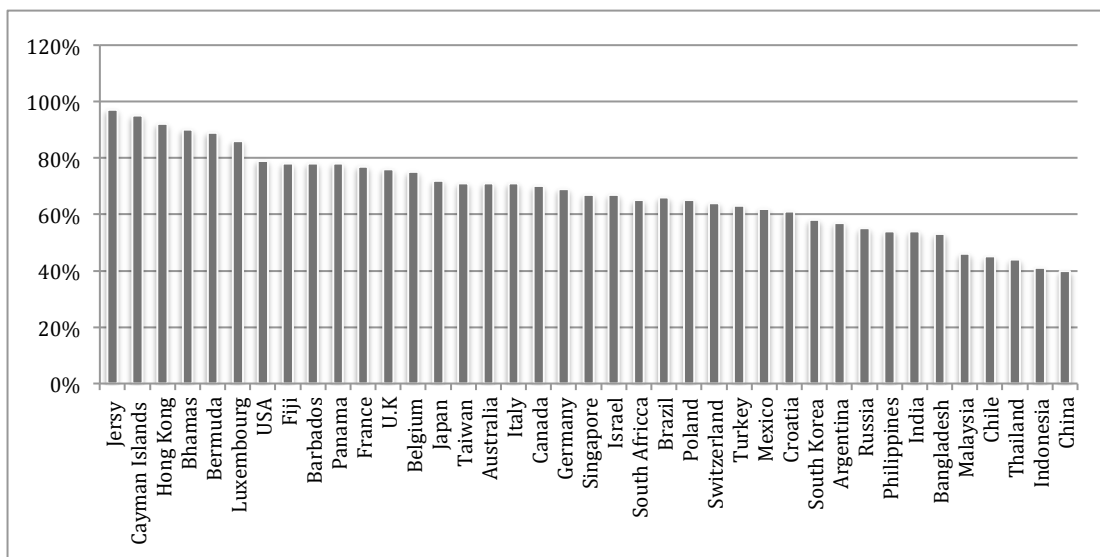


Figure 2.2. The contribution of services as a percentage of GDP [22]

In Figure 2.2, it is observed that the amount of services in most of the developed economies is between two thirds and three fourths of the GDP, although manufacturing oriented country, like, South Korea is an exception. Services in emerging country, like,

India, Bangladesh, and China are contributed by more than and/or close to the 50 percent of total GDP these days.

However, the employment in manufacturing, mining, and agriculture industries is continuing shrinking and most of the developed economies are now looking new job creation in the field of service industry. But, when it is observed a significant trend in service industry and many of us live and work in service-dominated economies, there are less education in this respective field and still most of the graduate comes out from universities in the field of management or technical education. After years of attention to the integration of value creation in the service economy, IBM coined the term Service Science, Management and Engineering (SSME), often called service science that integrates key disciplines required to design, improve, and scale service systems.

Service science is the study and understanding of many types of service systems, how they interact with each other and evolve to co-create value [23]. Literally, a service system is viewed as a value co-production configuration of people, technology and organizations that are connected via internal or external networks [24, 25]. These connections and interactions enable information to be shared among members, exchanging knowledge and co-creating value in the process [26]. Lush et al. [27], claim that service dominant (S-D) logic, i.e., value-in-use or value-in-context, would be an appropriate foundation for service science as it is based on exchange, and naturally incorporates four resources, namely, people, organizations, technology and information sharing in the theory that they interact to co-create value. Consequently, Institute for Manufacturing (IfM) and IBM supported the S-D logic as a conceptual foundation by which the notion of resource clusters working toward creating value. They argue that looking at the resources used in service systems is a starting point for the development of service science.

The study of service science focuses on various disciplines, including, management, marketing, economics, information technology and the cognitive and social sciences as well [23, 28]. In order for better understanding the service systems, service science integrates knowledge from all of these disciplines that leads itself to the study of dynamic systems, as it focuses on different part of the service systems [23, 25]. It is important to note that this does not mean that the specialization is losing and/or somehow unimportant. Specialization remains imperative as each discipline provides a deeper understanding of each silo. However, focusing on each discipline as one separate silo hinders the ability to understand service systems [29]. Hence the need to consider service systems as integrated

parts, and create a discipline that spans many disciplines, not just one.

Thus, the need for a field of study that integrates various disciplines is crucial in today's service-oriented economy. It helps to foster a shared perspective and language amongst those involved in businesses, academics and students [30]. In order to create a service-oriented culture and co-create additional value, company seeks to employ the peoples who have deep knowledge in multi-disciplinary areas and able to communicate and share knowledge with cross-functional business units. Mukthar et al. [31] is concluded in his paper that in the service economy graduates needed to work in teams made up of multidisciplinary members to deal with multifaceted complex problems and therefore required are, what the researchers termed to be "adaptive innovators". In this regard, it is important to note that the IfM and IBM [29] white paper draws a very definite correlation between adaptive innovators and so called T-shaped people skills. On the basis of their research, Mukthar et al. [31] established a table reflecting the T-shaped skills and attitudes that they found to be of pertinence is presented in the following.

Table 2.1. T-shaped skills [31]

Type of skills	Description
Meta Competence	<ul style="list-style-type: none"> <li>○ Experts in business communication and interpersonal competence</li> <li>○ Creative and critical thinkers who are able to analyze and synthesis problems and situations</li> <li>○ Can adapt their skills and knowledge to the problem at hand</li> </ul>
Integrative skills	<ul style="list-style-type: none"> <li>○ Able to collaborate with people from different disciplines</li> <li>○ Have leadership skills and are also able to manage a multidisciplinary team</li> <li>○ Business and technology integration</li> <li>○ Diversity orientation</li> </ul>

Service mindset	<ul style="list-style-type: none"> <li>○ Implementing service strategies via an understanding of the concept of value co-creation</li> <li>○ Conceptualize and developing service designs and new types of services</li> <li>○ Analyzing the service life cycle to ensure quality</li> <li>○ Assessing and managing the supply and demand of services</li> <li>○ Contextualize service science</li> </ul>
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Finally, it may be concluded that within a service science framework, engineering and technological skills are required from side of the skills coin, the other being the need for a wide range of multidisciplinary skill set.

### 2.2.1 Defining Services

Nowadays, service sector is the dominant part of the economy, but still the exact nature of it is poorly defined. Producing an exact definition of services is not an easy task. Several scholars have tried to define the notion and most of the cases it preferably fits their own research purpose. Accordingly, there is no common opinion on how to define services. Many authors offer similar, yet different views on services; for example, Quinn and Gagnon attempted to define services by saying what they are not. They suggest that:

*‘Services are actually all those economic activities in which the primary output is neither a product nor a construction [32].’*

Taken to its extreme, services can broadly be condensed and reduced into “something we do”. Marketing guru P. Kotler provides a positive and more substantive definition that describes services as:

*‘Any activity or benefit that one party can offer to another that is essentially intangible and does not result in the ownership of anything [32].’*



The essence of this definition indicated that services center around intangibility. There is more to it, however, the more extensive definition by Grönroos stating in the following that:

*‘A service is an activity or series of activities of a more or less intangible nature that normally, but not necessarily, take place in interactions between the customer and service employees and/or physical resources or goods and/or systems of the service provider, which are provided as a solutions to customer problems [32].’*

Thus, it is revealed in the preceding definitions that two central notions are characterized services, i.e., intangibility and simultaneity. It appears that service is the result of a process or action where there is no distinct point of an ownership transfer. However, it is not clear where the process ends, i.e., when the service process is finished. Only, we can point that services consists a series of processes or activities, which address a range of customer needs. The other hand, tangible product possesses more obvious end boundaries that address customer need. For example, the tangible goods, such as a mobile phone can be specified into technical features and product specifications. Once the mobile phone is come out from production factory, these features and specifications are fixed and final and the attention is focused toward them. But, with services, it is difficult to make any such concrete observations. The following Table 2.2 is provided some of the differences between services and products described in the literature.

Table 2.2. Differences between services and products [32]

Services	Products
An activity or process	A physical object
Intangible	Tangible
Simultaneous production and consumption	Separation of production and consumption
Customers participate in production	Customers do not participate in production

Core value produce in provider and customer interaction	Core value produce in a factory
Heterogeneous	Homogeneous
Perishable, i.e., cannot be kept in stock	Non-perishable, i.e., can be kept in stock
Cannot transfer the ownership	Can transfer the ownership

In Table 2.2, it is observed that services and products are basically form in two interdisciplinary areas and their nature or characteristics is different from each other. Therefore, it makes more sense to discuss the notion of service or the concept of service. In the following section we focus on the nature of services.

## 2.2.2 Nature of Services

Services are different from goods considering its characteristics, such as, intangibility and simultaneity that imply heterogeneity and perishability. All of these characteristics are significantly pose challenges for the management of designing and process of delivering services, as it is different for every individual product or services and produced for different reasons as well as consumed different benefits. For an example, the management of hairdressing salon is different from that of consulting firm or the management of a fast-food restaurant is different from that of a banking service. In this regard, identifying or classifying the service nature is very helpful and important. Therefore, this section will focus on the very nature that distinguishes services from products and how services internally are categorized, the clear and vague differences and similarities. According to Van Looy, Van Dierdonck and Gemmel [32], there are nine different methods of classifying service nature that we discuss in the following:

- i. Degree of intangibility: The intangibility of services is the key characteristic that most frequently cited in the literature. A general differentiation between goods and services is that goods are tangibly produced while services are intangibly performed. As a result, there is no direct transfer of ownership occurs when service is performed. For example, watching a movie in the theatre, somebody could be

relaxed or impressed by the experience, but cannot take home the service that they received. Only they can take the effect of services that means there is no exchange of ownership.

- ii. Degree of simultaneity: The second common characteristic of services is the simultaneity of production and consumption. It cannot be separated from each other because services are produced and consumed at the same time whereas goods are produced first and then consumed. Nonetheless, it should be apparent that the consumer is not necessarily being only a consumer, but also, a part of production process. They play dual role in the production process, i.e., a consumer and a producer. Hence, production cannot be stored and consumption is concurrent with production. For example, a taxi driver drives the car at the same time as the passenger is transported.
- iii. Degree of heterogeneity: The degree of heterogeneity is closely related to the degree of customer contact. The sources of service benefits arise from the interaction between the service provider and customer. Standardization of service system is one solution for reducing the heterogeneity, but still there are some other factors that can make variability, such as, the atmosphere of service provider and the location of restaurant. This means that the outcome of service delivery process is variable creates uncertainty and higher risk for the customer who wants to purchase and/or re-purchase a service.
- iv. Degree of perishability: This particular dimension of services is of course closely related to the degree of intangibility and simultaneity. Unlike commodities, services cannot be stored and this is not only for intangibility, but also for limitations of simultaneous production and consumption. The lower the goods element in the offering is and the closer production and consumption overlap, the higher the degree of perishability. However, managing the operation system by means of capacity management becomes more complex. Therefore, it is only possible to affect the service outcome by developing the capacity of operation management that influences both the provider and consumer. For example, capacity management

might reducing the customer waiting time, but at the same time cause provider to adopt a more flexible approach.

- v. Degree of customer contact: The higher the customer contact is, the higher demand for an instantaneous service increases the immediate and direct effects on the customers. The interaction between the provider and the customer means that the service providers have to be both competent and communicative. Therefore, it is important to select and train right people for right position in order to perform better as a front-office service provider. In a human nature, the higher degrees of customer contact leads to the higher degree of performance variability, and high performance variability impedes the continuity of quality.
- vi. Degree of demand fluctuation over time: This particular dimension is related to the perishability, i.e., the service offerings cannot be stored. Naturally, the demand of product fluctuates over time, and therefore, the necessity of capacity management becomes crucial. Restaurants cannot store customer visits, but they can naturally prepare for rush hour visits.
- vii. Degree of service customization: The characteristics of services, such as, the intangibility, simultaneity and heterogeneity, in and of themselves give rise to the monopolistic feature of services. A service does not have as complete a boundary when it comes to the finished offering as a product does, because of the interaction between providers and customers. Of course there are differences within the service arena; the degree of customization in professional services, hospitals and upmarket restaurants is much higher than McDonald's worldwide concept of service standardization.
- viii. Degree of labor intensity: Services can have higher or lower labor intensity based on industry and offering. For instance, even there are many employees work in the hospital, it is considered as a capital intense service industry because of the very expensive equipment in operation. This is of course not to say hospitals have low labor intensity, but in relation, the system operation management involves making more capital decisions than pure professional firms do. Professional services and

personal services show the opposite end of the spectrum, having high labor intensity. Consequently, human resource management, including hiring, training, and rewarding, is a top priority in the management of high-labor-intensive business.

- ix. Service direction towards people or equipment: This is important to discern the service or maintenance of products, such as, freight or dry cleaning, from the service where the direct beneficiaries are people. The consequence of this is that direct people-oriented services require the presence of customer and completely different mindset and skills than in those where the service rendered does not involve direct customer contact. For example, visiting hairdresser has a high degree of customer contact and caring about customization. But, in contrary, dry cleaning has a low degree of customer contact and less care about customization.

The subsequent framework of service classification developed by Professor David H. Maister [33] in Figure 2.3 describes the combinations of degrees of contact with the degrees of customization. The result is demonstrated here two-by-two matrix with four different situations, such as, the pharmacist, the nurse, the brain surgeon and the psychotherapist.

	<b>Standardized Process</b> <i>(Execution)</i>	<b>Customized Process</b> <i>(Diagnosis)</i>
<i>High degree of client contact (Value is on interaction)</i>	<b>Nurse</b> <b>Key skill:</b> ensure users comport by pre-set process	<b>Psychotherapist</b> <b>Key skill:</b> real-time diagnosis of problems
<i>Low degree of client contact (Value is on results)</i>	<b>Pharmacist</b> <b>Key skill:</b> supervision of low- cost delivery team	<b>Brain Surgeon</b> <b>Key skill:</b> creative solutions to unique problems

Figure: 2.3. The contact and responsiveness matrix [33]

The above matrix shows that how different can be the levels of contact and responsiveness even in the same sector. For example, in the case of the pharmacist, clients want the service to be delivered at minimal cost that resulting in standardized process with a limited degree of customer contact. But, in nursing, the client wants to be nurtured and nursed that required a considerable degree of customer contact to obtain customer satisfaction. However, in the case of brain surgeon, the situation is different and requires a high degree of customization, creativity and innovation but relatively involves low level of customer interaction. Finally, for the psychotherapist, it is required the professional skills with high degree of customer interaction. In this circumstance, one is faced with problems whereby the customer wants to be - and even must be - involved in the process to come to solutions.

## 2.2. 3 Service Triangle

Today, it is realized by everybody that we are all in services in some extent, either more or less. However, we will be more in services in coming age as the back-stage activities, i.e., focus on the making of product is shrinking with economies of scale and increasing the focus on front-stage activities, i.e., services. The service triangle in Figure 2.4 has been modified from James Teboul's original version [34] and presents additional components with description.

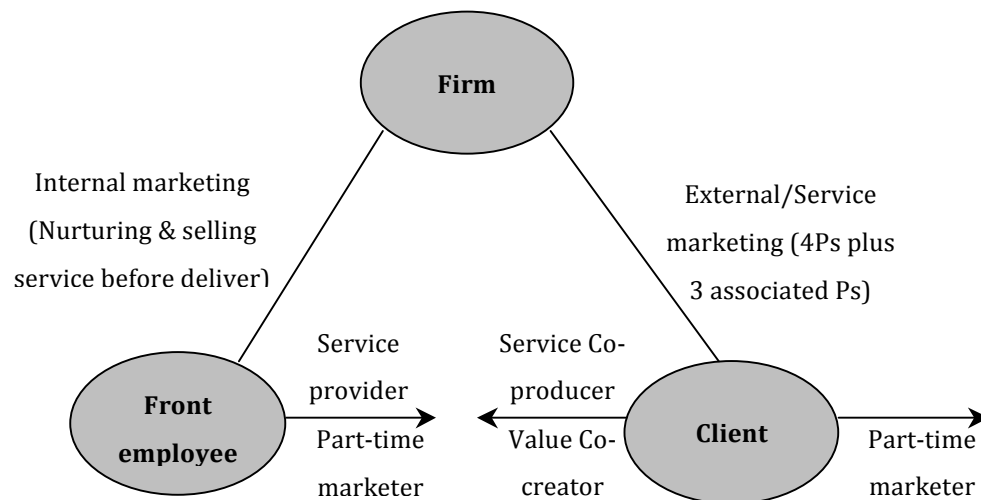


Figure 2.4. The service triangle from value chain perspective [34]

In the service triangle, depicted in Figure 2.4, the organization is placed at the top of triangle that plays a significant role by developing the employees' skills and providing necessary information required for service easiness and smooth delivery. Since employees are engaged in promoting the service, it is responsible of organization to pursue the role of every individuals and make sure that they understand and willing to act as required. Be sure that prior to any external marketing, organization is needed to sell the service to those who are going to provide it to clients or final users.

The bottom segments of the triangle indicate the frontline employees, i.e., service provider and client, i.e., co-producer. While employees deliver, control and market the services, clients take the part in the production process and marketing the services by using word of mouth.

In addition to 4Ps of external marketing i.e., product, price, place and promotion, there are three-associated Ps of service delivery, i.e., people, process and physical environment added new value of service marketing. A summary table of 7Ps of services marketing represent in the following:

Table 2.3. The seven Ps of services marketing [22]

7Ps	Description
Product	In service marketing, service product is the heart of firm's marketing strategy that consists with two key elements: (1) the core product meet the clients' primary needs and (2) the supplementary service addition mutually enhancing value that helps the clients to use the product more effectively.
Price	From suppliers perspective, pricing strategy is the financial mechanism even that income is generated to offset the costs of providing service and to create a surplus for profits. It is often highly dynamic that adjusted over time based on customer type, time and place of delivery, level of demand, and available capacity. On the other hand, customers see the price as a key part of the costs they must incur to obtain desired benefits.

Place	The distribution of services consists with physical or electronic or both channels depending on the nature of service. Nowadays, telephone or internet completes many services transactions where the access is available. Furthermore, firms may deliver services directly to end-users or through intermediary organizations, such as, retail outlets. In order to deliver the services to customers, decision should make considering where, when and how service will be delivered.
Promotion	A promotional activity mainly encompasses the monetary incentive that is often designed to stimulate immediate trial purchases or to encourage consumption when demand is comparatively low or economic down turn. However, it is also aimed to educate the people by providing the necessary information and advice, persuading target customers of the merits of specific brand or service product, and encouraging them to take action at specific times.
People	Even though, technology is advancing or good enough these day, but still many services require direct interaction between customers and service employees. Therefore, service firms should give special attention in selecting, training, and motivating their service employees. Consequently, a good interpersonal skills and positive attitude are crucial for front employees to deliver better services.
Process	The process of service delivery is very important that indicate how a service firm does things and what it does. In order to create and delivering better services to customers, it is required a good design and an effective process implementation. Any bad design or poor processes may lead to slow, bureaucratic and ineffective service delivery that ultimately make the customers unhappy even the service product is good enough.
Physical environment	The physical appearance of service space has significant impact on service quality and it's value that may includes, buildings, landscaping, equipment, printed materials, staff member's uniform, and other visible cues, etc. Thus, service firm need to manage "servicescapes" carefully, which ultimately have a positive impact on customer satisfaction and service productivity.

Thus, these seven elements-"7Ps" of services marketing collectively show the elements required to create appropriate strategies for meeting client needs profitably in a competitive marketplace.



## 2.2. 4 Service Dominant Logic

The worldview of service-dominant (S-D) logic stands in sharp contrast with the goods-dominant (G-D) logic of the past, as it holds services - the application of competences for benefit of others - rather than goods to be the fundamental basis of economic exchange. It is a logic that focused on the interaction of the producer and the customer and other supply and value network partners as they co-create value through collaborative process [35, 36, 37]. In S-D logic, the purpose of economic exchange is service provision for other party to obtain reciprocal service, i.e., service is exchanged for service. In this process, goods are sometimes involved as an appliance for service provision and conveyors of competences. Either service is provided directly or through a good, it is the knowledge and skills of providers and beneficiaries that mutually create value, not the goods themselves, which are only sometimes used to convey them. The following Table 2.4 gives a precise overview of vital differences between S-D logic and G-D logic:

Table 2.4. S-D logic vs. G-D logic on value creation [35-37]

<b>Viewpoint</b>	<b>S-D logic</b>	<b>G-D logic</b>
Value creation	Value is tied to the value-in-use and always co-created, jointly and reciprocally, in interactions among providers and beneficiaries through the integration of resources and application of competences	Value is created (manufactured) by the firm and distributed in the market, usually through exchange of goods and money
Value creator	Firm, network partners, distribution channels, and customers	Firm, often with input from firms in a supply chain
Value creation process	Value is proposed through firm's market offerings whereas customers continuing create value by using it	Value is embedded in goods or services and sometimes added by increasing or enhancing its features

Determination and meaning of value	Value is perceived and determined by the consumer on the basis of “value in use.” Value results from the beneficial application of operand resources sometimes transmitted through operand resources. Firms can only make value propositions.	The producer determines value. It is embedded in the operand resource (goods) and is defined in terms of “exchange-value.”
Role of goods	Goods are transmitters of operand resources (skills and knowledge); they are intermediate “products” that are used by other operand resources (customers) as appliances in value-creation processes	Goods are operand resources and end products, marketers take matter and change its form, place, time, and possession
Role of firm	Proposing value-added services and co-create value by mutual interactions	Producing value through an article and distribute them
Role of customers	The customer is a co-producer of service whereas marketers focus on interacting with customer and developing a long-term relationship with them	The customer is the recipient of goods whereas marketers focus on promoting customers, segmenting and penetrating them
Source of economic growth	Wealth is obtained through the application and exchange of specialized knowledge and skills. It represents the right to the future use of operand resources	Wealth is obtained from surplus tangible resources and goods. Wealth consists of owning, controlling, and producing operand resources

Furthermore, S-D logic represents a shift in logic of exchange, not just a shift in type of product that is under investigation. Vargo and Lusch [36], stated that the evidence of S-D logic somewhat can be found in diverse disciplines, for an example, information technology - service-oriented, architecture; human resources - organizations as learning systems; marketing - service and relationship marketing, network theory and so on. However, they also suggests that S-D logic should have a service-based foundation, built upon service-driven principles, i.e., value creation and co-creation, which can be generalize for understanding all economic activity even when goods are involved. Thus, a more robust

logic for transitioning from goods to services is important.

In order to transitioning from G-D to S-D logics and enhance its effectiveness, a new mindset is required. This transition can be captured in eight areas: (1) a shift to the process of serving rather than the creation of goods, (2) a shift to the primacy of intangibles rather than tangibles, (3) a shift to the creation and use of dynamic operant resources as opposed to the consumption and depletion of static operand resources, (4) a recognition of the strategic advantage of symmetric rather than asymmetric information, (5) a shift to conversation and dialog as opposed to propaganda, (6) an understanding that the firm can only make and follow through on value propositions rather than create or add value, (7) a shift in focus to relational rather than transactional exchange, and (8) a shift to an emphasis on financial performance for information feedback rather than a goal of profit maximization. Consequently, Vargo and Lush have developed ten fundamental premises (FPs) of S-D logic over the last years [35, 36, 37, 38]. A summary of most important and relevant FPs is described in the following Table 2.5:

Table 2.5. Fundamental premises of service-dominant logic [35-38]

Premises		Descriptions
FP1	Service is the fundamental basis of exchange	The application of knowledge and skills, 'service' is the basis for all exchange. Service is exchanged for service
FP2	Indirect exchange masks the fundamental unit of exchange	Exchange moved from the one-to-one trading of specialized skills to the indirect exchange of skills in vertical marketing systems. Goods, money, and organizations masks the services-for-services nature of exchange
FP3	Goods are distribution mechanisms for service provision	Goods are viewed as distribution mechanisms for services. Both durable and non-durable goods, the value is derived by using the service they provide

FP4	Knowledge is the fundamental source of competitive advantage	Knowledge is an operant resource. The source of competitive advantage is the ability (Knowledge and skills) to conceive the entire value creating system and make it work
FP5	All economies are services economy	Services are not just now becoming important, but just now they are becoming more apparent in the economy as specialization and outsourcing increases and as less of what is exchanged fits the dominant manufactured output classification system of economic activity
FP6	The customer is always a co-producer of creating value	The customer is always involved in the production of value, which is created throughout the relationship by the customer, partly in interactions between the customer and the supplier or service provider.
FP7	The enterprise can only make value propositions	Organizations can offer its applied resources and collaboratively create value following acceptance, but can not create or deliver value alone
FP8	A service-centered view is customer oriented and relational	Interactivity, integration, customization, and coproduction are the hallmarks of a service-centered view and its inherent focus on the customer and the relationship
FP9	All economic and social actors are resource integrators	Implies the context of value creation is networks (resource-integrators)
FP10	Value is always unique and logically determined by the beneficiary	Value is idiosyncratic, experiential, contextual, and meaning laden

Therefore, the central implication of a service-centered dominant logic is the general change in perspective. It disposes the limitations of thinking of marketing in terms of goods taken to the market, and it points to opportunities for expanding the market by assisting the customer in the process of specialization and value creation. The objective of this view is to customize offerings, to recognize that the customer is always a co-producer, and to strive to

maximize customer involvement in the customization for better fit their needs.

### 2.2.5 The Growing Importance of Services

The importance of services in the current economy is increasing rapidly than ever. Today, majority of economists agree that services make an important contribution to the economic development in every nation. Recently, it is observed that services, such as, producer service has a significantly positive influence on manufacturing sector's effectiveness. However, the value creation is not only confined to producing and consuming goods, but also enhancing the quality of life by means of services can be equally important. In this section, we will explain why services become important or what forces behind the growth of services in today's economy.

It is hard to determine just one factor in the service sector's growth; rather, a number of factors combinedly play a significant role in increasing this sector's importance. For an example, the factors, like, government policies, social changes, business trends, advances in information technology, and globalization are more powerful forces that transforming today's service markets. The following Figure 2.5 represents a summary of these forces based on Lovelock and Wirtz [22]:

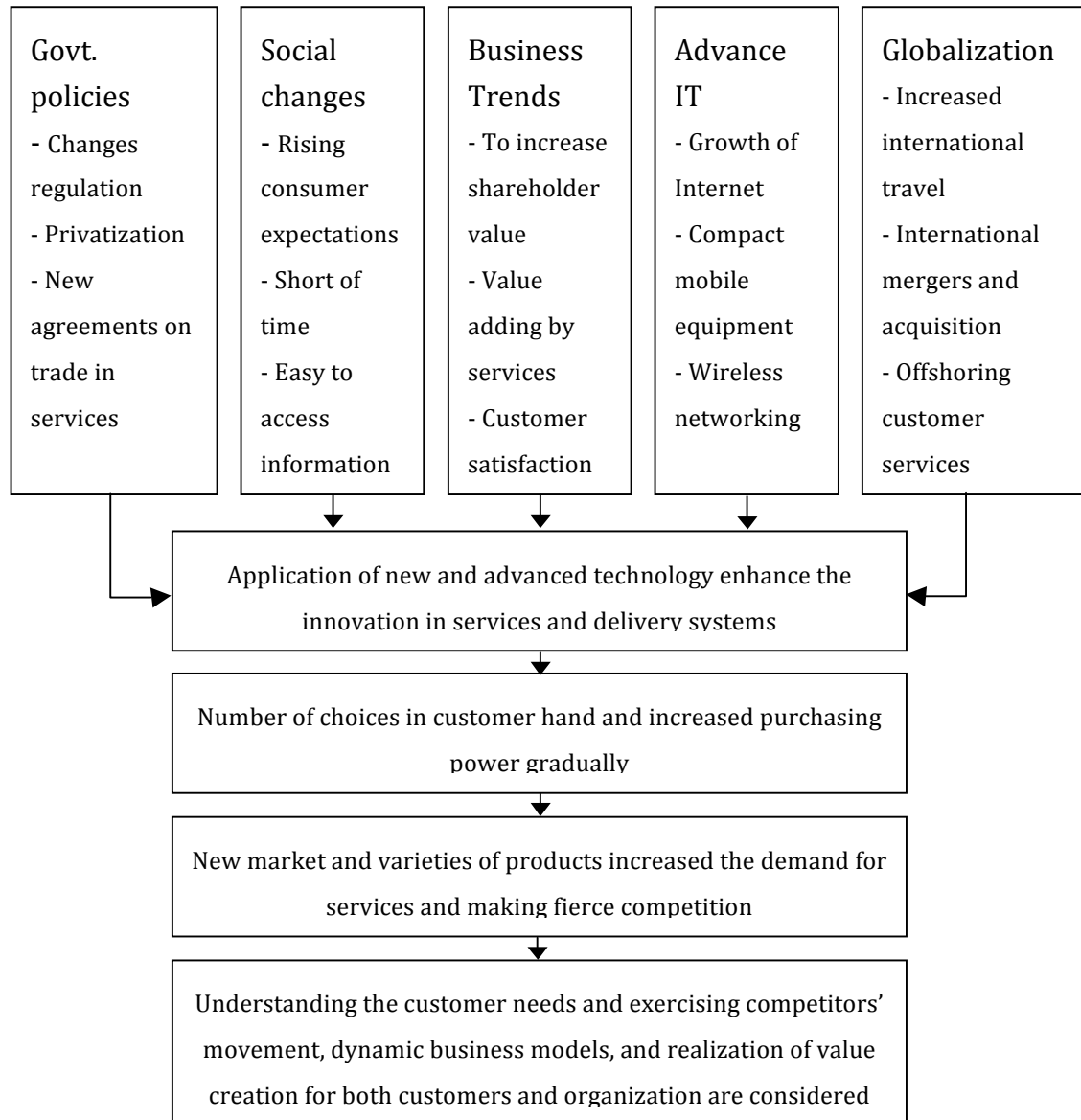


Figure 2.5. Factors forces the economy toward services [22]

The above factors in Figure 2.5 are collectively reshaping the supply, demand, the competitive landscape, and even customers' styles of decision-making. Although the importance of the service sector can vary between developing and developed economies, the growth of this sector can be considered a general trend.

## 2.3 The Servitization of Manufacturing

The previous sections provided a clear description of the history of service science, market trends, and its significance in the current economy. However, in this section we come to the pinpoint of this dissertation and describe the term ‘servitization’, which is our main concern. Consequently, we describe the rationale of firm movement, development stages, merits and demerits, and the implication of this strategy. In addition to these, we provide the most key challenges that the firms confront with the implementation of servitization strategy. Before we go to the deep discussion of this section, we would like to start a good definition of term ‘servitization’ in 2.3.1.

### 2.3.1 Definition of Servitization

A clear definition is the starting point for all good research. Defining the concept without finite limits raise many interpretations. Generally, the academicians are particularly known for coming up with a range of definitions, preferably a definition that fits their own research purpose and we are not except in this regard as well. Here, the term service and product are intrinsically linked to discussions on servitization. Product terminology is generally well understood by manufactures that are typified by a material artifact, for an example, aircraft, automobile, computer and so on. The term ‘services’ is more contentious, often used loosely and defined based on what they are not, i.e., a product. For the purpose of this dissertation is to discuss not only product or service alone but also a combination of products and services together that we termed ‘servitization’. The first use of this term was by Vandermerwe and Rada in 1988 [1]. They defined servitization as “the increased offering of fuller market packages or ‘bundles’ of customer focused combinations of goods, services, support, self-service and knowledge in order to add value to core product offerings”. In later, there are many other definitions of servitization observed in the literature that we summarized in the following Table 2.6.

Table 2.6. Definitions of servitization by different authors

Authors	Definitions of servitization
Vandermerwe and Rada (1988)	A fuller market packages or ‘bundles’ of customer-focused combinations of goods, services, support, knowledge, training and self-services
Tellus Institute (1999)	The emergence of product-based services which blur the distinction between manufacturing and traditional service sector activities
Verstrepen and Van Den Berg (1999)	Adding extra service components to core products
Robinson <i>et al.</i> (2002)	An integrated bundle of both goods and services
Desmet <i>et al.</i> (2003)	A trend in which manufacturing firms adopt more and more service components in their offerings
Lewis <i>et al.</i> (2004)	Any strategy that seeks to change the way in which a product functionality is delivered to its markets
Ward and Graves (2005)	Increasing the range of services offered by manufacturer
Ren and Gregory (2007)	A change process wherein manufacturing companies embrace service orientation and/or develop more and better services, with the aim to satisfy customer’s needs, achieve competitive advantages and enhance firm performance

Although, the above definitions have emerged from different perspectives in the literature, they are converging towards a common conclusion that manufacturing companies should be focusing on selling an integrated solutions or product-service-systems [39]. However, after giving an especial attention to the above definitions and considering all other relevant factors, we developed a more strategic and purposeful definition of



servitization that is fully effective for achieving the objective of this dissertation:

*“Servitization is an organization’s strategic innovation of creating value and processes to transform from selling products to selling an integrated product and service offering that delivers value in use and collectively meet the desired needs of client”.*

We consider this definition throughout the whole dissertation and designed our research, including, research objectives, methodology, and implication of the output in the real world. The next section we will explain the evolution of servitization concept based on previous study and related materials.

### 2.3.2 The Evolution and Related Study of Servitization

There are very few studies evidence recording the evolution of servitization within manufacturing industry. In 1988, Vendermerwe and Rada [1] was first described how companies initially considered themselves to be in goods or services, and then moved to offering goods combined with closely related services, and finally to position where firms offer ‘bundles’ consisting of customer focused combinations of goods, services, support, self-service, knowledge, and so on. In management-related studies, servitization development is commonly traced to the early 1990s, which in later became spotlight to the manufacturer and many firms have dramatically moved toward services and so caused the boundaries between products and services is blurred. However, in one study, Davies *et al.* [40] point out that in industrial marketing literature, the pioneering applications of it originated in the 1960s with the introduction of ‘systems selling’ strategies.

The ‘servitization’ phenomenon is marked by a manufacturer’s increasing focus towards service activities, a tendency to adopt services as a critical element of their competitive strategy [42], and a trend whereby manufacturing firms creates service businesses around and beyond conventional product offerings [43]. Howells [44] defines ‘servitization’ as the “tendency of some manufacturers to re-position themselves as service providers (SPs);” and Avadikyan and Lhuillery [45] suggest the increasing ‘bundling’ of products with services, and the sale of manufactured goods as services instead of products, leads to servitization. It is a bigger umbrella word for the transition of a firm from simply procuring parts and products to procuring services. Companies are adopting customer and service centric

strategies aimed beyond product supply and solution provision for the consumer's needs, due to the greater intricacy of products, flexibility of manufacturing infrastructure and the modularization trend [45].

Furthermore, the servitization phenomenon has also been introduced in (A) concepts such as: 'integrated solutions' [46, 47]; 'product-service systems', 'new manufacturing' [48]; 'performance based contracting' [49]; and 'going downstream' [2]; 'after-sales marketing' [50, 51]; and 'service profitability' [52, 53, 54, 55, 56], and (B) terms such as: 'servitization' [1, 57]; 'product-related service activities' [21, 42]; 'producer services' [58, 59]; 'service encapsulation' [60]; and 'product-service package' [16, 45], and so on. However, even the servitization concept or term is explained by different authors in their own way, the objective of all views are almost similar, i.e., to add value with manufacturing goods through services and solutions that mutually benefitted both organization and customers as well.

### 2.3.3 Development Stages of Servitization

According to Vandermerwe, the development stages of servitization have evolved three overlapping phases, i.e., "Goods or Services", "Goods and Services", and "Goods + Services + Support + Knowledge + Self-services" [1, 61].

- i. The first phase has observed before the 1950s when the firm defined themselves either as a manufacturers, for an example, General Motor, or as a service provider, like, Merrill Lynch. Only few manufacturers viewed themselves as a service provider in that time. But, after a rapid advancement of technological innovation, the business environment began to change and industries started to converge, which lead many firms to enter the second phase.
- ii. The second phase of this development is "Goods and Services", in which manufacturing firms started to realize that other players in the industry can easily replicated their goods and began to offer accompanying services with products due to increase customer satisfaction and differentiate the firm from competitors. For an example, the U.S. automakers' entrance into the customer automobile finance market. Similarly, the financial institutions, such as banks, brokers, and insurance started to design and use products in order to expedite the delivery of their services.

- iii. The final phase is stated as “Goods + Services + Support + Knowledge + Self-services” that allows customers to customize the packages or ‘bundles’ of goods and services, which mutually create values for both customers and firms.

Thus, dividing the things in categories of goods or services is not longer anymore as an interesting point to the manufacturing industry. However, manufacturing firms run to innovate and compiling their offerings with the combination of value added goods and services as of means the implication of servitization strategy. The next section will explain why manufacturing firm is going to servitized or what pushes them toward servitization.

### 2.3.4 Rationale for Movement towards Servitization

Services are essential for the growth and competitiveness of manufacturing firms, as they can contribute to the increased demand and complement the sale or lease of tangible products [62]. Designing, building and delivering integrated product-service solutions can foster innovation within organizations and improve capabilities and processes. Howells [60] regards technological innovations related to information and communications technology (ICT) as key factors motivating high customization and service orientation in manufacturing companies [45]. The rationale for developing service operations, extending the services business and integrating products and services can be summarized by following view points that drive companies to pursue a servitization strategy; namely, financial, strategic, economic, marketing and environments.

- a) Financial Benefits: Services retain potentially higher margins than products and generate substantial revenue from an installed base of products with a long life cycle [16, 54]. However, it secures the firm for regular income and balances the effects of mature markets and unfavorable economic cycles [63, 64].
- b) Strategic Advantages: Service addition helps the firm differentiate from competitors, aids the consolidation and protection of the core product businesses, and establishes intimate relationships with clients. Since services are more labor dependent and less visible rendering, and then more difficult to imitate, and hence a source of sustainable competitive advantage [3, 65].

- c) **Economic Pressure:** Service roles in manufacturing sector are growing rapidly, as increased the share of services activities are necessary to produce goods [66, 67]. Also, the de-industrialization and increasing international division of labor between manufacturing and services led to the declining shares of manufacturing in developed economies.
- d) **Marketing Opportunities:** Service component has great influence on purchasing decision and tend to induce repeat-sales, and by intensifying contact opportunities with the customer, can put the supplier in the right position to offer other products or services [62, 64].
- e) **Environmental Rationale:** Services make sure the use of resources more rationally. However, it also ensures the right way of products handling and increase efficiency that is friendlier with the environment [14].

According to the above study, we can conclude that servitization is mainly happened due to the market demand and desire to develop and/or sustain a competitive advantage. Most of the manufacturing firms realize that they need to inject more value to the core product through a service wrap, which in turn leads to changes in the firm's core business, its revenue and profit margin. Thus, adding value by adding services can be one of the routes for manufacturing firms to develop and achieve such advantages. In the next section, we will explain more precisely about the advantages of servitization. In contrast with this, we also discuss about disadvantages of its implication.

### 2.3.5 Advantages of Servitization

The application of servitization concept in today's highly competitive manufacturing industry is crucial. There are numerous advantages of servitization observed in the literature, however, the following key points are our own interpretation that we developed based on case studies:

1. **Enhancing product uniqueness:** For an example, Rolls-Royce, a UK based aircraft engine makers had passed tough time due to the competition of many low cost aircraft engine makers in the world. But, these day, instead, they are selling "power by the hour"- a complex offering of services that make them unique in the industry.

2. Creating barriers for new entrants: Services addition with manufacturing goods creates block for new entrance in the industry and/or third party, such as, distributors.
3. Generate transaction revenue: Traditionally, selling a product means one-time-transaction whereas selling a service-usage is a subscription-like transaction with multiple streams of revenue.
4. Make time monopoly: Due to the conceptual nature of services, it is more time dependent than products.
5. Increase dependency on supplier: Services characteristically evolve higher degree of customer contact that creates stronger relationship and increase customer dependency on supplier.

### 2.3.6 Disadvantages of Servitization

According to a brief discussion in all previous sections, it is obviously true that servitization has great benefits in terms of firm's competitiveness and creating customer value as well. However, transforming a firm focus away from goods to services certainly has its encumbrances. Even, services have been used in the past, but the form of offering and/or objective was undoubtedly different that it is in servitization. In this regard, we became in some opinions which is consisted number of disadvantages with the implementation of servitization strategy:

1. Servitization, i.e., packages or 'bundle' of offering as a new concept might interfere the firm's traditional operations.
2. The scope of competition becomes wider and deeper. This new dimension of doing business might create high level of uncertainty and some companies may find it difficult to handle properly.
3. Services is naturally intangible and frequently occurred with the interaction of front employees means the decision-making power is literally divert downstream, i.e., front office, which increases performance variability. As a result, variability might influence the customer satisfaction and burdens the quality of continuity.
4. Calculating the exact costs of services and profits or values might raise the difficulties in the accounting systems, as it is sometimes immeasurable.

5. The possibility of losing identity, including, brand name, core value and social recognition if the transition from manufacturing to servitization is not occurred smoothly.

The Section 2.3.5 and Section 2.3.6 reveals that while servitization could lead to lucrative opportunities and revenues, the manufacturer's transformation to integrate products and services is tremendously complex, even more than suggested by the literature. This could possibly be due to the involved of costs and difficulties. Thus, Section 2.4 will discuss a comprehensive list of challenges associated with the implementation of servitization strategy.

## 2.4 Challenges of Implementing Servitization Strategy

The implementation of servitization strategy consists with significant cultural and corporate challenges that can be broadly categories into integrated product-service design, policies, process, structure, strategy and organizational transformation [3, 4, 5, 63]. The design of services is significantly different to the design products since, by their nature, services are fuzzy and difficult to define [4]. In consequence, the organization is struggle to integrate product and services and identifies a moderate size of packages for different target markets or clients. This may discourage companies to expand its business from manufacturing to service dimension, because they need to take account of competition outside the usual domain, unexpected rivals including their own suppliers, distributors, and customers as well [1, 3, 62].

A manufacturer considering service-provision or expansion of the service business is faced with dynamically changing market conditions, speedy response to client needs, requirement of rapid process turnaround times, and volatile demand. These issues challenge the supplier, and demand fabrication of new protocols and paradigms. Tackling the emergence of such challenges requires a competitively enhanced business strategy. However, manufacturers that decide on a service-oriented strategy have to adapt the necessary organizational structures and process [3, 62, 65]. Here, there are challenges in defining the organization strategy necessary to support the customer allegiance required to deliver a combination of product and services [2]. Adopting a downstream position, such as the provision of installed base services, organizations have to be service oriented and value

services [3]. These organizations provide solutions through product-service combinations and tend to be client-centric and providing customized, desirable client outcomes organized around particular capabilities, competences, and client requirements [68].

Transforming a firm from product-domination to services-oriented total offering requires a continuous development of new services and management of customer productivity [69]. Services also present challenges in the form of integrated production, delivery components, and cultural movement. This culture is specific and different from the traditional manufacturing culture [62], and a shift of corporate mindset is necessary to take on services and priorities their development with respect to more traditional sources of competitive advantage [3, 4, 52]. This will require significant changes to long-standing practices and attitudes [1, 70]. For example, abandoning their product-centric structure in order to become more customer-centric [70, 71, 72]. Implementing these changes, companies are likely to meet resistance from areas within the organization where the service strategy is not understood or the fear of infrastructure changes [62]. Creating a service oriented environment and finding the right people for the service dimension is another big challenges. Particular skills like as, customer accessibility, solution oriented thinking are required to react appropriately in these circumstances – skills that must often be targeted in the recruitment process and develop over time. In order to provide a superior services, managers must be consider the peoples in the organization as their main assets that is required in moving from manufacturing to service operations.

## Chapter 3

# Research Methodology

### 3.1 Introduction

This chapter demonstrates the research methods we used for this dissertation and explains the procedure adopted to analyze the empirical data collected. We begin with a greater description of the methods available and then show how we used these methods in our study more detail.

There are two main approaches identified for this research that we combinedly used to develop servitization theory and practice as well: firm specific and multi-firm. A specific firm's approach helps us to deeply analyze its transformation process into a service-based company and generalize the findings. In this approach, we interviewed multiple executives and key personnel in our case company, which already highly recognized as a servitized firm in the respective industry. This case allowed us to delve deeper into the issues related with servitization, specifically, firm's operational process transformation, change drivers, cultural factors, and so on. The other approach (multi-firm) consists of analyzing a large number of companies that have dealt with or currently dealing with the transformation into a more service-based company and yields broad, general issues. In this approach, we conducted a questionnaire survey in three multi-national firms and gain a broad understanding of the issues, including, the factors influencing firms' implementation of servitization strategy, and the challenges that they faced during the transition process.

The selected methodological approach resonates the availability of resources, disposition of the studied objects, and philosophical assumptions related to their reality; along with ways to study it, and ascertain details required by the [73, 74]. Irrespective of the researchers awareness, these factors directly influence the research design. The research design must follow a logical sequence of events starting from philosophical assumptions, to preliminary study questions, to data collection, through to possible interpretations [75].



## 3.2 An Exploratory and Explanatory Approach

A well-respected case study research approach was used as a main source in establishing our methodology. Robert Yin [75, 76] identifies three categories of strategy for conducting a research: exploratory, descriptive, and explanatory. An exploratory study aims to explore a subject or phenomenon for which there is no or limited prior information or knowledge exists, and helps in furnishing detailed data through the use of literary sources, expert interviews and focus groups [77]. A descriptive study attempts to explain or define a subject for better understanding of researched features. Finally, an explanatory study goes further than a descriptive research and aims to explain observed results by establishing relationships between different factors. It is proven to be an effective strategy where the 'how or what question is being asked [75, 76]

According to the above definitions, we will use both an exploratory and an explanatory research approach for this dissertation. The process began with purposefully as an exploration on the related issues and/or subject of servitization in the current business arena. As we already have determined the subject of this dissertation through relevant studies, interviews and observations, we then focus on explanatory approach more precisely.

## 3.3 Research Design

The goal of this dissertation is to study the servitization of hi-tech manufacturing firms. The huge gap in understanding servitization of manufacturing firms, the underdeveloped literature, and scarcity of qualitative and quantitative statistical data has compelled the formation of an effective research strategy. In order to bridge this gap, research was designed to analyze firm's operational process transition towards servitization and challenges faced by servitizing firms. In-depth scrutiny of the service interaction of manufacturing firms, their strategy and classification of concepts furnishes interesting results, laying a foundation for the analysis of the process. An analysis of the industry and determination of organizational factors for successful servitization can be undertaken by producing and using research findings.

According to the Robert Yin [75, 76], research design should have five critical parts: (1) the research question; (2) the underlying propositions; (3) the logic/theory that links the

data to the propositions; (4) the unit of analysis; and (5) the criteria to interpret the findings. Based on the Yin's recommendation, we first developed the research questions with the supporting propositions in Chapter 1. Chapter 2 provides a broad range of theoretical background and our criteria to interpret the findings. The rest of the paper focused on the process of data collection, analysis and interpretation.

Since our research questions focused on the "how and what" of servitization and we had a little control over the behavioral events that affect the process, we used the above conditions to determine that a case study design best met our needs. Thus, we chose the case study approach for our research because it helps us to better understand the reality and complex phenomenon, and allows us to retain a holistic and meaningful view of the characteristics of today's business events. Consequently, the number of interviews and an exhaustive archival appraisal of various firms' experience in product-service integration also help us for preparing this dissertation more feasible.

### 3.4 Data Collection

The thesis is purposefully started out as an exploration on the subject of servitization. There is two main issues have prioritized in this dissertation: firm's operational process transformation and organizational factors on implementing servitization strategy. In order to solve these two key issues and enhance better understanding of the subject, we used both qualitative and quantitative research approach in this study. While the qualitative approach relies on the interpretation of the gathered information from primary and secondary sources and not on statistical findings, the quantitative approach is more reliant upon transforming the data into numerical values that leads to accomplished the statistical analysis. The next sections will provide more precise overview of qualitative and quantitative approaches.

#### 3.4.1 Qualitative vs. Quantitative

The careful selection of data collection mechanisms is indispensable for the achievement of aims and objectives of a study. Patton [78] suggests that direct observation, written documents, and interviews form the basis of qualitative findings; and extensive data volumes, in qualitative research, are organized into "common themes, patterns and insights." This approach is more advantageous than quantitative research when testing and

verifying existing theories, and is better suited for generation of grounded theories [79]. Qualitative data may not only be grounded theory, as the preparation of a survey without seeing what people in the field are doing or saying would be inappropriate. In contrary, quantitative approaches obtain information by utilizing numerical data through a systematic, objective and formal process.

Although servitization literature suggests a qualitative approach to be most effective approach that allows fabrication of a framework through collected qualitative data, we adopted quantitative approach as well as with the qualitative approach that give us more concrete results and enrich the quality of dissertation from theoretical and factual perspective.

### 3.4.2 Selection of Data

For a wide-ranging analysis of the servitization phenomenon, multiple data collection and investigational techniques have been used for primary, secondary and tertiary sources of information. Before selecting the data, we should first define what the term data actually mean. According to Cooper [80], data are the facts presented to the researcher from the study's environment. Here, the environment for our thesis is consisted of both the academic and business world. Thus, we needed both primary data and secondary data to demonstrate and to explain the servitization process and its strategic implementation.

Primary data is first hand information collected by the researchers to solve the specific research problem. The aim of primary data collection is to fill inconsistencies in 'existing knowledge'. It is essentially consists of interviews, surveys, questionnaires, first-hand observations and work experience. The most important and unique source of our primary data collection is divided into two stages, respectively, 17- in depth interviews of one specific firm, i.e., IBM Corporation and 57- questionnaire survey of three multinational hi-tech firms, namely, Fujitsu, Toshiba, and Hitachi (FTH) limited.

Secondary data include openly available sources of data collected by others such as books, research reviews, journals, news articles, surveys, statistics, industrial reports, and databases. It was important in the setting up the theoretical framework and understanding the case companies business environment. Appropriate sources of secondary data were chosen for this dissertation and close attention-to-detail was given to the operational industry, research aims, company profile, and geographic region. By using information

from other researchers and industry sources, we were able to develop a more integrative approach with which to analyze case companies in respect to our research questions and develop generalized conclusions and recommendations.

### 3.4.2.1 Interviewing

The strongest contribution in our research is the folder of interviews we carried out as the main and most unique source of primary data in qualitative case study research approach. The findings reported here are from a multinational information and communication technology (ICT) firm, hereafter referred to as ‘International Business Machine (IBM) Corporation’ that has been classified their business as the amalgamation of goods and services (Servitization). The company is one of the largest computer and technology firm in the world, which conducted its activities into five business segments, and acquired market from U.S. to Europe, Asia, Africa, Oceania, and many others part of the world. In accordance with the principles of process research, particular attention was given to unfolding processes of flux and transformation [81, 82]. The case study was presented as a ‘thick description’ to enable the reader to judge the extent to which the findings can be generalized to other organizations with similar characteristics [83].

The case study draws upon a prolonged engagement with the firm over one and half year period. We conducted a total of 17 in-depth interviews, separated into two distinct phases. Each of the interviews lasted between 60 and 90 minutes, and was recorded and subsequently transcribed verbatim. The interviewees were designated as the director of research and development, senior management consultants, marketing and communication managers, service engineers, operational managers, and service employees. In addition to primary data collection, the secondary data (company documentation and archival records) were collected as well, in order to achieve a theoretical triangulation [75, 76]. The data were analyzed using a thematic framework initially developed from the relevant literatures. A coding framework was then developed, and used Nvivo software (QSR International) for managing the vast amounts of data, annotations and memos recorded within the transcripts [84].

The first phase of the research commenced in 2011. This was composed of 9 semi-structured interviews across the selected business units in Japan. The objective of this phase is to derive a conceptual model of firm process transition from manufacturing to

servitization based on in-depth interview under the viewpoint of research and development, procurement, production, sales and marketing, and after sales services. The questions focused on the respondents' career backgrounds, the history of company's current and previous activities, and their perception of the shift from manufacturing to service operations. Special attention was also given to the respondents' viewpoint on firm's operational process transition and the evolving organizational structure. The second phase of the research was composed of a further 8 semi-structured interviews carried out in 2012. The interviews explored in depth changing processes of IBM and identified the key change drivers towards servitization of business. These are vision creation, mindset and strategy development, leadership and teaming, value sharing and communication, and anchoring a new service culture. However, internal company documentation elucidating firm performance, operations, service offerings, devised strategies, and organizational structures supplemented the interviews. The interviews with people in the industry aim to reduce uncertainties related to the process of servitization of manufacturing firm by better comprehending managerial issues, customer needs and challenges faced.

### 3.4.2.2 Questionnaire

A questionnaire is the most effective written survey that we used for achieving the specific subject under quantitative research approach. In this respect, we conducted a self-administered questionnaire to measure the factors under the investigation. Prior to the actual distribution of the questionnaire, a discussions and pilot study were conducted with the engagement of the firms over two months period. This helps us to explain the objective of questionnaire to the respondents and ensure the consistency and clarity of the questions asked which resulted in the questionnaires being refined and rephrased accordingly. The questionnaires were also translated to the native language (Japanese Language) for better understanding who were less expert in English.

The questionnaires were then distributed to the employees of three multinational Hi-tech firms, referred to as Fujitsu, Toshiba, and Hitachi (FTH) limited, Japan, which can be qualified in its industry as a medium or large size companies with yearly sales of JPY 4467 billion, 6100 billion, and 9665 billion (FY 2012) respectively [85, 86, 87]. The selection of these companies were a critical task for this study, as we sought to investigate the hi-tech manufacturing firms who have a track record of successful provision of product related

services. For this reason, we have adopted a purposive sampling strategy and selected Japan based original hi-technology products manufacturer that designs and manufactures high-value electronics / IT goods for the business enterprise, government and consumer market as well.

The questionnaire for this study consisted of 30 items, there were 25 items divided into five dimensions based on the literature review and other 5 items were about the questions of servitization strategy. A total of 100 questionnaires were distributed, and 57 were returned giving a response rate of 57%. The respondents' background ranges from diverse functional areas including, planning and decision making, research and development, portfolio strategy and marketing unit, finance and human resource, business development unit, service design and engineering and so on. The majority of the respondents (70%) occupy managerial rank or higher-level positions. The proportion in this rank includes HR managers, sales and marketing managers, service engineers, operational managers, ubiquitous managers and senior managers. The other 30% of the respondents belong to the top-level management. They are the marketing directors, vice president of portfolio strategy, senior consultants, and CEO. The use of respondents from different backgrounds allowed different avenues of inquiry to be pursued in the data collection [88]. The questionnaire focused on determining the influence organizational factors on implementing servitization strategy. Subjects were asked to assess their perceptions of various items of different constructs about the factors of organization and servitization strategy. Assessment were based on a five-point Likert scale ranging from 1 = strongly disagreed to 5 = strongly agreed the participants indicated to what degree they observed the reasons as important. Measures were adapted from Ang et al. [89].

### 3.5 Practical Considerations

The interview questions and questionnaire survey can be found in Appendix A and B. The right to avoid confidential questions was verbally re-iterated at the onset of each interview. Participating interviewees had the option of a promise of anonymity and/or confidentiality of proprietary information, to ensure safety of the disclosure of potentially sensitive information. Despite the benefits of interviews, the following points need practical consideration:

- a. Requirement of external resources
- b. Scope of the dissertation
- c. Results subject to researcher's inference of the responses
- d. Restricted sample size and limited interviewee subjects
- e. Unavailability of all targeted interviewees
- f. Interviewees biased towards particular beliefs and practices

In some cases telephone interviews are effective, but were not considered due to the following practical disadvantages:

- i. Insensitive towards valuable non-verbal elements
- ii. Interview notes will inevitably lack detail
- iii. Inability of the interviewee and interviewer to utilize props
- iv. Lacks flow through face-to-face rapport
- v. High possibility of missing out key points (unless recorded)
- vi. Possibility of nomination of additional interviewees during a face-to-face discussion
- vii. Unlikely provision of support materials from interviewee (diagrams, reports, etc.)

### 3.6 Conclusions and Limitations

This chapter highlights the tools and techniques used to structure, narrow-down and filter the broad subject area surrounding the servitization of manufacturing. While the primary research mostly focused on bringing the real insights from industry experts who were concerned about the firms' transformation toward servitization, the secondary research furnishes intricate details and helps in the broader appreciation of primary data. The results forming part of this dissertation are a critical evaluation and in-depth analysis of the servitization process for manufacturing firms and constitute a combination of research methods, approaches, designs, strategies, information sources, data-collection techniques, expert industrial views, and classification of mechanisms.

This dissertation is based on an exploratory and explanatory study that undertaken with limited resources, and a narrow window of opportunity (time frame, financial resources, external research assistance) to extend this dissertation over a broader topic range. With a very few exceptions, the available literature on servitization is extremely underdeveloped

and many variables such as specific obstacles for manufacturing firms are still unknown. This makes it virtually impossible to quantify findings and use benchmarking techniques to ascertain industrial trends across the globe. Most research is based on case studies on specific examples in advanced countries, rather than sample-based studies or focusing on emerging economies.

The in-availability of comparisons across different strata of the industry or geographical regions severely constricts development of research analysis, as available studies only provide statistics from random sampling. The absence of standardized definitions, concepts and theories on servitization limit the scope and breadth of research. Interviews within the Japan, Finland, UK, and USA were initially planned as part of the research, but complication of contact and financial difficulties led to its failure except Japan and USA. In many cases, annexes from previous research studies weren't provided, even on multiple requests to the authors, which constituted a major limitation for the development of interview questions and collation of results.

The choice of firms on the basis of sector, knowledge on services, and accessibility, could be a major limitation. Statistical validity of the data also poses a major challenge, as managers often want interviewers to form a particular mental image and believe a certain perspective to help market ideas. Some level of imperviousness is offered by supplementary research of the sector and secondary data. The chosen methodology forms the most appropriate research method, as this dissertation opens doors for further future research on servitization.



## Chapter 4

# The Transformation: Manufacturing to Servitization

This chapter aims to analyze and develop a conceptual model of firm's operational process transformation from being a product-centric organization to product-service-centric organization. It also identifies the key drivers of successful change process and raises an empirical case study of IBM Corporation for validating the concept towards servitization of business. After the introduction of this chapter, we provide an overview of general theory of enterprise transformation in Section 4.2. Sections 4.3 and Section 4.4 will then describe the main objective of this chapter, i.e., operational process transformation and change process. The rest of the sections additionally explains the firm's cultural adaptation from manufacturing to servitization and concludes by the summary of this chapter.

### 4.1 Introduction

This chapter extends beyond the more scenes - setting literature review, real-life case studies, primary data collection (interviews), and interrogates the changes, processes, and strategies in the transition from product manufacturing to a service-focused total offering. The role of this extension is to form a prelude to the analysis, discussing concepts from researchers, while introducing our new ideas from research evidence. In this chapter we analytically conceptualizes a model of firm's operational process transformation from manufacturing to servitization based on number of case studies of successful servitized firm in hi-tech industry. The key examples of these firms are presented in Table 4.1. We then validate our conceptual model by using one particular case company, namely, 'IBM Corporation' and explain how a traditional hardware manufacturer revolutions in the computer industry through non-hardware (service-ware) depend services activities; consulting, financing, training, and so on and has fundamentally shifted their business from

not only producing goods to offering a bundle of goods and services (servitization). It also discusses the pertinent aspects of the firm's cultural adaptation and strategic change process towards servitization of manufacturing based on our observations and interview results of IBM professionals.

Table 4.1. Examples of Servitized Firms in Hi-tech Industry

Firms	Explanations	Sources
Rolls-Royce	Moved from manufacturing to selling "power by the hour"- a complex offering of services and guaranteed flying hours for aero engines	Lovelock [22]; Howels [60]
Xerox International	Document management services; integrates document storage and reproduction technology-Xerox's traditional manufacturing strength – with customer's business systems to produce automated, just-in-time, customized document production and guaranteed fixed price per copy	Mont [14]; White et.al. [80]
IBM	Transformed from mainframe maker to robust provider of integrated hardware, networking, software solutions, financing and consulting services	Zahir <i>et al.</i> [81]
Nokia	Nokia's network-infrastructure solutions, providing network equipment and service to carriers	Wise and Baumgartner [2]; Davies et al. [40, 46]
Alstom	Maintenance, upgrade and operation of trains, and signaling systems	Davies [47]
WS Atkins	System integration services and out sourcing solutions	Davies [47]
Fujitsu	Increases amount of services including, system integration services, front-end technologies, outsourcing services, network services, system support services, security solutions and consulting services	Zahir <i>et al.</i> [82]

Ericsson	Turnkey solutions to design, build and operate mobile phone networks	Davies [47]
Thales	Pilot training and simulator-building management	Davies [47]
Toshiba	Shifted from product-centric to product-service-centric organization and strengthening focus businesses, such as, integrated storage solutions, retail solutions, home solutions, health care services and solutions, and so on	Zahir <i>et al.</i> [83]
Siemens	Offering a wide variety of consulting, maintenance, and services around high IB it possesses	Neely [5]
ABB	Turnkey solutions in power generation	Miller <i>et al.</i> [68]
Hitachi	Add on non-hardware (Service ware) depend services including operation management systems, staffing, training, consulting, and solutions services	Zahir <i>et al.</i> [84]

The above all of these companies moved to exploit downstream opportunities from services. These services separated by Wise and Baumgartner into four categories [2]: (1) embedded services which allow traditional downstream services to be built into the product, for an example, Honeywell's AIMS (Airplane Information Management System) for in-flight monitoring of engine systems, (2) comprehensive services such as those offered by GE around its product markets like, capital's financing activities, (3) integrated solutions where companies look beyond their traditional product base to assess the overall needs of customers such as, Nokia's move to network-infrastructure solutions, and (4) distribution control as used by Coca-Cola to grab shelf space in its high-volume low-margin supermarket segment.

However, the implementation of servitization aims to provide customers with functional results that discussed by many authors in the above Table 4.1, for an example, Howells [60] in the case of Rolls-Royce's offering of guaranteed flight hours from their aero engines and White *et al.* [80] and Mont's [14] explanation about Xerox's movement from the provision of photocopiers to offering document management. Miller *et al.* [68] and Davies [47] describe examples of the provision of integrated solutions and view these as "integrated combinations of goods and services that are tailored to create desired outcomes for the

customers". Davies [47] also explains that suppliers of capital goods are moved into integrated solutions provision from different position up and down the value stream, for an example, Alstom's transport solutions, Ericsson's mobile networks, Thales's training solutions and WS Atkins's system integration capabilities and outsourcing. Finally, Zahir *et al.* [81,83, 84] concludes that hi-tech firms extend their value chain from hardware depend services to non-hardware (service-ware) depend services and solutions, such as, IBM's financial services, Fujitsu's training and consulting, Toshiba's retail solutions, and Hitachi's operation management systems.

The next Section 4.2 will provide an overview of the theory of enterprise transformation and rest of this chapter will explain one of our main proposition of this dissertation, i.e., firm's operational process transformation from manufacturing to servitization.

## 4.2 Theory of Enterprise Transformation

The need to transform - change in fundamental ways - has long been a central element of the economy and society [85, 86]. Rouse [12] claims that the "enterprise transformation is driven by experienced and/or anticipated value deficiencies that result in significantly redesigned and/or new work processes as determined by management's decision making abilities, limitations, and inclinations, all in the context of the social networks of management in particular and the enterprise in general". This transformation can occurs both in and internal and contexts. While the internal context of transformation is pursued through work process and yield work products, and incurring costs; the external context is partially driven by economy that affects markets and turn to enterprises eventually (e.g., regulation and taxation). There is a wide range of ways to pursue transformation such as, ends, means, and scope [12]. The ends of transformation can range from greater cost efficiencies, to enhanced market perceptions, to new product and service offerings, to fundamental changes of markets. The means can range from upgrading people's skills, to redesigning business practices, to significant infusions of technology, to fundamental changes of strategy. The scope of transformation can range from work activities, to business functions, to overall organizations, to the enterprise as a whole.

Now, the question might arise why enterprises need to transform? What processes can enable this transformation? According to Rouse [12], there are basically four alternatives perspectives that tend to drive needs for transformation such as, value opportunities, value

threats, value competition, and value crises. Transformation initiatives driven by external opportunities and threats, which tend to adopt strategy-oriented approaches, for example, markets targeted, market channels employed, value proposition, and offerings provided. However, there are other initiatives driven by competitors' initiatives and internal crises that tend to adopt operations-oriented approaches such as, supply chain restructuring, outsourcing and off-shoring, process standardization, process reengineering, and web-enabled processes. A summary table of these discussion is stated in the below Table 4.2.

Table 4.2. Value Deficiencies and Processes Enabler of Transformation [12]

	Description
Value deficiencies drive transformation	<ul style="list-style-type: none"> <li>- Value opportunities, e.g., the allure of greater success through market and technology opportunities</li> <li>- Value threats, i.e., the danger of anticipated failure due to market and technology threats</li> <li>- Value competition, which means the firm is influenced by competitors' transformation initiatives that ultimately creates the necessity of firm transformation for continuous success</li> <li>- Value crises that realizes the firm for steadily declining market performance, cash flow problems, and so on, which at the end push the firm transformation for surviving in the market.</li> </ul>
Work processes enable transformation	<ul style="list-style-type: none"> <li>• Initiatives driven by external opportunities and threats:               <ul style="list-style-type: none"> <li>- Market target is pursuing global markets such as emerging markets, or pursuing vertical markets such as aerospace and defense.</li> <li>- Market channels employ describes by adding web-based sales of products and services such as automobiles, consumer electronics, and computers.</li> <li>- Value proposition, e.g., moving from selling un-bundle products and services to providing integrated solutions for information technology management.</li> <li>- Offerings provided, i.e., changing the products and services provided, perhaps by private labeling of outsourced products and focusing on support services.</li> </ul> </li> <li>• Initiatives driven by competitors' initiatives and internal crises:</li> </ul>

	<ul style="list-style-type: none"> <li>- Supply chain restructuring encourages simplifying the supply chains, negotiating just-in-time relationships, and developing collaborative information systems.</li> <li>- Outsourcing and off-shoring shows the firm an opportunity of contracting out manufacturing, employing low-wage, high-skills labor from other countries.</li> <li>- Process standardization defines as an enterprise-wide standardization of processes for product and process development, R&amp;D, finance, personnel, and so on.</li> <li>- Process reengineering acts as an identification, design, and deployment of value driven processes.</li> <li>- Web-enabled processes develop online and self-support systems for customer relationship management, inventory management, and so on.</li> </ul>
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Furthermore, transformation involves resources allocation and management decision-making. The ability of an enterprise to redeploy its human, financial, and physical resources is central to the nature and possibility of transformation. Changing the tasks and activities of the enterprise, by themselves, relates to business process improvement. In contrast, changing the purpose, objectives, and functions of the enterprise is more likely to be transformational. The higher level of transformation, the more difficult, costly, time-consuming, and the changes will be risky. For instance, changing the purpose of the enterprise is likely to encounter considerable difficulties, particularly if the extent of the change is substantial. In many cases, for example, defense conversion, such change has only succeeded when almost all of the employees were replaced [12].

Nadler and Tushman [87] focused on critical success factors (CSF) that management should consider on handling complex and difficult changes of re-orientation and/or re-creation. These factors are diagnosis of the problem, formulating a vision, creating a sense of urgency, linking change to core strategic issues, communicating and leading, and broadening the base of leadership. Consequently, change drivers such as, values and culture [88], reward and recognition systems [89, 90], individual and team competencies [91], and leadership [92] have strong impacts on an enterprise's inclinations and abilities to pursue transformation.

Therefore, we can summarize that enterprise transformation occurs for proposing new value through products and services offerings or old value propositions provided in fundamentally new ways. It is driven by perceived value deficiencies relative to customer

needs and expectations and/or increasingly need to consider and pursue through continuous changes to maintain or gain its competitive advantages. However, many authors comment that the change drivers such as, culture, team competencies, leadership and rewarding system significantly influences on enterprise successful transformation. The next section aims to describe this transformation, especially, firm's operational process transformation and change drivers servitization perspectives.

### 4.3 Process Transformation towards Servitization

The process of servitization requires the implementation of various organizational changes, new processes, and strategies for transformation from product manufacturing to a service-focused total offering. However, organizations encounter a business shift when implementing service-addition, or increasingly adding-value to their core offering [1]. In spite of various difficulties or complexities involved with the process of servitization journey, it is observed in a long-term study of servitization research where researchers are suggested to manufacturer movement towards value extension through service addition and directed the firm transformation into relationship business model, building new structure, create service oriented culture, and focus skills and knowledge base operation. In this section, we focus on firm's process transformation, especially, operational process that is significantly different from those of pure manufacturing to servitization. Slack and Lewis [93] explain that firm's operation is a "total pattern of decisions which shape the long-term capabilities of any type of operations and their contribution to the overall strategy, through the reconciliation of market requirements with operation resources". Every firm highly relies on its operational process to produce an effective goods and/or services and efficient deliver of them. Literally, the firm's operation units or functions are responsible for transforming process of converting business inputs, such as, peoples, money, machines, materials, information and so on to produce an effective good that in turn add values for customers and make firm's profit margin. The major functions of firm's operational process are identified: marketing and sales, production, research and development, and customer support [93]. The effectiveness of these functions is important and critical to gaining competitive advantage for an organization.

Therefore, this section analyzes the firm's operational process more precisely and developed a conceptual model of process transformation from manufacturing to

servitization based on number of case studies of successful servitized firm in the hi-tech industry. This model is explained under the five key functions of operation management, respectively, research and development, procurement, production, sales and marketing, and after sales services. When we determined the significant differences between these two interdisciplinary areas of products and services provision based on literature review, real-life case studies, observations and our group analysis, we get a kind of conceptual model of firm's process transformation from manufacturing to servitization that portrayed in Figure 4.1.

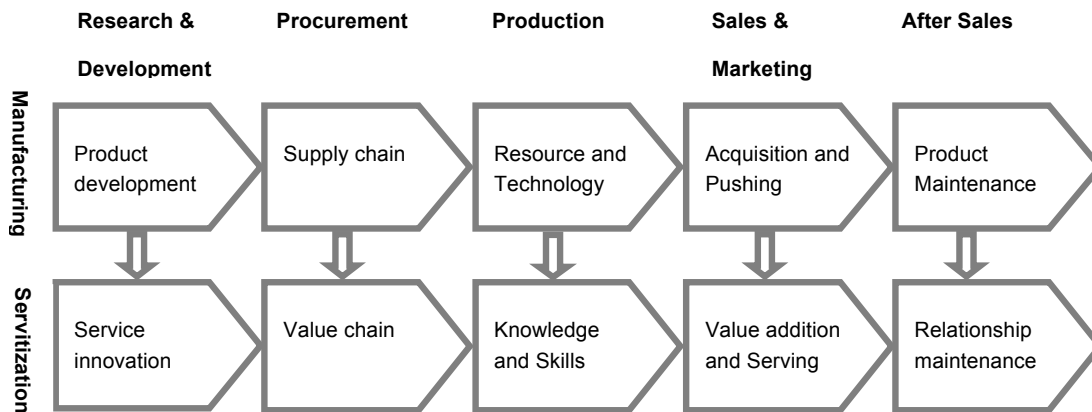


Figure 4.1. The concept of process transformation (manufacturing to servitization)

The model contains the notion of firm's operational process in two different perspectives and directed the firm transformation from manufacturing and servitization under the key functions of operation management, i.e., research and development, procurement, production, sales and marketing, and after sales services that we explain briefly in the following:

**Research and Development:** In manufacturing, it is observed that the research and development traditionally focused on product development, upgrading products quality and design, and improving process efficiencies, but they are less attentive to customer needs and expectations while servitization requires to interact with customers, gathering customer experience and/or market information, observing buying behavior, and developing more innovative and value-added products and services that collectively meet the user needs at the end.



Procurement: Generally, the procurement in manufacturing firm is highly concern on creating an efficient supply chain by which they can acquire or obtain raw materials, property or services at the operation level on-time at low cost. But in the case of servitization, we assumed that the concept of supply chain need to consider into value chain that increasingly create values in the whole chain processes from supplier to end users at more strategic level.

Production: The production in manufacturing firm is mainly completed by resources where raw materials are the core components of producing goods, and technology works for making an article and/or increasing production efficiencies. On the other hand, the servitized firm needs to conduct its operation through knowledge and skilled peoples who have customer accessibility, solution oriented thinking, and service oriented mentality to create high quality services and customized it. In addition to this, the service-driven firms must be concerned about its internal and external capabilities that supporting to make services more smoother and on-time delivery to the clients.

Sales and marketing: The core objective of sales and marketing in most of the traditional manufacturing firms is pushing new products in the market and acquiring more customers into their accounts. In this regard, the firm set-up its selling approach more transactional rather than relational, and target to gain short-term benefits for a certain period. However, in the context of servitization, firms are required to continuous research of customer needs and developing an effective marketing mix, including, people, process and physical environment that create additional values and satisfy the customer eventually. In this provision, the firms need to be solution oriented, building relationship base selling platform, and projecting to achieve long-term business benefits.

After sales: Traditionally, the manufacturing firms have provided the services in the form of after sales services, such as, installation, maintenance, and repair, which primary focus is to sell the products. In this regard, the firms usually do not maintain any contact or relationship with the customers once the transaction is finished. But in the servitization continuum, after sales services are the part of its integrated offering where relationship induces number of transactions. In this provision, the firms are required to interact with customers continuously and recognized their needs and/or solve the problems through better understanding by on time. However, the firms also need to react with customers as a potential repeat buyer and the promoters of future businesses.

Thus, the above discussion leads us to conclude and summarize that operational process in manufacturing and servitized firm is significantly different and run by its own pace. While the firm's operational process in traditional manufacturing is completed by resources and technology and the primary objective of the company is to produce high quality goods and achieve quick return, the servitized firms are required knowledge and skilled people to conduct its operation, and the firms' main focus to recognize their customer needs, adding values and building relationships with customers for long-term business gain. The next section will explain the firm's change process and/or key change drivers that are essential to consider during the transformation from manufacturing to servitization.

#### 4.4 Key Drivers of Change Process

Identifying the key drivers of change processes are an essential task for any organizational changes, such as, structural changes, policies changes, processes changes, cultural changes, or the extension of new business operations, and so on. Almost in every case, the basic goal is same: to make fundamental changes in how business is conducted in order to cope with a new and more challenging market environment. While there is significant literature and theoretical models available in the general field of strategic organizational change, there are no models specific to the issue of servitization as a change process. So, it is crucial to identify the way of organizational change from servitization perspective and identifying the key change drivers (KCD) that have a strong impact on implementing firm's servitization strategy. Therefore, this section try to analyzes the firm's general change process developed by John P. Kotter [94], and attempts to develop a conceptual model of strategic change process that specifically handle the issue of servitization based on literature review, case studies, observation and our group discussions.

Generally, it is observed by Kotter's change processes [94] that suggested eight significant stages, which is important for any organizational changes such as, establish a sense of urgency, form a powerful guiding coalition, develop a clear vision, communicate the vision, empower others to act on the vision, plan for and create short-term wins, consolidate improvements and produce more change, and institutionalize new approaches that the company should consider for successful changes in the organization. The basic structure of this change process can be drawn in the following Figure 4.2.

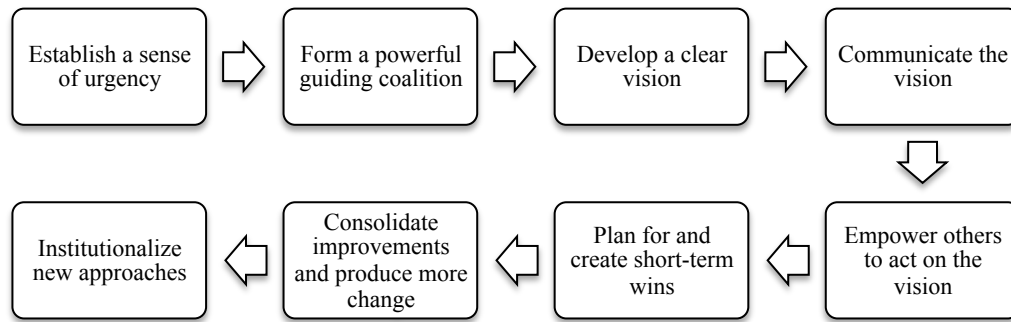


Figure 4.2. The model for organizational changes [94]

Transformation is a process, not an event that many managers do not realize. It advances through stages that build on each other and completed by number of years. By understanding the stages of change and the pitfalls unique to each stage - company can boost their chances of successful transformation. The following Table 4.3 describes the actions needed in each stage of change process and the reason - why transformation efforts fail.

Table 4.3. Stages of Transformation and Pitfalls [94]

Stages	Actions Needed	Pitfalls
Establish a sense of urgency	- Examining market and competitive realities Identifying and discussing crises, or major opportunities	- Underestimating the difficulty of driving people from their comfort zones - Becoming paralyzed by risks
Form a powerful guiding coalition	- Assembling a group with enough power to lead the change effort - Encouraging the group to work together as a team	- No prior experience in teamwork at the top - Relegating team leadership to an HR

Develop a clear vision	<ul style="list-style-type: none"> <li>- Creating a vision to help direct the change effort</li> <li>- Developing strategies for achieving that vision</li> </ul>	<ul style="list-style-type: none"> <li>- Presenting a vision that is too complicated or vague to communicate</li> </ul>
Communicate the vision	<ul style="list-style-type: none"> <li>- Using every vehicle possible to communicate that seriously undermine the vision</li> <li>- Teaching new behaviors by the example of guiding coalition</li> </ul>	<ul style="list-style-type: none"> <li>- Under communicating</li> <li>- Behaving in ways antithetical to the vision the vision</li> </ul>
Empower others to act on the vision	<ul style="list-style-type: none"> <li>- Getting ride of obstacles to change</li> <li>- Encouraging risk taking and nontraditional ideas, activities, and actions</li> </ul>	<ul style="list-style-type: none"> <li>- Failing to remove powerful individuals who resist the change effort</li> </ul>
Plan for and create short-term wins	<ul style="list-style-type: none"> <li>- Planning for visible performance improvements</li> <li>- Recognizing and rewarding employees involved in the improvements</li> </ul>	<ul style="list-style-type: none"> <li>- Leaving short-term success up to chance</li> <li>- Failing to score success early enough</li> </ul>
Consolidate improvements and produce more change	<ul style="list-style-type: none"> <li>- Using increased credibility from early wins to change systems, structures, and policies undermining the vision</li> <li>- Reinvigorating the process with new projects, and change agents</li> </ul>	<ul style="list-style-type: none"> <li>- Declaring victory too soon – with the first performance improvement</li> </ul>
Institutionalize new approaches	<ul style="list-style-type: none"> <li>- Articulating the connections between the new behaviors and corporate success</li> <li>- Developing the means to ensure leadership development and succession</li> </ul>	<ul style="list-style-type: none"> <li>- Not creating new social norms and shared values consistent with changes</li> <li>- Promoting people into leadership positions who don't personify the new approaches</li> </ul>

After analyzing the Kotter's general change process in along with the priorities of change drivers suggested by servitization literature, real-life case studies and our group discussion results, we developed a conceptual model of successful change process, which can be more

specifically guided the firm to implementing servitization strategy. In terms of emergency and a chronological viewpoint, we identified the five key change drivers and structured in the following Figure 4.3 that are crucial for those organization who are attempting to shift their business from manufacturing to servitization: create a service vision, mindset and strategy development, leadership and teaming, shared values and communication improve, and anchor the new service culture.

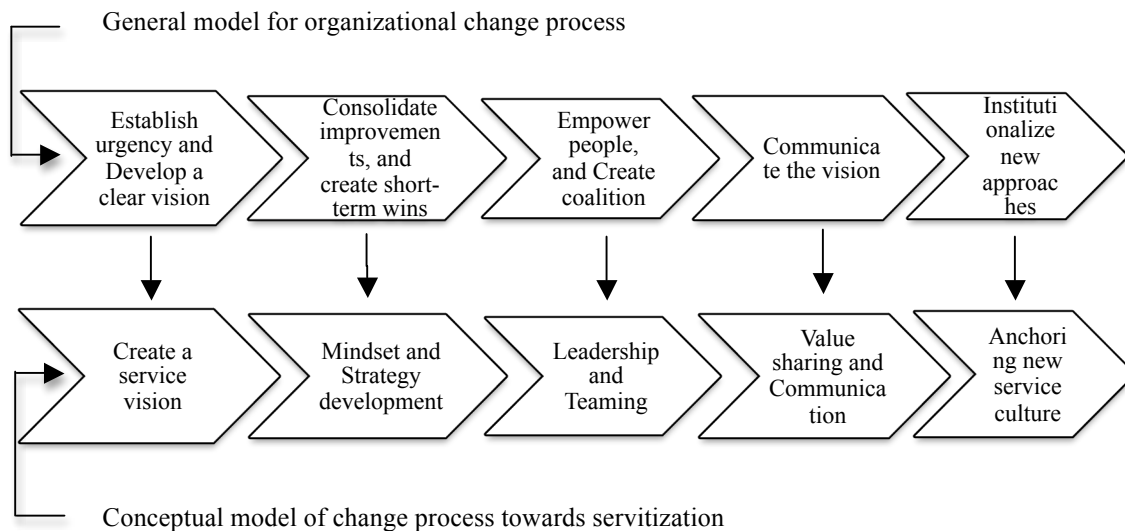


Figure 4.3. A conceptual model of change process toward servitization of business

At first, we focused on creating a clear service vision, which is very important in the beginning period of transformation. When companies are thinking or deciding to shift their business from manufacturing to service focused total offering, they should immediately share their clear vision with all employees to foster understanding. Consequently, employees need to know what the service vision and goal for customer service is and understand their responsibility to achieve that vision.

Mind-set and strategy development is its second crucial change driver, which is one of three big challenges; time scale, and business model and customer offering described by Andy Neely [5] that affects the employee's approach in dealing with service provision. Oliva and Kallenberg [3]) also emphasized that servitization incorporates a mindset change from being "transaction- to relationship-based" selling approach. So, before going to servitize, organization should set-up the mind of the people for new changes. If the mindset

does not change toward the company's new direction then the behavior will not change, and if the behavior does not change then servitization made to the organization will not succeed.

The third change driver is to create a strong leadership and teaming that combine with three key characteristics, respectively, living values, voice, and presence. After mindset-up into the company's new changes of product-service operations, the leader must be involved in the team early, communicate constantly what is going on, plan properly, and do not let up, then the team will likely treat as an opportunities and head the organization for successful changes towards servitization.

The next significant driver of this change process is identified as value sharing that the company stands for, such as, central beliefs, norms, and attitude and developing the communication in each level of the organization. It is observed in the case studies of successful servitized firm who highly emphasizes the importance of effective internal communication to sustaining and transparent the changes into product manufacturing to service provision.

Anchoring a new service culture is the final change driver that we clarified for an effective change process towards servitization. This is very important but challenging, as the culture in manufacturing firm is totally different compared to service-oriented firm, and people's natural inclination is to hold on to whatever they feel familiar, even if confronted with better alternatives. But, in spite of apparent complexity and difficulty involved, changing the way people think is the most powerful means to ultimately change behavior, which in terms of servitization is deemed to be vital importance. Hence, it is important to show people how the new approaches, behaviors, and attitudes have helped improve performance. According to Kotter [94], the better way is to go in and articulate what must be changed, implement the changes, and then alter the culture around that.

Therefore, transforming manufacturing organization into product-service provider require to follow a strategic change process that we clarified through five significant change drivers based on our findings. These drivers are creating service vision, mindset and strategy development, leadership and teaming, value sharing and communication, and anchoring new service culture that might enable and transparent the servitization process to be met.

## 4.5 Validation of Model through Empirical Case Study

In order to validate our conceptual model of firm's operational process transformation, we have collected a pool of interviews data from IBM professionals who are performing in various distinguishing positions within the organization that related to our investigation. The objective of this data collection from interviews is to have a real insight from IBMers who closely observed and/or engaged in the part of firm transformation from a hardware manufacturing to a product-service organization. So, in this section we mainly focuses on IBM's process transformation, key elements of change process, and grasp the way of company's cultural adaption towards servitization of its business. Before we go inside the main objective of this section, we provide an overview of IBM service journey and explain how we made sure the company as a successful servitized firm in the hi-tech industry, respectively, in Section 4.5.1 and Section 4.5.2.

### 4.5.1 IBM Story and Service Journey

In 1980, the United States dominated the computer industry with eighty percent of the total industry's revenues globally. Less than ten companies produced most of these revenues whereas IBM was the market leader. All of these firms, including IBM, however lost ground during the ensuing decade, despite the facts that the computer industry grew three times in size and its cost-effectiveness improved some ten-thousand-fold. This section explains a brief story of IBM and rationale for their movement towards servitization of business.

International Business Machine (IBM) is the world's leading computer and technology firm, and was established in 1911 that offers a variety of products and services in information and communication technology (ICT) industry. In the beginning, company started its operations by producing commercial scales and tabulators, and steadily expanded its activities in producing hardware products including mainframes, software, servers, and other storage devices. In 1975 IBM first released its personal computer to the market, but the sales were disappointing as the demand of personal computers was minimal at the time. It was not until 1980 that IBM tried again to crack the personal computer market. By then many other companies were already making the machines and started to influence the market. Unlike the mainframe computers, for which the hardware manufacturer usually

supplied software, the personal computer counted on much of its software being written by third parties. It was therefore not possible for IBM to maintain the tight control over the personal computer market that it had over mainframes. As the 1980s progressed, IBM began to lose its dominance in the manufacture of PCs to the various clone makers. However, due to increasing the global competition and the U.S. economic recession in early 1990s, IBM adversely affected its growth and lost market share. By 1991 their stock price had reached the lowest point since 1983. From 1986 to 1993 IBM had taken \$28 billion in charges and cut 125,000 people from their payroll after avoiding layoffs for more than 70 years. In January 26, 1993, in the face of looming disaster, CEO John Akers resigned and Louis V. Gerstner was appointed as CEO of the following year.

After few weeks on the job, Gerstner identified the company's main problems and indicated that IBM had lost of customer touch and trust, costs were out of line, the firm was too decentralized, confusing and contentious performance measurement systems, and they had stayed with their old strategy too long. On the other hand the market was too much crowded by the early 1990s, there were tens of thousands of companies in the computer industry that offered the lower prices products and more choices to customers even many of which lived for a few months or years, then disappeared. According to the industry trend and Gerstner's better understanding of customers' needs and on going business demand, he recognized that the market was shifting. The application of technology would become the key drivers of IBM not its invention. These insights led to a transformation that subsequently led IBM to exit the network hardware business, application software, storage, and personal computers to enter the services and develop a freestanding software business. After then to late 1990s, services were consistently growing 20-plus-percent a quarter. In 2001, services and software were \$35 billion and \$13 billion businesses, respectively, which combined represented 58% of total revenues and accounted for roughly half of IBM workforce. Since then, with Sam Palmisano to Virginia M. Rometty as CEO, IBM has continuing this remarkable shift to its business mix to more profitable segments, so that today, IBM has revenues of \$107 billion while more than 90% of its segment profit came from software, services and financing in the fiscal year 2011.



## 4.5.2 Identifying the IBM as Servitization of Business

After a cursory review of IBM business description and historical background from company profile, website, articles and interviews data, we are almost unanimous that even IBM is predominantly fall in the manufacturing category, but portray their products as an amalgamation of manufacturing and services. They have moved up in the value chain from production of hardware and reinvented themselves as providers of business solutions. These solutions are drawn from an industry-leading portfolio of consulting, delivery and implementation services, enterprise software, systems and financing. By considering this business nature of product-service combinations and on going business activities toward value addition, it is clear that beside of manufacturing products, IBM also offers accompanying services that identified the firm as servitization of business. However, there are some other factors that we also observed the reason of IBM as a servitized firm from financial and strategic viewpoints, like as, service revenues (Global Technology Services [GTS] and Global Business Services [GBS] accounted more than \$60 billion), Pre-Tax income of service segment (41%, which is equivalent of over \$9 billion), Return on Sales (Gross profit margin 46.89%; Operating profit margin 20.01%; and Net profit margin 14.83%), Return on Investment (ROE 78.73%, and ROA 13.62%), effect of probability, service quality, relationship quality between suppliers and buyers as well as buyers and sellers, and so on.

## 4.5.3 IBM Process Transformation

The notion of organizational process has been observed a significant shift since IBM transformed itself from manufacturing to service oriented new operations. In this section, we present the result of case study based on interviews data and show the relevance of our conceptual model in shifting from manufacturing to servitization. The process transformation of IBM is portrayed here in Figure 4 under the viewpoint of research and development, procurement, production, sales and marketing, and after sales services based on in-depth interviews of IBMers.

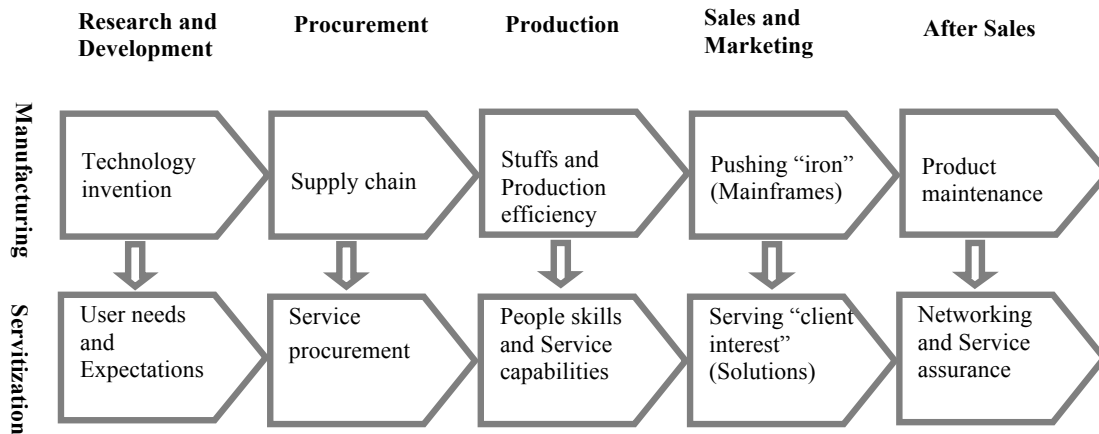


Figure 4.4. IBM process transformation towards servitization

The model shows a significant change in IBM process between two different approaches of IBM business operations as a manufacturing and servitization that we briefly discussed in the following based on our findings from the interviews with IBMers.

**Research and Development:** After taking the high profile servitization strategy in 1990s, the IBM's research and development section was shifting its focus from technology invention to application of technology and on-demand businesses, which main concern is to response the customer needs and expectations timely. Today they are investing approximately \$6 billions for research and development annually, most of which are developing for software and services.

**Procurement:** In order to extend the IBM supply chain into value chain, they created their own globally integrated supply chain that provides a strategic advantage for the company to create value for clients and ensure greater efficiencies and lower costs. IBM spends around \$35 billions per year through its supply chain, procuring materials and services globally.

**Production:** Considering the high quality and efficient services into the account, IBM has shifted resources toward building its capabilities and employee skills aiming to create superior services for its clients. They spent significantly more in staff and processes and the breadth and depth of the company's capabilities. More important, the company was brimming with talented people who had unique expertise. In the old IBM, it is observed that the all of IBM capabilities were of a business model that had fallen wildly out of step with marketplace realities. Commenting on whether IBM, a hardware company could make a successful transition toward servitization, IBM CEO, Gerstner said, "Services are entirely

different. In services, you do not make a product and sell it. You sell a capability and knowledge and this kind of capability you can not acquire”.

**Sales and Marketing:** In the case of sales and marketing, we believed that a successful company must have a customer or marketplace orientation and a strong marketing organization, but before shifting the IBM business into services in 1990s, there had never been any true marketing in the company. In IBM at that time the term “marketing” really meant sales. In June 1993, the company hired Abby Kohnstamm as the head of corporate marketing for IBM, and developed and implemented a key customer strategy that convinced customers and served their interest focusing on delivering value not just pushing “Iron” (Mainframes).

**After sales:** When IBM approached to servitization in 1990s, they offer a full range of after sales services to its customers including technical support, knowledge management and self-help solutions, training, consultancy, and so on, and transformed its resources toward building a strong client relationship. For example, when a customer bought something from the company, then trained their people on that product and got familiar with how to support it and maintain a continuous contact with the customers during product lifetime.

#### 4.5.4 IBM Change Process

This section compiles the survey results about IBM change process from manufacturing to servitization. We separated the answers into five different drivers as it is explained as our concept of change process in the earlier section of this chapter, such as; vision creation, mindset and strategy development, leadership and teaming, value sharing and communication, and anchoring a new service culture. However, a study of “Making Change Work”, IBM Global Business Services [95] revealed that the key change management drivers, ranked in order of most needed for successful change effort outcomes, are the softer skills in the change management portfolio that we represent in the following Figure 4.5 for better understanding about the concept and/or successful change process.

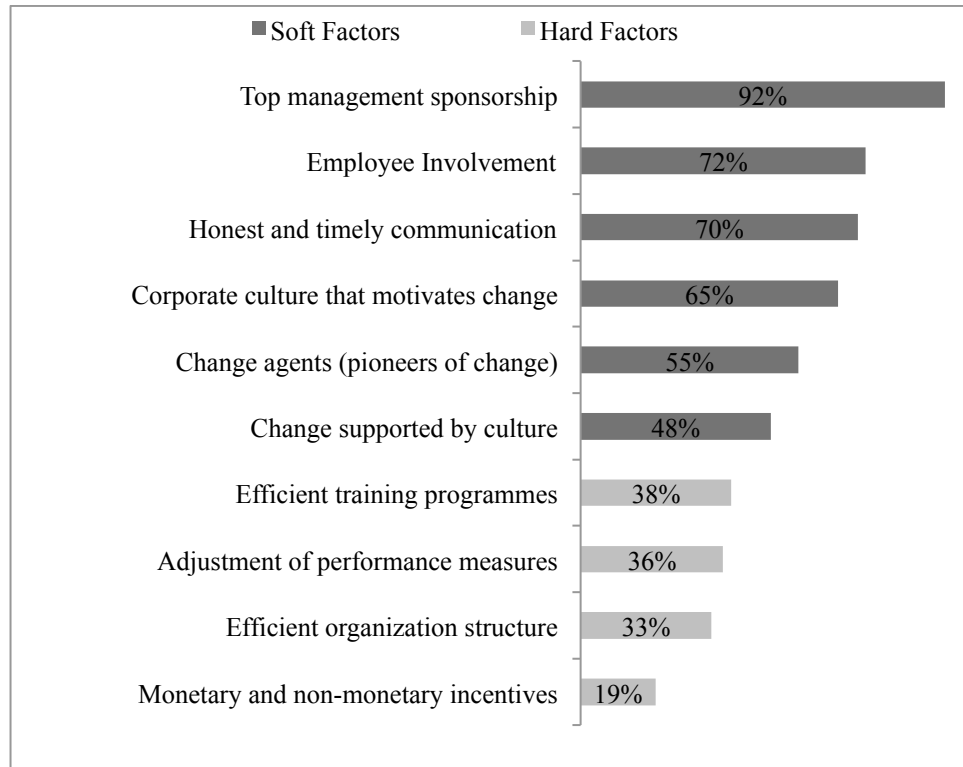


Figure 4.5. The key change management drivers by ranking [95]

According to the interview result and our observations of relevant survey output by IBM global business services, we explain the IBM successful change process towards servitization in the following.

At first we analyzed the vision. The results showed that the beginning of transformation toward servitization, IBM required on creating a service vision, and the first frame of that vision is to make the company profitable by continuing to be, in fact, the only full service provider in the industry. Luis V. Gerstner, the CEO of IBM quoted that “whatever hard or painful things you have to do, do them quickly and make sure everyone knows what you are doing and why”.

The second driver of this change process is mindset and strategy development. Since IBM transformed itself into a full range of service activities, they articulated their strategy in which services is a considerable component. They continuously develop this strategy turnaround the customer needs “on-demand business” that offering an open architecture, integrated process, and self-managing systems – selling computing services, not computers.

Leadership and teaming is the third change driver that observed in IBM CEO Luis V. Gerstner. He articulates a clear and compelling vision of the importance of servitization strategy and the role it can play within the organization. However, the most important thing of his leadership is to collaborate the all business units and its executives and motivate them into company's new changes and operations. In order to make sure efficient and effective workflows on new service vision, Gerstner turned his attention increasingly to the overall IBM team, top management team, and board of directors. He campaigned to rebuild the leadership team, give the workforce a renewed sense of purpose, and demanded the managers' work together to re-establish IBM's mission as a customer-focused provider of computing solutions.

The fourth change driver is value sharing and communication development. In line with IBM's basic beliefs: excellence in everything we do, superior customer service, and respect for the individual, Gerstner has given importance on value sharing for efficient changes. Besides of group meeting, he also met with individuals and received their opinion and ideas for effective change process. At the same time IBM remade its board and senior management systems that opened up a clear and continuous communications with IBM employees. Gerstner mentioned that if employees do not know what is happening in the organization, if they do not believe a crisis exists, then, they will not make the sacrifices that are necessary to change.

The final change driver is anchoring a new service culture. Toward building a service environment, Gerstner focused on eight new principles for establishing the IBM's service-oriented culture: (1) marketplace, which is the first principle of IBM driving force that they focused by serving their customers, processes, and beating the competition. Because they realized that the success of a company comes foremost from success with the customer, nothing else, (2) commitment to quality, which implies that technology has always been IBM's greatest strength but they need to funnel that knowledge into developing products that serve their customers' needs in all areas of the company, including hardware, software, and services, (3) measuring success through customer satisfaction and increased shareholder value, (4) productivity that forces the IBM to accept innovation, take prudent risks, and pursue growth, by both expanding old businesses and finding new ones, (5) strategic vision, which is crucial for building a service culture. In order to succeed, IBM must need to have a sense of direction and mission, so that no matter who they are, the most important thing is what they are doing and how they fit in, (6) act with a sense of urgency,

which signifies the IBM to be fast than insightful, (7) work together as a team that focused on delivering value to IBM's customers, and (8) sensitive to the needs of all employees and communities in which they should do business to become better because of their presence. The next section will briefly explain how IBM culturally shifted and adapted into service oriented new environment.

#### 4.5.5 IBM Cultural Adaptation

Organization culture is a system of shared actions, values and beliefs that develops within an organization and guides the behavior of its members [96]. More specifically, the concept of culture according to Trompenaars [97] is "the way we do things around here" or "the way the organization does its business". The adoption of servitization strategy in IBM business observed a significant changes between two different cultures of hardware manufacturing to product-service systems (PSS). It is one of the big challenges for organization that they faced during transition period, which have advocated by commentators for developing and shifting from product transactional mindset to a services relationship cultural orientation [3]. But, transforming the organization's culture constitutes one of the most fundamental challenges confronting an institution, as people's natural inclination is to hold on to whatever feels familiar, even if confronted with better alternatives [98]. The similar situation is seen in IBM in 1994, when the CEO, Luis Gerstner outlined the behavioral changes needed to make IBM's new culture (Table 4.4), while most of the executives were very supportive but some had simply been shocked. In spite of the apparent complexity and difficulty involved, changing the way people think is the most powerful means to ultimately change behavior, which in terms of servitization is deemed to be vital importance [99]. The behavioral changes of International Business Machine (IBM) towards servitization are shown in Table 4.4.

Table 4.4. IBM Behavioral changes towards servitization [100]

<b>From</b>	<b>To</b>
Product Out	Customer In
Do It My Way	Do it the Customers' Way

Manage to Morale	Manage to Success
Decision Based on Anecdotes and Myths	Decisions Based on Facts and Data
Relationship-Driven	Performance-Driven and Measured
Conformity	Diversity of Ideas and Opinions
Attack the People	Attack the Process
Looking Good Is Equal to or More Important Than Doing Good	Accountability
United States Dominance	Global Sharing
Rule-Driven	Principle-Driven
Value Me	Value Us
Analysis Paralysis	Make Decisions and Move Forward with Urgency
Not Invented Here	Learning Organization
Fund Everything	Prioritize

In order to do the required changes and make them come alive for all IBMers, Gerstner made them simpler and bake them into what people did everyday. Defining the IBM new culture, Gerstner emphasizes three key components: win, execute, and team, which are most important for all IBMers that needed to apply in setting their goals. He required making the marketplace as the driving criterion for all of IBM's actions and behavior. In the new IBM, successful people would commit to getting things done fast and effectively. And this commitment is the acting as one IBM, plain and simple.

## 4.6 Summary of the Results

This chapter highlighted the firm's operational process transformation from manufacturing to servitization under the viewpoint of research and development, procurement, production, sales and marketing, and after sales services. Based on the relevant literatures and case studies of successful servitized firm, we revealed that while manufacturing firm focuses on product standardization, market acquisition, economies of scale and production efficiencies, the servitized firm concentrates on innovation, value proposition, flexibility, customization

and building long-term relationship with customers. In order to transform the firm's operation from manufacturing to service provision, we identified the most important change elements, such as, creating service vision, mindset and strategy development, leadership and teaming, value sharing and communication, and anchoring the new service culture, which are crucial for developing and implementing an institution's servitization strategy.

We then validate our concept of firm's operational process transformation by using an empirical case study of IBM Corporation. We found that the IBM movement towards servitization was fully customer oriented, strategy developed around customer needs and expectations, and aimed to serve client's interest including non-hardware depend services like, operations, solutions, training, financing and so on. Based on interview results, we also found that the firm successfully transformed its business from product-centric operation to product-service-centric operation through skills, knowledge and strong leadership. They emphasized to create a vision, in fact, the only full service provider in the industry. Consequently, IBM focused on quick execution of its strategy, teamwork, and building a service culture that eventually makes them success as a servitized firm in the hi-tech industry.

In addition to these, this chapter also explained the IBM's cultural adaptation and behavioral changes into service provision, such as, from product out - to customer in, from do it my way - to do it the customers' way (provide real service), from value me - to value us, from attack the people - to attack the process, from rule-driven - to principle-driven, from fixed rewards -to variable rewards, from manage to morale -to manage to success, to name a few. The experiences of this real life case study has helped us to clarify how an effective process can enable a manufacturer to transform its business successfully from being a product-centric organization to product- service-centric organization.

The next chapter will discuss about organizational factors that are significantly influencing to the effectiveness of implementing firm servitization strategy. The chapter develops based on the questionnaire data and identifies the most important factors that have positive influence on servitization.



## Chapter 5

# Organization Factors on Implementing Servitization Strategy

This chapter aims to examine the influence of organization factors to the effectiveness of implementing servitization strategy. The main study materials were gathered for this chapter with the help of questionnaire survey, discussion, and observations of three giant hi-tech companies in Japan, namely, Fujitsu, Toshiba, and Hitachi limited (FTH). Companies' answer to a survey included multiple choices and open questions about the perception, process, barriers, and the important organizational factors of implementing servitization strategy. The structure of this chapter is as follows: after the introduction section, an overview of case companies (FTH) is presented in Section 5.2. A Section 5.3 is then presented our hypothesis about five organizational factors relating to servitization. Sections 5.4 will then respectively show a qualitative analysis and results of our findings about five organizational factors towards servitization of business. This is followed by Sections 5.5, which provide a quantitative analysis and verifies the factors that have significant influence on implementing servitization strategy by using path analysis. The next sections we articulate the output of the results and presented the degree of influence toward servitization strategy. Finally, we conclude this chapter by giving a summary of our key findings in Section 5.7.

### 5.1 Introduction

This chapter extends to support the implementation of servitization strategy properly. While servitization is recognized as one of the key business strategies to many hi-tech manufacturers, there is no specific roadmap or solid guideline how the firm approaching and/or implementing this strategy successfully. Oliva and Kallenberg [3], Araujo and Spring [101] and Davies [47] argue that during the firm transformation to a combined

product-service offering, organizations are likely to change their strategies, operations and value chains, technologies, people expertise and system integration capabilities. But, the transformation paths from product-centric strategy to a combined product-service strategy are still poorly understood and remain a new and complex concept [102, 103, 104]. In order to support the implementation of firm's servitization strategy, this chapter aims to examine the influence of organizational factors experienced and/or observed by Japanese hi-tech manufacturing firms towards servitization of their business. The organizational factors we identified for this study are vision, organization, human resources management (HRM), marketing and leadership. We conducted an open discussions and questionnaire survey to our target companies (FTH) for achieving the objective of this study.

Thus, this chapter is developed based on two major analyses, i.e., qualitative and quantitative which combinedly achieved the objective of this study. The qualitative analysis mainly deals the data collected from open discussions of FTH's executives and respectively shows the result in Sections 5.4, Section 5.4.1 and Section 5.4.2. The key findings of this analysis are identified as service-oriented vision, business integration capabilities, service-focused skills and knowledge, building customer relationship and peoples' empowerment that have significant influence on implementing servitization strategy. The quantitative analysis is then adapted in Sections 5.5 to 5.6.2 that verifies the data collected from a questionnaire survey of FTH and shows the result more specifically. The most influential factors of organization are identified from this analysis as leadership (17.2%), vision (16.3%), and marketing (9.5%) that significantly influencing to the implementation of firm's servitization strategy.

## 5.2 Overview of Case Companies

We conducted a questionnaire survey for achieving our objective of this chapter, i.e., identifying the influential factors of organization for implementing servitization strategy. The findings reported here is from three multinational hi-tech companies, hereafter referred to as Fujitsu, Toshiba and Hitachi limited, Japan. They are doing almost similar business in the industry and qualified as a medium and/or large size companies with yearly sales of JPY 4467 billion (Fujitsu), 6100 billion (Toshiba), and 9665 billion (Hitachi) in fiscal year 2012 [85, 86, 87]. These companies are significantly dominant in both local and global business world in different business fields. For an example, Fujitsu is a strong ICT player in

the local industry and has a good presence in international market that positioned them Japan's number 1 and world's 3<sup>rd</sup> largest IT service provider in the industry. Toshiba is highly dominant in electrical and electronic goods both local and global markets such as, POS Systems – Japan and world's No.1, TV market share in Japan 22%, NAND flash memory and power device – world's No. 1, nuclear, hydroelectric and geothermal power generation – world's No. 1, and large-scale solar plant for utility companies in Japan – No. 1 (market share 39%). Hitachi has a strong presence in the field of heavy equipment and machinery in both local and internationally such as, integrated operation with Japan railway, business alliance with UK railway, partnership with TATA India and so on. According to the revenues in FY 2012, the largest firms in both Japanese /Global industry ranked these companies as Fujitsu 20/166, Toshiba 12/97 and Hitachi 4/38 respectively. A brief overview of these three companies' background, business activities and movement toward servitization of business is explained in the following as Case 1 (Fujitsu), Case 2 (Toshiba), and Case 3 (Hitachi):

Case 1: Fujitsu limited, a leading Japanese information and communication technology (ICT) firm was established in 1935, as the manufacturing subsidiary of Fuji Electric limited. At the beginning of the journey, company started to produce telephone and automotive exchange equipment and steadily expanded its activities in producing computers, semiconductors, and telecommunications equipment and so on. Historically, Fujitsu was best known as the world's number 2 maker of mainframe computers, just behind IBM, but they exited from that market at the turn of the millennium to focus its hardware efforts on Unix-based servers, personal computers, and peripherals. In the early 21<sup>st</sup> century, however, the firm was deemphasizing its hardware roots, billing itself as an internet-centered company, and generating increasing amounts of revenues from services and software. The later, which included such areas as system integration services, front-end technologies, outsourcing services, network services, system support services, security solutions and consulting services. As a result, they achieved over 50 percent of revenues from the provision of services that are closely coupled to its products. The company has made a significant progress and is at a relatively advanced stage of servitization for a traditional manufacturer. This was confirmed by the portfolio strategy and marketing president who acknowledged that, “at the interfaces between the company and customers, I think we are now seeing far more evidence of responsive agile service-centered behavior

and solution oriented to the customers, so that, today we recognized as the Japan's number 1 and world's 3<sup>rd</sup> largest IT service provider in the industry".

Case 2: Toshiba, a world leader in high technology, is a diversified Japanese manufacturer and marketer of advanced electronic and electrical products, spanning information & communications equipment and systems, internet-based solutions and services, electronic components and materials, power systems, industrial and social infrastructure systems, and household appliances. Under the management vision of "Innovation-driven, customer-focused growth," the key objective of the Toshiba is to provide total utmost satisfaction to customers worldwide through leading-edge products and top-of-the-line services. In realizing this objective, company started to transform its business structure from not only product-centric to product-service-centric organization and strengthening such focus businesses as integrated storage solutions, retail solutions, home solutions, health care services and solutions, and so on. In order to offer these wide ranges of solutions to such business, pursuing technology development, Toshiba realizing the importance of M&A investments and established new business alliances. In addition, the firm continuing speed up the pace of innovation by nurturing the buds for next generation business development and creating exciting new values through the introduction of World's First and expansion of World's No.1 products and services in the global market.

Case 3: Hitachi is a traditional manufacturing firm often called the General Electric of Japan, and is in fact considered to be one of the 'Big Five' sogo denki or general electric companies in Japan. The company balanced its portfolio of business activities predominantly in the field of electronics and electrical engineering that renowned the Hitachi as a giant manufacturer in the industry. However, in the middle part of the last decade, company realizes a significant change in the market demand, increasing customer expectations for reliable and high quality services, cutthroat competition, and a thin profit margin of manufacturing goods that calculated only 2% of total revenues compared to more than 7% from maintenance services. In these circumstances, Hitachi started to shift its operations from not only producing or selling goods to offering an integrated package of goods and services, even they already had hardware depend services approximately 30 years ago like, maintenances. So, in extend to service provision with core business, company added non-hardware (service ware) depend services including operation

management systems, staffing, training, consulting, and solutions, etc. and expected to gain 7% to 8% profit from combination of goods and services (a senior marketing manager, interviewee). Of particular interest is the way in which the company is frequently held to be an exemplar of the trend towards servitization of business [47,72,105]. The next section will draw and explain our hypothesis about the influential factors of organization that have positive impacts on implementing servitization strategy.

### 5.3 Hypothesis

This research hypothesizes that the implementing servitization strategy require a collaborative support of many organizational factors such as, vision, mission, organization size, structure, policy, process, culture, goal balancing, leadership, management style/philosophy, management collaboration (JVs, M&A, Partnerships, and R&D consortiums), human resources, finance, and interactive marketing activities, which is implicitly or explicitly influence on building firm product-service operations or changing company's objective into new directions. Based on a comprehensive list of these organizational factors from related studies and survey [12, 88-92, 106], five organizational factors are identified to use in this study that assume to influence on implementing servitization strategy. The five factors are vision, organization, human resource, leadership, and marketing as shown in Figure 5.1.

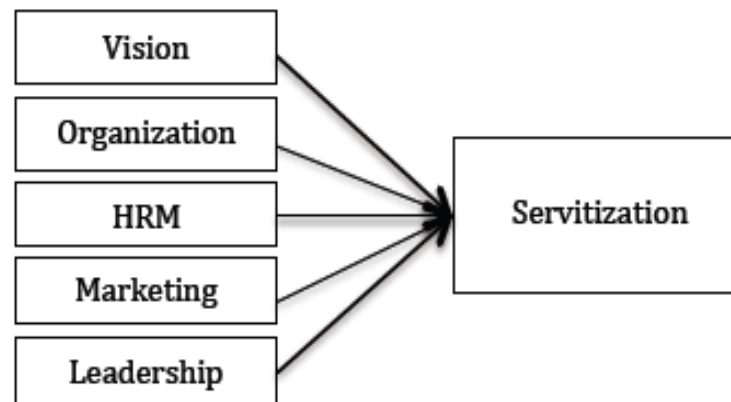


Figure 5.1. Structural model exploring the influence of organizational factors: vision, organization, human resource, leadership, and marketing on implementing servitization strategy.

Based on the review of the literature on the five dimension related to the implementation of servitization strategy, the following hypotheses are presented:

H1: Vision has a significantly positive influence on implementing servitization strategy.

H2: Organization has a significantly positive influence on implementing servitization strategy.

H3: Human resources have significantly positive influence on implementing servitization strategy.

H4: Marketing has a significantly positive influence on implementing servitization strategy.

H5: Leadership has a significantly positive influence on implementing servitization strategy.

## 5.4 Qualitative Analysis

This section is developed based on round table discussions with FTH's executives and peoples who have highly engaged and/or observed the firm's movement from manufacturing to servitization. The objective of this section is to present a real insights and perceptions of the expertise from various business disciplines towards servitization and organizational factors that we hypothesize in the earlier Section 5.3. These factors are vision, organization, HRM, marketing and leadership.

Under the first factor, the discussion was run about the changes of organization vision and strategic development towards servitization. This strategy includes not only the goal that organization is looking for but also everything from delivering information to the development of the current abilities [107].

Next we discussed about organization that gives us the information about resources and capabilities required for bundling a combination of goods and services. These resources may include money, peoples, skills and knowledge, information and time that are essential to successfully complete the project [108].

Human resource is our third discussion factor by which we gathered valuable insights about firm's hiring, skills and knowledge required for service operations. We also discussed about organization's culture on developing employees, empowerment and engaging employees to the effective change process. It is obviously important that every employee

should be part of implementing servitization strategy, so organization can get the maximum benefit from the employees [109].

The fourth factor was about marketing that provides the information how organization changes from product selling to product-service selling approach and building its capabilities under sales and marketing activities. Marketing opportunities are generally understood as the use of services for selling more products [55, 62].

Finally, we discussed about leadership that drives the strategy into new changes and develop the service-oriented new culture inside the organization. Today, many organization preferred employees' autonomy instead of having a strict leadership culture that helps in creating innovativeness and make changes more success [110].

### 5.4.1 Output of Analysis

This section explains the output of analysis based upon discussions with FTH's executives and our teamwork. We describe the findings under five organizational factors, i.e., vision, organization, HRM, marketing and leadership, which give us more insightful information toward implementing firm's servitization strategy.

At first we analyze the vision factor and found that almost everybody is unanimous to change the company's vision into service – oriented and focused much more on operations, consulting, maintenance and support services rather than just producing an article and sell them. Since the firm required transforming themselves into a full range of service activities, they should articulate their strategy in which services is a considered component. However, the strategy also needs to consider the elements, such as, customer needs, technology trends, competitive threats and partner requirements. In response to the 'differentiation strategy', a senior sales and marketing manager explained that:

*“We do not see the servitization strategy as well enough for differentiation rather we consider it as the key driver of profit maximization”.*

Secondly, we focused on organization factor and found that the firm's capabilities of resources allocation and collaboration with various business units are very important in approaching towards servitization but challenging. However, the structure of the

organization, especially, ICT infrastructure significantly influences and enables servitization process. The result also showed that transforming the firm from manufacturing to service provision requires a big investment that induces the organization to make alliances with desired firms rather than building a new business division. A management executive explained in the discussion about their beginning of servitization as:

*“We first created a cross-service unit and initially assigned the peoples inside the organization who are responsible to make a moderate size of packages considering the economic situation in each individual market, and ensure to deliver more reliable and customized services, which ultimately meets users’ needs”.*

The third factor we analyzed in this section is HRM. The output of the discussion is revealed that shifting a manufacturing environment into service environment require changes the dominant mindset of employees, training to support the development of new skills, and necessary to articulate a clear career path for service workers. The result also showed that creating a service-oriented environment and finding the right people for the service dimension is key to success. So, if an organization is motivated to extend the service business, they rationally need to invest human resources at the employee level because a successful extension of service business requires the enthusiastic and ongoing commitment of service workers. One senior HR manager as described the evolving HRM context:

*“We primarily promoted peoples inside the organization and gradually hired expertise from outside who belongs to external capabilities and solution oriented thinking. We then hiring specialist, such as, consultant who can co-ordinate the all department including R&D, production department, sales & marketing department and able to collaborate with other companies. Gradually, we adopted special training programs, which main purpose is to develop employees’ skills on communication, negotiation, and collaboration with partners, customers, stakeholders, and so on”.*

The fourth analyzing factor is marketing. The result showed that a service-oriented firm must have an effective marketing unit, which will be responsible for identifying customer



needs, wants, and values of customers. However, shifting a business nature, i.e., manufacturing to services is required to develop its commitment to build a more relationship-based business, instead of solely focusing on the transactional side of business. To accomplish this company need to emphasize their commitment to build better relationship with their customers and, in turn, increase both sales and profitability of the customer base. Explaining the importance of marketing in product-service operations, a senior marketing executive state that:

*“To ensure an effective and efficient marketing unit, we created a special section ‘service promotion’ and the mission of this section is to maintain two main activities: packaging, and marketing from solution perspectives”.*

The final factor of this analysis is leadership. The result showed that leadership is one of the most crucial factors of firm transformation from manufacturing to servitization or any other changes in the organization. Literally, this leadership starts with the CEO who articulates a clear and compelling vision of organization new strategy and objectives. The role of this leadership identified from discussion is to collaborate the all business units and its executives and motivate them into company’s new changes and operations. A management executive explained that:

*“It is almost impossible to implement the servitization strategy without a proper leadership, and the pivotal roles of this leadership is to give the workforce a renewed sense of purpose and autonomy, create a service culture, develop communication in each level, and demanded the managers’ work together to re-establish the company’s mission as a customer-focused provider of business solutions”.*

The next section will provide the key findings observed from qualitative analysis of organizational factors based on group discussion with FTH’s executives, peoples and our observation and teamwork.

## 5.4.2 Key Findings from Qualitative Analysis

This section summarizes the key findings we have found based on group discussion, observation and teamwork. The result is shown here in Table 5.1 regarding to five organizational factors, respectively, vision, organization, HRM, marketing and leadership. Consequently, this section also provides a sample of open questions and feedback in Table 5.2.

Table 5.1. The key findings of five organizational factors

Organizational Factors	Key Findings
Vision	Service-oriented, Customer-centric
Organization	Capabilities of resources allocation, Business integration
HRM	Communication skills, Producer
Marketing	Solution oriented, Relationships
Leadership	Cross-functional collaboration, Empowerment

Table 5.2. The sample of open questions and feedback

Questions / Issues	Feedback / Answers
How FTH sees the concept of servitization from strategic viewpoint or others?	<ul style="list-style-type: none"> <li>- A key driver of profit maximization, but not good enough from differentiation viewpoint.</li> <li>- The way of grasping fundamental value of goods which users receive when they own and use it.</li> <li>- It is a function of many business units' working together with company's service vision.</li> </ul>

What are the core competencies of FTH's movement towards servitization?	<ul style="list-style-type: none"> <li>- Several business units especially IT</li> <li>- Brand equity and customer reliability</li> <li>- Business integration ability, including, merger and acquisition.</li> </ul>
How FTH creates values for customer after servitization?	<ul style="list-style-type: none"> <li>- Recognizing customer needs based on demand.</li> <li>- Value addition through non-hardware depend services offering.</li> <li>- Developing customer interaction and relationships.</li> </ul>
What big challenges or problems face by organization during the transformation from product selling to package offering?	<ul style="list-style-type: none"> <li>- Developing a new business structure that fit for product – service operations.</li> <li>Identifying a moderate size of packages that peoples can afford.</li> <li>- Culturally adapted peoples into new changes even the expertise hired from outside</li> </ul>
What are the perceptions of organization's peoples to move its business from manufacturing to servitization?	<ul style="list-style-type: none"> <li>- Still many peoples do not understand the true meaning of servitization.</li> <li>- Worried whether customers accept the package offering or not.</li> <li>- So far we are servitized!</li> </ul>

The next sections will provide a quantitative analysis and results of these five organizational factors based on a vast amount of questionnaire survey of FTH by which we identified the most influential factors and degree of influence of these factors towards servitization of business.

## 5.5 Quantitative Analysis

This section analyzes a vast amount of data collected from three multi-national hi-technology firms (FTH) through a questionnaire survey. The objective of this section is to identify the influence of organizational factors quantitatively that influencing to the effectiveness of implementing servitization strategy. The next sections will explain the data analysis procedure and respectively shows a series of analysis and results in Section 5.5.2 to Section 5.6.2.

### 5.5.1 Data Analysis Procedure

The hypothesis of influential organizational factors of implementing servitization strategy was analyzed using SPSS 18.0 program (PASW). In order to ensure that the variables were internally consistent, reliability assessment was carried out using Cronbach's Alpha (Table 5.3). The results showed that the value of Cronbach's Alpha for all variables is higher than 0.8, satisfying a minimum requirement of 0.6. This suggests that the questionnaire and its variables are reliable for the intended study.

Table 5.3. Reliability test results of the independent variables

<b>Variables</b>	<b>Items</b>	<b>Cronbach's Alpha</b>
Vision	5	0.899
Organization	5	0.898
HRM	5	0.896
Marketing	5	0.898
Leadership	5	0.897

According to the above Table 5.3, it is clear that we can use all variables for the further statistical analysis, *i.e.*, path analysis, which we conduct in Section 5.5.2.

### 5.5.2 Path Analysis

To verify the influence of organizational factors on implementing servitization strategy, a path model linking vision (*V*), organization (*O*), human resource management (*H*), marketing (*M*), and leadership (*L*) with servitization (*S*) is tested using a series of regression analysis in SPSS (PASW 18.0). The following path diagram in Figure 5.2 is representing a proposed hypothetical model involving five variables.

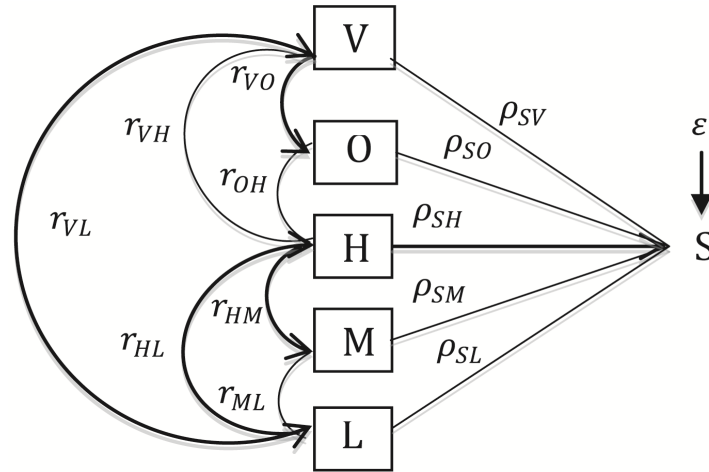


Figure 5.2. Structural relationship between  $V, O, H, M, L$  and  $S$

Figure 5.2 indicates that the path diagram consists of a substructure, which contains five exogenous variables  $V, O, H, M, L$  and an endogenous variable  $S$ . Therefore, the structural equation from above path diagram is as follows:

$$S = \rho_{SV}V + \rho_{SO}O + \rho_{SH}H + \rho_{SM}M + \rho_{SL}L + \varepsilon.$$

According to the structural equation, servitization is influenced by five exogenous variables  $V, O, H, M,$  and  $L$ . We will investigate how these variables  $V, O, H, M,$  and  $L$  influence the implementation of servitization strategy.

### 5.5.3 Correlations

First, we investigate the correlations of each variable  $V, O, H, M,$  and  $L$  to  $S$ . Based on the data, the correlations matrix between variables has been obtained by using SPSS version 18.0 (PASW). The output of the result is shown in Table 5.4.

Table 5.4. Correlations between variables

		$S$	$V$	$O$	$H$	$M$	$L$
$S$	Pearson Correlation	1	.638	.379	.383	.547	.629
	Sig. (1-tailed)		.000	.002	.002	.000	.000

	N	57	57	57	57	57	57
	Pearson Correlation	0.638	1	0.451	0.299	0.437	0.532
<i>V</i>	Sig. (1-tailed)	0.000		0.000	0.012	0.000	0.000
	N	57	57	57	57	57	57
	Pearson Correlation	0.379	0.451	1	0.416	0.353	0.348
<i>O</i>	Sig. (1-tailed)	0.002	0.000		0.001	0.004	0.004
	N	57	57	57	57	57	57
	Pearson Correlation	0.383	0.299	0.416	1	0.277	0.381
<i>H</i>	Sig. (1-tailed)	0.002	0.012	0.001		0.018	0.002
	N	57	57	57	57	57	57
	Pearson Correlation	0.547	0.437	0.353	0.277	1	0.445
<i>M</i>	Sig. (1-tailed)	0.000	0.000	0.004	0.018		0.000
	N	57	57	57	57	57	57
	Pearson Correlation	.629	.532	.348	.381	.445	1
<i>L</i>	Sig. (1-tailed)	.000	.000	.004	.002	.000	
	N	57	57	57	57	57	57

Based on Table 5.4, for example, the correlation between organization and servitization is 0.379. From Table 5.4, the variable which have high correlation is vision, *i.e.*, 0.638.

### 5.5.4 Regression

Here are the tests for the predictors' goodness of the fit of the regression model and regression equation.

Table 5.5. Summary of the model testing

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	0.760a	0.577	0.535	0.361

<sup>a</sup>Predictors: (Constant), *V*, *O*, *H*, *M*, *L*.

In Table 5.5, the  $R^2$  is 0.577. This suggests that there is 57.7% goodness of fit of the model produced by the regression equation. From  $R^2$ , we can calculate the path coefficient for others variable, which is not included in our model. Thus,  $\rho_{S\varepsilon} = \sqrt{1 - 0.577} = 0.650$ .

Table 5.6. ANOVA output of the hypothesis testing

Model	Sum of Squares	df	Mean Square	F	Sig.
Regression	9.100	5	1.820	13.909	0.000a
1 Residual	6.673	51	0.131		
Total	15.773	56			

<sup>a</sup>Predictors: (Constant), *V*, *O*, *H*, *M*, *L*. <sup>b</sup>Dependent variable: *S*

In Table 5.6, ANOVA tested the hypothesis that there is a linear relationship between the predictors and the dependent variable.  $F$  is the ratio of the mean square for regression to the mean square for the residual. In Table 5.5, when all predictors were entered, the significance level associated with the observed value of  $F$  was 13.909 (=0.000). Thus, the hypothesis can be accepted and we may conclude that there is a significant linear relationship between the set of independent variables and the dependent variable.

Table 5.7. Regression coefficients analysis

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	0.353	0.405		0.870	0.388
<i>L</i>	0.276	0.105	0.304	20.635	0.011
<i>V</i>	0.358	0.120	0.347	20.977	0.004
<i>M</i>	0.208	0.095	0.235	20.191	0.033
<i>O</i>	-0.007	0.100	-0.008	-0.071	0.944
<i>H</i>	0.068	0.070	0.102	0.973	0.335

<sup>a</sup>Dependent variable: *S*.

In Table 5.7, coefficients for variables *V* to *L* or beta coefficients has been calculated, i.e.,  $\rho_{SV}$  is 0.347;  $\rho_{SO}$  is - 0.008;  $\rho_{SH}$  is 0.102;  $\rho_{SM}$  is 0.235; and  $\rho_{SL}$  is 0.304. Therefore, the regression coefficients from the above results can be represented in our output path diagram in Figure 5.3. Here, we also displayed the  $r_{VO}$ ,  $r_{OH}$ ,  $r_{HM}$ ,  $r_{ML}$ ,  $r_{VH}$ ,  $r_{HL}$ , and  $r_{VL}$  values of  $R^2$ .

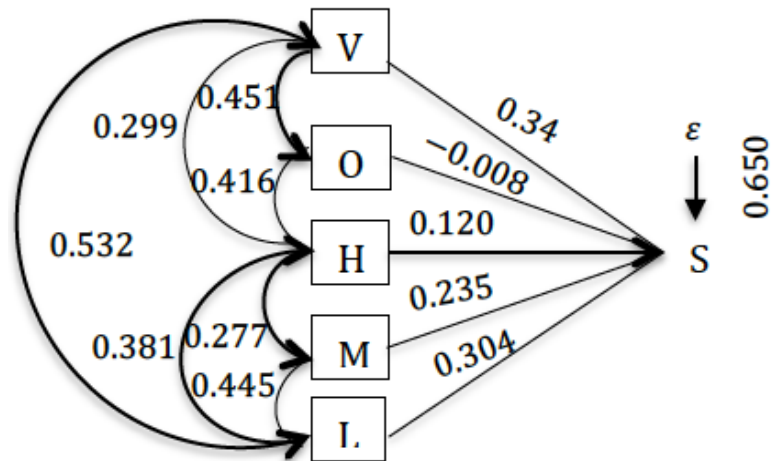


Figure 5.3. Output path diagram (Structural relationship of *V*, *O*, *H*, *M* and *L* to *S*)



## 5.6 Output of the Results

In this section, we compile the results of our analysis based on survey data. The section 5.6.1 shows the output of our hypothesis and explain the influential factors that have significant influence on implementing servitization strategy. Consequently, the section 5.6.2 provides the degree of influences of these factors towards servitization of business.

### 5.6.1 Identifying Influential Factors

The relevant output is in the tables labeled Correlations, Model Summary, ANOVA and Coefficients. These tables are shown in SPSS output 18.0 (PASW). The first table in the output (not produced here) gives descriptive statistics such as means and standard deviations. Next comes the correlations (Table 5.4), and we see that the correlations that our model specified as casual effects are all statistically significant. This is encouraging. The next table (not produced here) is Variables Entered/Removed, and this just tells us that vision, organization, HRM, marketing, and leadership were entered properly and that Servitization was the dependent variable. Next is the model summary (Table 5.5), in which we see that  $R^2 = 0.577$ . Thus, there is 57.7% goodness of fit of the model produced by the regression equation. Then comes an output of ANOVA (Table 5.6) that just confirms that the regression equation is significant. Finally, we have the coefficients Table 5.7, in which we see that the ‘Sig.’ values are 0.004 for vision, 0.033 for marketing, and 0.011 for leadership to servitization, which is just significant ( $p = 0.05$ ), as ‘Sig.’ ( $p$ -value = 0.05) is the significance level for the test of the hypothesis. But, the ‘Sig.’ value for factors, like organization and HRM are 0.944 and 0.335 respectively, which is greater than 0.05 and is not significant to servitization. Therefore, the hypothesis H1, H4, and H5 are accepted and have direct influence to the implementation of servitization strategy. But, the hypothesis H2 and H3 that there are a linear relationship between these predictors and attractiveness can be rejected. A Table of hypothesis test result is shown in below:

Table 5.8. Result for hypotheses test

Research Hypotheses	Results
H1	Accepted
H2	Rejected
H3	Rejected
H4	Accepted
H5	Accepted

### 5.6.2 Degree of Influential Factors

According to the output of analysis described in the previous section, we found that the factors, like vision, marketing, and leadership are significantly influence to the implementation of servitization strategy. On the basis of this understanding, we can propose and improve the following path diagram involving three variables in Figure 5.4.

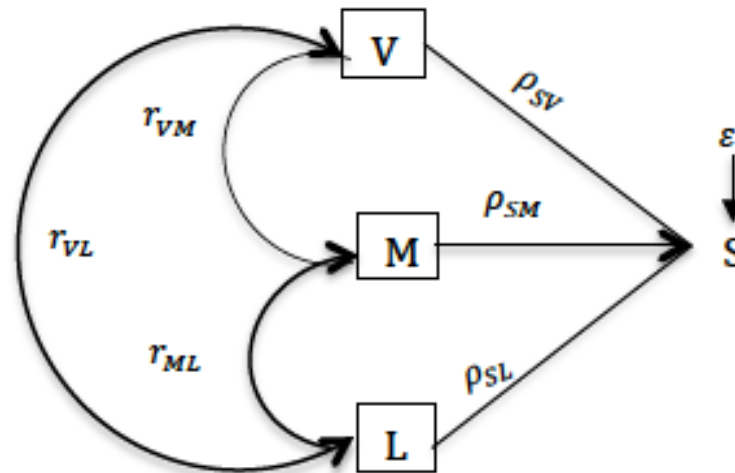


Figure 5.4. Structural relationship between V, M, L and S

The current path diagram (Figure 5.4) contains three exogenous variables  $V$ ,  $M$ ,  $L$  and an endogenous variable  $S$ . Thus, the structural equation of this path diagram is as follows:

$$S = \rho_{SV}V + \rho_{SM}M + \rho_{SL}L + \varepsilon.$$

Based on the above structural equation, servitization is influenced by three exogenous variables  $V$ ,  $M$ , and  $L$ . We will investigate how these variables  $V$ ,  $M$ , and  $L$  are influenced to the implementation of servitization strategy. The regression analyses required by the path model in this part are carried out in the same way, using regression dialog boxes. This time, we will not reproduce the output tables again, but only the relevant information from them is as follows: the correlations specified in the model are significant, the independent variables in each regression was entered and the ANOVA confirmed that all were significant. The  $R^2$  is 0.569, which means that there is 56.9% goodness of fit of the model produced by equation. Finally, the coefficients of the variables, in which p-value (Sig. column) = 0.002 for vision, 0.023 for marketing, and 0.004 for leadership that are smaller than 0.05 and significant to the implementation of servitization strategy. The graphical regression coefficients are displayed in our output path diagram in Figure 5.5, where we also displayed the  $r_{vm}$ ,  $r_{ml}$ , and  $r_{vl}$  values of  $R^2$ . From  $R^2$ , we can calculate the path coefficient for others variable, which is not included in our model, *i.e.*,  $\rho_{S\varepsilon} = \sqrt{1 - 0.569} = 0.656$ .

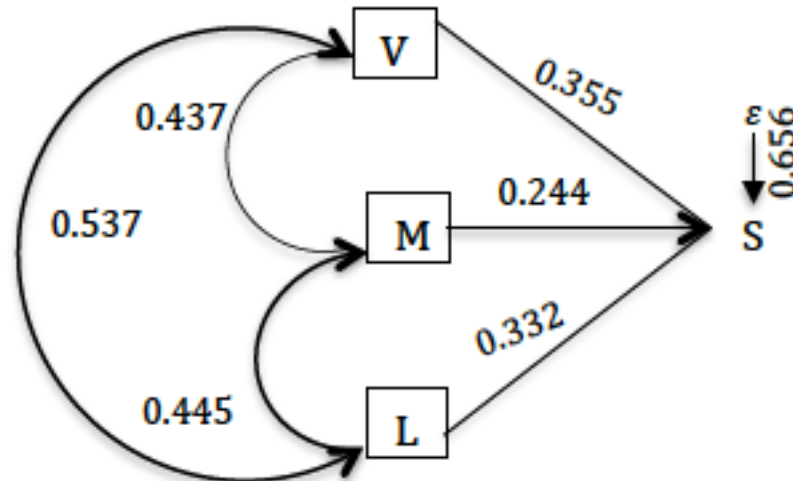


Figure 5.5. Output path diagram (Structural relationship of  $V$ ,  $M$ , and  $L$  to  $S$ )

In order to identify the degree of influence of variables  $V$ ,  $M$ , and  $L$  towards servitization, we calculated each of these variables' direct and correlative relational influences, which are as follows:

1) Influence of Vision ( $V$ )

$$\begin{aligned} & \text{Direct Influence} \\ & = \rho_{SV} \times \rho_{SV} = (0.355)(0.355) = 0.126 \end{aligned}$$

Influence through correlative relations with marketing ( $M$ )

$$= \rho_{SV} \times r_{vm} \times \rho_{Sm} = (0.355)(0.437)(0.244) = 0.037$$

2) Influence of Marketing ( $M$ )

$$\begin{aligned} & \text{Direct Influence} \\ & = \rho_{Sm} \times \rho_{Sm} = (0.244)(0.244) = 0.059 \end{aligned}$$

Influence through correlative relations with leadership ( $L$ )

$$= \rho_{Sm} \times r_{ml} \times \rho_{sl} = (0.244)(0.445)(0.332) = 0.036$$

3) Influence of Leadership ( $L$ )

$$\begin{aligned} & \text{Direct Influence} \\ & = \rho_{sl} \times \rho_{sl} = (0.332)(0.332) = 0.110 \end{aligned}$$

Influence through correlative relations with vision ( $V$ )

$$= \rho_{sl} \times r_{lv} \times \rho_{SV} = (0.332)(0.532)(0.355) = 0.062$$

Therefore, on the basis of above calculations, we can summarize the following results:

- 1) The direct influence of vision ( $V$ ) to servitization is 12.6%(0.126), and through the relationship with marketing is 3.7% (0.037). Thus, the influence of vision toward implementing servitization strategy in total is 16.3% (0.163).
- 2) The direct influence of marketing ( $M$ ) to servitization is 5.9% (0.059), and through the relationship with leadership is 3.6% (0.036). Thus, the influence of marketing toward implementing servitization strategy in total is 9.5% (0.095).

- 3) The direct influence of leadership ( $L$ ) to servitization is 11% (0.110), and through the relationship with vision is 6.2% (0.062). Thus, the influence of leadership toward implementing servitization strategy in total is 17.2% (0.172).

## 5.7 Summary

This chapter highlighted the influence of organizational factors on implementing servitization strategy. The beginning of the chapter we developed a qualitative analysis about five organizational factors: vision, organization, HRM, marketing and leadership based on discussions with FTH's executives and peoples. We found that the service-oriented vision, business integration capabilities, service-focused skills and knowledge, building customer relationship and peoples' empowerment in the organization have significant impacts on building product-service operations.

We then did a quantitative analysis to explore the relationship between organizational five factors and the implementation of servitization strategy using a questionnaire survey to Fujitsu, Toshiba and Hitachi (FTH) limited. The results of this analysis provide a clear indication that organizational factors are, indeed, highly significant on implementing servitization strategy. We showed that the three key organizational factors such as, leadership (17.2%), vision (16.3%), and marketing (9.5%) are significantly influence to the implementation of servitization strategy. The output of this chapter assumed to help companies for mitigating transformation risks especially related to organizational process and behaviors. The expected benefits from this chapter are to help enterprise managers and decision makers to consider the most influential organizational factors when they approaching towards servitization their business.

## Chapter 6

# Presentation and Discussion of Findings

This chapter is presented the relationship between research outputs, and provides a brief discussion of the results found throughout the dissertation respectively in Section 6.1 and Section 6.2. The Section 6.3 will then provides lesson learning and/or implications of this research in academy and real business world.

### 6.1 Relationship between Research Outputs

The output of the research shows a significant relationship between key research findings under different objectives, survey and analysis throughout the whole dissertation. This section will try to articulate those findings and pointing the relationship between each other in the following respectively:

First of all, we observed the relationship between most influential factors of organization and change process that significantly impacts on implementing firm's servitization strategy. For an example, the highest influential factors of organization is found as leadership that also observed to play a significant role of firm change process from manufacturing to servitization, including, the setting employees' mind and strategy towards service-oriented, integrating peoples into new vision, and creating a culture that fit for service environment. Moreover the importance of leadership has also been observed during the firm's operational process transformation from manufacturing to servitization. The finding shows that the key responsibility of this leadership in firms new, i.e., customer-centric strategy is to collaborate all business units and its executives together and motivate them towards service-oriented operations, including, R&D, production and sales and marketing.

Secondly, we have found that the factor, like, vision has also a positive relationship with the implementation of firm's servitization strategy, which observed in the beginning steps of successful change process, i.e., "creating a service vision". A good example in this regard is IBM case where company give importance on "creating a service vision" in the

beginning of transformation towards servitization and the first frame of that vision is to make the company profitable by continuing to be, in fact, the only full service provider in the industry.

Finally, we observed a significant relationship between third influencer of organization, i.e., marketing and change processes that acts as the step of value sharing and communication towards servitization of business. However, the relationship of this factor is also found in the firm operational process transformation from manufacturing to servitization in which sales and marketing and after sales services implies the firm to offer an additional values and building relationship base selling approach towards servitization of business.

Therefore, we can conclude that the key findings of this research have significantly good relationship with each other and positively influence all together for the implementation of firm's servitization strategy.

## 6.2 Discussion of the Results

Servitization is now widely recognized as the innovation of an organization's capabilities and processes, to better create value through a shift from selling product to selling product-service systems (PSS). To be competitive, sustainable, and differentiate itself, it is one of the key strategic choices that the manufacturers need to consider for long run business perspectives and profitability. Today, many leading hi-tech firms like, IBM, Fujitsu, Toshiba, Hitachi, Rolls-Royce, Siemens and so on embraces this concept as a service-led competitive strategy, environmental sustainability, and the basis to differentiate themselves from competitors who simply offer lower priced products.

Though, servitization becomes an important business strategy to the manufacturers, particularly in "customer-oriented" business world, in some instance, it shows a big dilemma for organization. Because, in one hand, it offers the firm lucrative benefits and alluring opportunities both in strategic and economic view point, on the other hand, it demonstrates number of risks, including structural changes, cultural shift and corporate challenges that sometimes discourage the firm from expanding the service dimension and/or even head the firm to bankruptcy.

To succeed with the implementation of servitization strategy, a manufacturer first needs to carefully design its services and adapt new and/or alternative organizational principles

structures and processes. The firm also needs to have better understanding about the change process and/or organizational factors that is important for implementing an institution's servitization strategy. To analyze these kinds of issues and finding some guidelines supporting to the implementation of servitization strategy, this dissertation principally concentrated on two goals. Firstly, to propose a conceptual model of firm's operational process transformation from manufacturing to servitization, which is very challenging but important. This model explains how a traditional manufacturing firm can extend their value chain towards service provision and achieve their desired objective of product-service integration. The key findings in this regard is observed that the manufacturing firm is traditionally driven by technology and tangible resources, which is significantly different than those of servitized firm, i.e., people's skills, knowledge and intangible resources. Secondly, to identify the organizational factors that significantly influence to the effectiveness of implementing servitization strategy. The key organizational factors are identified as leadership, vision, and marketing that positively influence to the implementation of servitization strategy.

In addition to these, the dissertation focused on identifying the change drivers of successful process transformation. The most important and critical change driver of strategic change process is mindset. Servitization or product to service transition is a change in mindset from the understanding of value as that created in the production and exchange of goods to one in which value is attained from the use of an offering aimed at achieving customer goals. This change of mindset is based on service dominant (SD) logic as an appropriate philosophy for the development of service science. Consequently, this dissertation also emphasized firm's cultural adaption towards service provision through its structural and behavioral changes, such as, marketplace is the driving force, customer satisfaction and shareholder value, sensitive to the needs of all employees and from product out - to customer in, from do it my way - to do it the customers' way, from attack the people - to attack the process, to name a few. Finally, the dissertation identified the key challenges of adopting servitization strategy by a conventional manufacturer are service design, organization strategy and organization transformation.

The real value of this dissertation is the output of number of real-life case studies/evidence and the result of our empirical data collected from IBM, Fujitsu, Toshiba and Hitachi who are strategically transformed their business from manufacturing to service provision and recognized as a successful servitized firm in the hi-tech industry.



### 6.3 Lesson Learnt: Implications

With the support of our thesis output, we can say that services can boost a firm's market share and reduce obstacles in maintaining a competitive edge in cost and technological superiority, by improving product adoption and increase sales. This can lead manufacturers to depend on services as a vital differentiating factor in their strategy mix. The amalgamation of products and services supports the tendency of a lock-in with the supplier and increases switching costs, due to inimitability of service-relationships.

Integrating business units and internally promoted peoples inside the organization can provide the manufacturing firms with a good starting point. Gradually, the firm can acquire and/or merge with potential organization and hire skilled peoples from outside who is collaborative, customer-oriented and committed to the organization. This must be followed by the basic recognition and appreciation of the extensive scope for the spectrum of services throughout the industry.

The overwhelming emphasis on tangible characteristics eclipses the potential of servitization and constricts service related resource allocation, such as, skills, knowledge and information. Planning and implementing the transformation of firm's operational process, changes culture and organizational structure are a prerequisite for any further development. Emphasizing leadership, vision and marketing factors of organization, the firm can stem-up towards servitization strategically. It is imperative to terminate the transfer of 'rule-of-thumb' policies, former manufacturing practices, and old procedures to new service approaches. Previous core competencies and capabilities are likely to be rendered irrelevant to the new organization, due to their inability to cater to the full service cycle. Managerial skepticism regarding the economic potential of service-activities must be avoided, as it undermines the efforts for successful performance and may lead to the service paradox.

Servitization is directly influenced equally by product and process innovations, unlike manufacturing where mostly product innovations are deemed to be influential. Long-term servitization projects are good for a firm, as services require negligible inventory compared to products; but create a complex environment for the management of innovation. As a practical implication for managers and policy makers it is crucial to monitor progress and avoid one-step forward with two-steps backwards. For individual commitment and acceptance of managerial goals and objectives, their setting should be mutual participation

between management and employees.

A review of the fundamental managerial practices to consistently support the evolving business strategy and organizational changes is important. In the process of ensuing service-provision, managers of manufacturing firms must not get obsessed with service evidence – they should focus in parallel on both manufacturing activities and service benefits. Uncompromising delivery of promised offerings, high service quality, optimum configurations, and value addition should unfailingly remain the fundamental constant objective. Manufacturers' need to consider full-integration of services with the product development process, and not a mere expansion of customer support. Ability of the service department to deliver offerings, meet targets, and keep up with promises is essential.

Finally, the manufacturing firm who is thinking or planning to move from product-provision to product-service-provision need to understand and address the strategic challenges and hurdles in the servitization process, such as, service design, organization strategy and organization transformation. It must to the dual role that customers play in services and address the abstractions and intangibles that are inherent in services. We reckon that preparing for these challenges and hurdles will enable the manufacturing firm to undergo the process of servitization quicker with more success.

The next section will conclude the dissertation by representing the key findings of this research and raising some important issues for future work in the related field of servitization.

## Chapter 7

# Conclusion and Future Research

This chapter is designed for concluding remarks. The Section 7.1 summarizing the research output obtained from this dissertation. A brief background of future research and some potential topics in the related field will then raised for investigation in Section 7.2.

### 7.1 Summary of Research

Today, hi-tech manufacturing in developed economies is under massive pressure as the rapid technological development has commoditized product differentiation and matured the market. Consequently, cutthroat competition in the manufacturing industry is pushing product sales through razor-margins, and firms are battling over customer retention. In these circumstances, manufacturers have sought alternative routes to increase the opportunity for competitive differentiation and found that they could do so by increasing the service component in their offerings. In turn, this service component as a value addition process with core offerings has emerged as the concept of “servitization” and became spotlight to the hi-tech manufacturers.

But, due to the very different natures of service, many companies experience problems to develop product-service (servitize) organization. In other words, one cannot simply add services to an existing organization without revamping it, because services addition require changes to many aspects of doing business. Therefore, our empirical study aims to deal two main issues of these aspects: (1) the firm operational process transformation from product manufacturing to product-service operation, and (2) the organizational factors that influence the firm to implement product-service operation. Consequently, we also tried to discuss change drivers, cultural issues and challenges that the firm confronted during the transformation from manufacturing to service provision.

With the purpose of making contribution both theory and practice, the following key findings is summarized based on cursory review of servitization literature, couples of case

studies, and interview results of IBM that mainly supports our first research problem and related objectives:

- i. We developed a conceptual model of firm's operational process transformation from manufacturing to servitization under the viewpoint of research and development, procurement, production, sales and marketing, and after sales services (Figure 4.1). The key finding shows that traditional manufacturing firm is run by technology and tangible resources while servitized firm is driven by skilled peoples, knowledge and intangible resources.
- ii. The result shows a significant difference between a traditional manufacturing and servitized firm in terms of operation, process and objective perspectives. While manufacturing firm focuses on product standardization, market acquisition, economies of scale and production efficiencies, the servitized firm concentrates on innovation, value proposition, flexibility, customization and building long-term relationship with customers.
- iii. Based on couples of case studies in the related field and interviews result of IBM, we found that the servitized firm always need to be stay in customer-centric operation, strategy should taken based on customer needs and expectations, and aimed to serve client's interest including, non-product related services like, consulting, operations, solutions, training, financing and others.
- iv. The analysis also indicates that successful servitization extends beyond the ability to acknowledge potential gaps and opportunities to the deployment of a 'whole business approach'. Service-delivery for successful firms focuses on product-service integration, extension of the range of offerings, and value proposition for their clients.
- v. To promote a successful transformation from manufacturing to servitization, we developed a conceptual model of change process and identified key drivers based upon literature and interview results such as, creating service vision, mindset and strategy development, leadership and teaming, value sharing and communication,

and anchoring a new service culture (Figure 4.4). Consequently, speed and execution of strategy also emphasized by interview results and IBM case study.

- vi. The interview results also confirmed that the need to restructure of company's organization and reorient the company culture is crucial for developing product-service operation, especially, building a service-oriented culture is undoubtedly important. However, the successful servitized firm like, IBM has also emphasized some principles and change behaviors in this regard, such as, marketplace is the driving force, customer satisfaction and shareholder value, sensitive to the needs of all employees and from product out - to customer in, from do it my way - to do it the customers' way (provide real service), from attack the people - to attack the process, from fixed rewards -to variable rewards, from manage to morale -to manage to success, to name a few (Table 4.4).

However, by conducting a questionnaire survey, open discussion and long-term observation of three multi-national Japanese hi-tech firms (FTH), we supported our second research problem and related objectives. The key findings from this survey is summarized in the following:

1. We explored the influence of five organizational factors, namely, vision, organization, HRM, marketing and leadership on implementing servitization strategy. We found that the service-oriented vision, business integration capabilities, service-focused skills and knowledge, building customer relationship and peoples' empowerment have significant impacts on building and implementing firm's servitization strategy.
2. We identified three most influential factors of organization that have significantly positive influence on implementing servitization strategy, such as, leadership 17.2%, vision 16.3%, and marketing 9.5%.
3. We also showed some other important factors of organization influencing servitization strategy opinionated by the participants in discussions. These are ICT infrastructure, brand equity, business size, merger and acquisition, and so on.

Furthermore, we identified some key challenges confronted by a conventional manufacturer during the adoption of servitization strategy based upon literature and empirical case studies. These challenges are pointed in the below:

- a. The analysis shows that implementing a servitization strategy consists with number of cultural and corporate challenges, such as, combination of product-service design, policies, process, structure, strategy and organizational transformation, which sometimes discourages the firm to expand its business from manufacturing to service dimension.
- b. Extrapolating the findings from theory and practice expose that the manufacturing firm who considering service-provision is faced with dynamically changing market conditions, speedy response to client needs, requirement of rapid process turnaround times, and volatile demand. These issues challenge the supplier, and demand fabrication of new protocols and paradigms.
- c. The empirical case study and discussion with FTH's executives indicates that identifying a moderate size of packages for different target markets or clients is really hard and consists with uncertainties of success. In this regard, one of the participants in our discussion claimed that the chance of success is fifty-fifty.
- d. The servitization of manufacturing also present challenges in the form of integrated production, delivery components, and cultural movement. This culture is specific and different from the traditional manufacturing culture and a shift of corporate mindset is necessary to take on services and priorities their development with respect to more traditional sources of competitive advantage.
- e. Finally, the internal-resistance, recruitment and training difficulties, infrastructural limitations and skill capacities are other big challenges identified for manufacturing firm to transform its business from product-oriented to service-oriented new operations. In this regard, customer accessibility and solution oriented thinking are required to react appropriately and develop over time.

Therefore, we believe that the result of this research can be used both in academic field and industrial organization. Due to the poor literature and theory observed in the servitization concept and/or process, we assume that our initial findings and case evidence will help the readers to better understanding about the issues, at the same time, it will raise debates between researchers which in-turn promote to develop a body of theory that address the current gap in the literature. Consequently, this research also helps to enterprise managers and decision makers to make the correct tactics for implementing servitization strategy and achieving their desired objectives.

## 7.2 Suggestions for Future Research

The scope of our dissertation aimed to concentrate on servitization of hi-tech manufacturing. We have focused on issues such as operational process transformation, change process, organizational factors, cultural adaption and challenges associated with the implementing servitization strategy. There are, of course, others ways of exploring and/or explaining the firm's operational process transformation towards servitization other than we highlighted and validated through case studies. Finding the sources of those way of operational process transformation is recommended to explore.

Since we examined the influence of organizational factors data collected from 3 hi-tech firms (FTH) in Japan, it would be interesting and valuable to conduct similar surveys in other regions for comparative studies. However, as our study revealed only three organizational factors such as leadership, vision and marketing that have combinedly 43% influence on implementing servitization strategy, so finding the other influential factors such as organizational culture, top management support, management collaboration, resources allocation, corporate strategy and others are recommended to examine.

As the concept of servitization in this thesis is discussed from organization viewpoint particularly for hi-tech manufacturing industries in developed economies where market is commoditized and companies can not gain their desired profit anymore, but still there are big gap of discussing the concept from customer viewpoint, other manufacturing industries and developing economies as well. So, exploring the significance of implementing servitization strategy from customers' perspective, different industries and other economies are recommended to investigate.

Since our thesis raised some case studies of successful servitized companies in developed economy where the concept is highly recognized and well accepted by industry experts, so, finding the opportunities of applying these companies' capabilities, servitized business model and success story towards developing economy where the concept of servitization is still new or unknown are recommended to explore.

Finally, we have realized that there is no existing research model on how to successfully transform and implement a process of servitization strategy in hi-tech manufacturing industry. As a result, there is no standardized and/or manual model in this regard that leads to indicate the paths of success. Though we have attempted to clarify the process including operational process, change process and organizational process, much further work must be done focusing these processes and related issues.



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# Appendix A

## Interview Questions

1. What are the basic operations of your company? Can you provide some information about your company including background information, management structure, main markets and competitors?
2. How long are you engaging with this company? What is your departmental function and position within the firm (e.g., your background, training and responsibilities)?
3. What is your opinion about company's current business activities? Does it fit for company's growth and/or meet current market demands?
4. There has been a lot of discussion of the latent need for manufacturing firms to offer new services. How far, and in what ways, do you believe this affects your company? Could you provide some examples about different kinds of services your firm might be able to offer?
5. Does your firm currently provide/sell any services or packages as part of your total offering, or is it a manufacturing dominated firm? Services (like aftersales support) may be bundled into the package you sell to customers, or sold separately (like consultancy, systems integration etc.). Which of these services are free, and which ones are paid for?
6. What service developments have most affected in today's competitive business environment?
7. How has your company responded to the increased demand for services?
8. What is your company's approach to services, are services bundled together with

- products or offered separately?
9. What were the business obstacles you faced when implementing more service-oriented strategy?
  10. How has your company handled or overcome these problems to be a full service provider in the industry?
  11. What big changes happened in the organization's operational process when your company started to move service-provision (e.g., R&D, procurement, production, sales & marketing and after sales services)?
  12. What are the major objectives that you pursuing with the development, production, marketing, supply of service offerings and after market services (AMS)?
  13. What do you consider to be the key change drivers that might lead to your organization more successful transformation towards service-orientation?
  14. How has the growth of services affected hi-tech industry? What service developments will take place in future?
  15. How will shape these changes shape the future business environment?
  16. As it is seen in today's manufacturing industry that they realized the importance of servitization strategy and started to move or already shifted into services, then how you differentiate your company from competitors in near future, do you think any other strategy/alternatives?
  17. Do you think your business model, i.e., "servitized model" can be applicable to the country where services are not emerged or became important yet?
  18. What are the possible scenarios you expect in this regard and/or how you approach?

# Appendix B

## Questionnaire Survey

### *Proposal Letter*

Dear Sir or Madam,  
FTH Limited, Tokyo, Japan

This is Ahamed Zahir, PhD student of Tokyo Institute of Technology, Department of Value and Decision Science. With most respectfully inform you that I am going to conduct a questionnaire survey supervise by Professor Takehiro Inohara, to determine “the influence of organizational factors on implementing servitization strategy” at hi-tech firms in Japan. It would be highly appreciate having your cooperation for completing this research successfully.

The main purpose of this survey is to collect some real data from professionals and practitioners in the organization that we use for conducting an academic research in the field of servitization. We believe this research output will carry some value for both organization as well as the academic field.

We developed a questionnaire survey to have your ideas and/or perceptions about five organizational factors such as vision, organization, HRM, marketing and leadership to identify its influence on implementing servitization strategy. In this regard, we would like to know your thoughts by clarifying the degree of preference in each statement starting with 1 for low and 5 for high. Finally, we request your comments or ideas on other influential factors of organization toward implementing servitization strategy.

Sincerely,

Ahamed Zahir  
Tokyo Institute of Technology  
E-mail: zahir@valdes.titech.ac.jp

**Questionnaire (English)**

Please rank the following statement in order of preferences. For each statement where you are determined to answer, please cross the box (X).

Name.....Position.....Duration.....

General perceptions about “Servitization”	<i>Disagree</i>		<i>Agree</i>		
	1	2	3	4	5
Servitization is the key business strategy for manufacturing firm in a competitive business arena					
Servitization differentiate the firm from competitors and protect its core product business					
Servitization generate substantial revenue and potentially higher margins than products					
Servitization leads the firm building a long-term relationship with customers					
Servitization is environmentally fit strategy that ensure more rational use of products					
The Influence of “Vision”	<i>Disagree</i>		<i>Agree</i>		
	1	2	3	4	5
Vision should be service oriented and profit-driven in long-term perspective					
Vision must be centralized and know by whole organization in the period of transition					
Vision influence the people more positively and motivate them to accomplish their goals					
Strategy should be turnaround customer needs and expectations "customer-centric"					
Strategy will be based on company's new vision in which service is core component					
The Influence of “Organization”	<i>Disagree</i>		<i>Agree</i>		
	1	2	3	4	5
Organization size and its business nature is very important for servitization					
Organization changes its structure from hierarchal to flat in servitization context					
Organization integrating its business units towards servitization of business					

Organization creates a service culture, which is most challenging part for servitization					
Organization build a larger front office where customer is involved with operating system					
The Influence of “HRM”					
	<i>Disagree</i>		<i>Agree</i>		
	1	2	3	4	5
Human resource changes in employees' skills and behavior require for servitization					
Human resource develop the interpersonal skills of customer-contact employees in service space					
Human resource empowered personnel to make decision and act in the customer's interest on the spot					
Human resource develop the communication skills and sensitive to customer needs in each level					
Human resource develop the producer who play significant role an integrated service delivery system					
The Influence of “Marketing”					
	<i>Disagree</i>		<i>Agree</i>		
	1	2	3	4	5
Sales and marketing support the implementation of servitization strategy by allowing customization, personalization, and market segmentation					
Sales and marketing design to create extended relationship with customers through database marketing, interaction marketing, and network marketing, which is required for service business					
Sales and marketing identify the moderate size of package for every different market and meet each client's needs and expectations through best solutions					
Sales and marketing develop market by promotional activities and create demand for package business					
Sales and marketing identify the customer needs and expectations and put that elements in strategy					
The Influence of “Leadership”					
	<i>Disagree</i>		<i>Agree</i>		
	1	2	3	4	5
Leadership is the key factor that drive organizational changes and implement servitization strategy					
Leadership support the execution of servitization strategy through cross-functional collaboration					
Leadership divert the employees mind into new changes and motivate them to work together					



Leadership influence on building firm service culture towards servitization of business					
Leadership continuously develop the servitization strategy focusing on customer value creation					

Other Factors:

Statement:

Comments:

I sincerely hope your cooperation. If you have any question, please feel free to ask me, I will response as early as possible.

Sincerely,

Zahir Ahamed  
 Value and Decision Science  
 Tokyo Institute of Technology  
 E-mail: zahir@valdes.titech.ac.jp

Note: To better understanding and convenient we translate the questionnaire in Japanese in next page.

## Questionnaire (Japanese)

ご氏名:.....職名.....勤続年数.....

「サービス化 (Servitization)」戦略についての一般的な認識: 選好の程度						強く反対			強く賛同			
						1	2	3	4	5		
「サービス化」は、競争が激しいビジネス環境におかれている製造業企業にとって、重要なビジネス戦略である。												
「サービス化」は、自社を競合他社と差別化し、自社の製造部門の中核を守る。												
「サービス化」は、実質的な利潤と、製品よりも潜在的に高い利益を生みだす。												
「サービス化」は、企業を、長期的な顧客との関係の構築へと導く。												
「サービス化」は、環境配慮に適した戦略で、製品のより合理的な使用を確かにする。												
第一指標: 企業理念/戦略: 選好の程度						強く反対			強く賛同			
						1	2	3	4	5		
企業理念は、サービス指向で、長期的視点での利益駆動型であるべきである。												
企業理念は、経営陣主導で策定され、変革期には組織全体に知られていなければならない。												
企業理念は、従業員に良い影響を与え、目標の達成の動機を与える。												
ビジネス戦略は、顧客のニーズと期待を変化させる「顧客中心型」であるべきである。												
ビジネス戦略は、サービスが中核的な構成要素であるような新しい企業理念に基づくものになっていく。												
第三指標: 組織: 選好の程度						強く反対			強く賛同			
						1	2	3	4	5		
組織規模とそのビジネスの特性は、「サービス化」において極めて重要である。												
組織構造は、「サービス化」の過程で、多階層からよりフラットなものへと変わっていく。												
組織は、「サービス化」に向けて、その部署を統合していく。												
「サービス化」においては、組織におけるサービス文化の創出がもっとも難しい事柄である。												
組織は、顧客が業務システムに関与するような、より大きな営業オフィスを構築する。												
第四指標: 人材: 選好の程度						強く反対			強く賛同			
						1	2	3	4	5		
人材管理によって、「サービス化」に必要な従業員の技能や振舞いを変化させる。												
人材管理によって、サービスにおける顧客接点の従業員(注3)がもつ対人技能を引き出す。												
人材管理は、従業員がそれぞれの職場で意思決定し顧客の関心のために行動する能力を向上させる。												
人材管理によって、従業員のコミュニケーション能力を引き出し、自分の職場の顧客のニーズに敏感になるようにする。												
人材管理によって、統合されたサービス提供システムで重要な役割を持つ責任者を育てる。												

第五指標：販売とマーケティング：選好の程度	強く反対			強く賛同	
	1	2	3	4	5
販売部門とマーケティング部門は、「サービス化」戦略の実施を、カスタマイズ、特定個人化、市場分割によって支える。					
サービス・ビジネスには、顧客とより深い関係を築くために、データベース・マーケティングやインタラクション・マーケティング(注4)、ネットワーク・マーケティングなどの、販売やマーケティングの設計が必要である。					
販売部門とマーケティング部門は、異なる市場それぞれについて、適切な大きさの商品パッケージを特定して、最高のソリューションで各顧客のニーズと期待に答える。					
販売部門とマーケティング部門は、プロモーション活動を通じて市場を開拓し、自社の商品パッケージの需要を掘り起こす。					
販売部門とマーケティング部門は、顧客のニーズと期待を特定し、それらを企業戦略に組み込む。					
第二指標：リーダーシップ：選好の程度	強く反対			強く賛同	
	1	2	3	4	5
リーダーシップは、組織を変革し「サービス化」戦略を実行するための重要な要素である。					
リーダーシップは、機能別組織を横断する協働(注1)を通じて「サービス化」戦略の実行を支えるものである。					
リーダーシップは、従業員に、新しい変革への意識と協働への動機を与える。					
リーダーシップは、ビジネスの「サービス化」に向けた企業のサービス文化の形成に影響を与える。					
リーダーシップは、顧客価値の創出(注2)に焦点を合わせた「サービス化」戦略を引き出し続ける。					

注1 : cross-functional collaboration

注2 : customer value creation

注3 : customer-contact employees

他の要因：

ご意見：

コメント：

ご協力をお願いいたします。ご不明な点がございましたらお気軽にお問い合わせください。できるだけ早くご回答いたします。

アフマッド ザヒル

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**Sample Answer Sheet (Questionnaire survey / English)**

**Interview Data**

Name: Yoshikuni Takashige Position: Vice President Duration: .....

General perception about "Servitization" Strategy, Degree of preferences		Strongly disagree			Strongly agree	
		1	2	3	4	5
1	Servitization is the key business strategy for manufacturing firm in a competitive business arena					✓
2	Servitization differentiate the firm from competitors and protect its core product business					✓
3	Servitization generate substantial revenue and potentially higher margins than products				✓	
4	Servitization leads the firm building a long-term relationship with customers					✓
5	Servitization is environmentally fit strategy that ensure more rational use of products			✓		

First Indicator: Vision / Strategy, Degree of preferences		Strongly disagree			Strongly agree	
		1	2	3	4	5
1	Vision should be service oriented and profit-driven in long-term perspective				✓	
2	Vision must be centralized and know by whole organization in the period of transition					✓
3	Vision influence the people more positively and motivate them to accomplish their goals				✓	
4	Strategy should be turnaround customer needs and expectations "customer-centric"			✓		
5	Strategy will be based on company's new vision in which service is core component			✓		

Second Indicator: Leadership, Degree of preferences		Strongly disagree			Strongly agree	
		1	2	3	4	5
1	Leadership is the key factor that drive organizational changes and implement servitization strategy				✓	
2	Leadership support the execution of servitization strategy through cross-functional collaboration				✓	
3	Leadership divert the employees mind into new changes and motivate them to wrok together				✓	
4	Leadership influence on building firm service culture towards servitization of business				✓	
5	Leadership continuously develop the servitization strategy focusing on customer value creation				✓	

Third Indicator: Organization, Degree of preferences		Strongly disagree			Strongly agree	
		1	2	3	4	5
1	Organization size and its business nature is very important for servitization			✓		
2	Organization changes its structure from hierarchal to flat in servitization context			✓		
3	Organization integrating its business units towards servitization of business				✓	
4	Organization creates a service culture, which is most challenging part for servitization				✓	
5	Organization build a larger front office where customer is involved with operating system			✓		

Fourth Indicator: Human resource, Degree of preferences		Strongly disagree			Strongly agree	
		1	2	3	4	5
1	Human resource changes in employees' skills and behaviour require for servitization				✓	
2	Human resource develop the interpersonal skills of customer-contact employees in service space				✓	
3	Human resource empowered personnel to make decision and act in the customer's interest on the spot				✓	
4	Human resource develop the communication skills and sensitive to customer needs in each level				✓	
5	Human resource develop the producer who play significant role an integrated service delivery system					✓

Fifth Indicator: Sales and Marketing, Degree of preferences		Strongly disagree			Strongly agree	
		1	2	3	4	5
1	Sales and marketing support the implementation of servitization strategy by allowing customization, personalization, and market segmentation				✓	
2	Sales and marketing design to create extended relationship with customers through database marketing, interaction marketing, and network marketing, which is required for service business				✓	
3	Sales and marketing identify the moderate size of package for every different market and meet each client's needs and expectations through best solutions				✓	
4	Sales and marketing develop market by promotional activities and create demand for package business				✓	
5	Sales and marketing identify the customer needs and expectations and put that elements in strategy				✓	

Other Factors:

Statement:

Comments:

*I believe it is important to grasp the fundamental value of goods which users receive when they use the goods. Such understanding will lead <sup>from and</sup> us to creating "good concepts" for the goods, which could involve/combine services.*

I sincerely hope your cooperation. If you have any question, please feel free to ask me, I will response as early as possible.

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 Cell: 090-1759-2466



Sample Answer Sheet (Questionnaire survey / Japanese)

日本語版 (Japanese version)

ck (49)

インタビュー・データ  
主任 教師

24年

ご氏名: ..... 職名: ..... 勤続年数: .....

「サービス化 (Servitization)」戦略についての一般的な認識: 選好の程度

	強く反対	1	2	3	4	5	強く賛成
1 「サービス化」は、競争が激しいビジネス環境におかれている製造業企業にとって、重要なビジネス戦略である。							
2 「サービス化」は、自社を競合他社と差別化し、自社の製造部門の中核を守る。							
3 「サービス化」は、実質的な利益と、賛否よりも潜在的に高い利益を生み出す。							
4 「サービス化」は、企業を、長期的な顧客との関係の構築へと導く。							
5 「サービス化」は、環境配慮に適した戦略で、製品のより合理的な使用を確かにする。							

第一指標: 企業理念/戦略: 選好の程度

	強く反対	1	2	3	4	5	強く賛成
1 企業理念は、「サービス化」指向で、長期的視点での利益駆動型であるべきである。							
2 企業理念は、経営陣主導で策定され、変革期には組織全体に知られていなければならない。							
3 企業理念は、従業員に良い影響を与え、目標の達成の動機を与える。							
4 ビジネス戦略は、顧客のニーズと期待を最大化させる「顧客中心型」であるべきである。							
5 ビジネス戦略は、「サービス化」が中核的な構成要素であるような新しい企業理念に基づいたものになっていく。							

第二指標: リーダーシップ: 選好の程度

	強く反対	1	2	3	4	5	強く賛成
1 リーダーシップは、組織を変革し「サービス化」戦略を実行するための重要な要素である。							
2 リーダーシップは、機能別組織を横断する協働(注1)を通じて「サービス化」戦略の実行を支えるものである。							
3 リーダーシップは、従業員に、新しい変革への意識と協働への動機を与える。							
4 リーダーシップは、ビジネスの「サービス化」に向けた企業のサービス文化の形成に影響を与える。							
5 リーダーシップは、顧客価値の創出(注2)に焦点を合わせた「サービス化」戦略を引き出し続ける。							

第三指標: 組織: 選好の程度

	強く反対	1	2	3	4	5	強く賛成
1 組織規模とそのビジネスの特性は、「サービス化」において極めて重要である。							
2 組織構造は、「サービス化」の過程で、多層層からよりフラットなものへと変わっていく。							
3 組織は、「サービス化」に向けて、その部署を統合していく。							
4 「サービス化」においては、組織におけるサービス文化の創出がもっとも難しい事柄である。							
5 組織は、顧客が業務システムに関与するような、より大きな営業オフィスを構築する。							

第四指標: 人材: 選好の程度

	強く反対	1	2	3	4	5	強く賛成
1 人材管理によって、「サービス化」に必要な従業員の技能や振舞いを変化させる。							
2 人材管理によって、サービスにおける顧客接点の従業員(注3)がもつ対人技能を引き出す。							
3 人材管理は、従業員がそれぞれの職場で意思決定し顧客の関心のために行動する能力を向上させる。							
4 人材管理によって、従業員のコミュニケーション能力を引き出し、自分の職場の顧客のニーズに敏感になるようにする。							
5 人材管理によって、統合されたサービス提供システムで重要な役割を持つ責任者を育てる。							

第五指標: 販売とマーケティング: 選好の程度

	強く反対	1	2	3	4	5	強く賛成
1 販売部門とマーケティング部門は、「サービス化」戦略の実施を、カスタマイズ、特定個人化、市場分割によって支える。							
2 サービス・ビジネスには、顧客とより深い関係を築くために、データベース・マーケティングやインタラクション・マーケティング(注4)、ネットワーク・マーケティングなどの、販売やマーケティングの設計が必要である。							
3 販売部門とマーケティング部門は、異なる市場それぞれについて、適切な大きさの商品パッケージを特定して、最高のソリューションで各顧客のニーズと期待に答える。							
4 販売部門とマーケティング部門は、プロモーション活動を通じて市場を開拓し、自社の商品パッケージの需要を掘り起こす。							
5 販売部門とマーケティング部門は、顧客のニーズと期待を特定し、それらを企業戦略に組み込む。							

注1: cross-functional collaboration  
注2: customer value creation  
注3: customer-contact employees

他の要因:

ご意見: 組織構造のフラット化はある程度必要だが、基本は標準を固く守り、そのトレーニングが必要とされる。

コメント: 基本的な企業理念は顧客満足が自己利益と結びつき多岐にわたる。サービスの質の向上が新しいビジネスモデル。  
より具体的な報告が必要とされている。

ご協力をお願いいたします。ご不明な点がございましたらお気軽にお問い合わせください。できるだけ早くご回答いたします。

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***Interviews/Discussions*****Vision oriented**

1. Do you think company's new vision is turn around customer needs or service oriented? How you differentiate this (Service oriented) vision to previous one (Product oriented) vision?
2. Do you think company's current vision is perfectly suited to meet market demands? What benefits will the functional/operational groups see when the vision is realized or adopted?
3. What's your opinion about the company's new business strategy? What are the strength/supportive tools behind of this strategy?
4. Do you think company's current strategy is suitable in response to market demands or meet customer needs, why?
5. What Initiatives you (Company) take to apply for this strategy? Is there any hard thing that company felt in execution period?

**Organization oriented**

6. How the organization changes into the service development process?
7. What organization considers for implementing servitization strategy? Does it consider big changes in organization?
8. How much organization used resources for adding service business into their operations?
9. Can you explain the other resources required to initiate this project successfully?
10. Does the organization maintain any co-operation or alliance with other organization in transition period?

**HRM oriented**

11. What sort of structure does your HR department had? And what are the big changes happening in operations after adding service activities in main business?
12. Operations within service environment are inherently different to those associated with a product focused, so which mode of HR policies and practices are targeted at how the tensions between the two modes play out in different contexts?
13. Does the company need to recruit more staff for implementing the new policies? If so, what kind of people/skill you required for service operations? Do you think outsourcing is the best and more effective way in this situation, why?
14. What are the steps that you (Your Organization) have taken to develop the HR planning or achieve company's new objective?
15. If given a choice, what changes would you like to see in the HR department of your organization so as to make it more effective and manageable for company's new directions?

**Marketing oriented**

16. Do you think there has big difference between product and service marketing? If so, how you aligned these two goals at one direction?
17. What changes did you required in previous marketing strategy, which was crucial for implementing firm servitization strategy? Do you think company's current marketing strategy driving growth, how?
18. Are the marketing plans built in keeping and giving more attention to the customer needs and expectations? What have you taken to support these initiatives?
19. How much resources your organization uses for executing new marketing strategy? What was your main concern on developing service marketing? How you did it?



20. How you differentiate your marketing activities (product-services) with those who only focused on selling products or increasing market share? Is there any market segmentation that you did after servitization? Who are the target customers of your new offerings of goods and services?

**Leadership oriented**

21. What have you changes in your leadership policies in a new environment of product-service business?
22. What are the important factors of leadership that played a significant role in company's new direction or changes?
23. Do you think leadership is the key driver on building a service culture and motivate the employees to change their mind into new changes? What you did for these initiatives?
24. Does 'empowerment' is the best way for building an efficient and effective service environment? Do you feel that after having daily meetings with you, the employee union feels empowered? Can you explain any specific pattern that you follow to interact with your employees?
25. How the organization changes into the service development process?

## Appendix C

### Data Analysis Table (Unproduced)

In the main manuscript, we avoided some less important tables due to the writing consistency and quick understanding. The following are those unproduced tables that we found from statistical analysis by using SPSS software.

**APPX. C1:** Tables for overall analysis (Total statistics):

#### Item Statistics (Chapter-5/Section-5.5)

	Mean	Std. Deviation	N
S1	4.1342	.64940	57
S2	3.4579	.78050	57
S3	3.6301	.83819	57
S4	4.0108	.79300	57
S5	3.0809	.78903	57
V1	3.4078	.93084	57
V2	4.1128	.83896	57
V3	4.0141	.78323	57
V4	3.8945	.76008	57
V5	3.3120	.78998	57
L1	3.8154	.80384	57
L2	3.6044	.75812	57
L3	3.9470	.72683	57
L4	3.4581	.89318	57
L5	3.2135	.74923	57

	Mean	Std. Deviation	N
O1	2.9165	.93229	57
O2	2.7560	.81357	57
O3	2.7229	.80096	57
O4	3.1375	.96796	57
O5	2.5578	.75095	57
H1	3.3155	.93558	57
H2	3.2060	.97935	57
H3	3.2343	1.03596	57
H4	3.2615	1.12618	57
H5	3.2568	1.02059	57
M1	3.3701	.84973	57
M2	3.7665	.70916	57
M3	3.6527	.84284	57
M4	3.8647	.78716	57
M5	3.9466	.83262	57

**Item-Total Statistics (Chapter-5/Section-5.5)**

	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Cronbach's Alpha if Item Deleted
S1	99.924641191	160.035	.433	.899
S2	100.600914833	153.873	.676	.894
S3	100.428700475	160.014	.323	.900
S4	100.047965360	158.891	.403	.899
S5	100.977935670	153.902	.666	.894
V1	100.651011758	155.738	.472	.898
V2	99.945987058	158.295	.406	.899
V3	100.044748719	159.091	.398	.899
V4	100.164265170	161.968	.260	.901
V5	100.746838944	158.207	.440	.898
L1	100.243394711	159.483	.366	.900
L2	100.454375672	156.084	.576	.896
L3	100.111792109	160.396	.361	.900
L4	100.600666014	154.879	.535	.896
L5	100.845351786	155.093	.638	.895
O1	101.142256416	159.377	.311	.901
O2	101.302816939	159.022	.384	.899
O3	101.335906698	156.449	.523	.897
O4	100.921349360	156.070	.437	.898
O5	101.500965291	157.517	.503	.897
H1	100.743340746	157.491	.392	.899
H2	100.852817677	154.244	.508	.897
H3	100.824540891	151.551	.586	.895
H4	100.797353428	150.825	.559	.896
H5	100.802048989	152.308	.564	.896
M1	100.688689039	156.412	.491	.897
M2	100.292284900	160.019	.393	.899
M3	100.406100533	157.488	.443	.898
M4	100.194138289	160.752	.310	.900
M5	100.112158340	158.022	.423	.899

**Scale Statistics (Chapter-5/Section-5.5)**

Mean	Variance	Std. Deviation	N of Items
104.058805414	167.567	12.9447683555	30

**APPX. C2:** Tables for finding degree of influential factors (Unproduced):

**Correlations (Chapter-5/Section-5.6.2)**

		S	L	V	M
Pearson Correlation	S	1.000	.629	.638	.547
	L	.629	1.000	.532	.445
	V	.638	.532	1.000	.437
	M	.547	.445	.437	1.000
Sig. (1-tailed)	S	.	.000	.000	.000
	L	.000	.	.000	.000
	V	.000	.000	.	.000
	M	.000	.000	.000	.
N	S	57	57	57	57
	L	57	57	57	57
	V	57	57	57	57
	M	57	57	57	57

**Model Summary (Chapter-5/Section-5.6.2)**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.754 <sup>a</sup>	.569	.544	.35830

a. Predictors: (Constant), M, V, L

**ANOVA (Chapter-5/Section-5.6.2)**

Model		Sum of Squares	df	Mean Square	F	Sig.
1	Regression	8.969	3	2.990	23.289	.000 <sup>a</sup>
	Residual	6.804	53	.128		
	Total	15.773	56			

a. Predictors: (Constant), M, V, L

**Coefficients (Chapter-5/Section-5.6.2)**

Model		Unstandardized Coefficients		Standardized Coefficients	t	Sig.
		B	Std. Error	Beta		
1	(Constant)	.403	.397		1.017	.314
	L	.301	.101	.332	2.989	.004
	V	.366	.114	.355	3.213	.002
	M	.217	.093	.244	2.339	.023

a. Dependent Variable: S

# Appendix D

## Sources of Research

The secondary research for this dissertation is based on databases, academic and trade journals, and books accessible through Tokyo Institute of Technology's Library website. Key search tools on the online library and other scholarly websites were used to obtain articles through likely keyword searches.

➤ The following databases were searched for subject-wise search for articles:

- |                      |                   |                      |
|----------------------|-------------------|----------------------|
| > Emerald Insight    | > World Scholars  | > Elsevier Direct    |
| > Scirp              | > Sciedu Press    | > Hoovers            |
| > Informaworld       | > Jstor           | > Springer           |
| > Mintel             | > Sage            | > McGrawhill         |
| > Aldine             | > Science Direct  | > Wiley InterScience |
| > Infonomics Society | > Blackwell       | > Pearson            |
| > Acorn              | > Service Science | > Sheffield          |

➤ Articles and reports were also consulted from the following:

- United Nations Industrial Development Organization (UNIDO)
- American Marketing Association
- Japan External Trade Organization (JETRO)
- Bangladesh Institute of Development Studies (BIDS)

➤ The following journals were referred to:

- Journal of Service Science and Management
- International Journal of Business Administration
- Managing Service Quality
- Journal of Service Research
- Industrial Marketing Management
- International Journal of Service Industry Management

- International Journal of Advanced Manufacturing Technology
  - European Management Journal
  - Journal of Economic Literature
  - European Journal of Marketing
  - European Journal of Purchasing and Supply Management
  - Journal of Business Logistics
  - International Journal of Physical Distribution and Logistics Management
  - Journal of Business Research Journal of International Business
  - Journal of International Economics
  - Journal of Management Development
  - Journal of Marketing Theory and Practice
  - Journal of Operations and Supply Chain Management
  - Journal of Contemporary Management
  - American Journal of Business and Management
  - International Journal for Infonomics Society
  - Journal of Human Resource Management
  - Journal of the Academy of Marketing Science
  - Journal of Business Strategy
  - Journal of Operations Management
  - Journal of Information and Management
  - Journal of Manufacturing Technology Management
- The following review publications were referred to:
- Harvard Business Review
  - MIT Sloan Management Review
  - Wharton University of Pennsylvania Review
  - Cranfield School of Management Review
  - Manchester University Business Review
  - IBM White Paper Review

# Appendix E

## Types of Studies

- The following types of elements considered for study:
  - Literature review
  - Secondary analysis and meta-analysis of existing data
  - Qualitative and Quantitative research
  - Research based on administrative records and documentary evidence
  - Interviews
  - Questionnaire surveys
  - Case studies
  - Experimental social research
  - Internships
  
- Primary research and interviews specifically have the following advantages:
  - First hand information
  - Direct observation of theories in practice for fair understanding
  - Present time, not dated like archived secondary research
  - Aimed directly at the research question, not inferences from secondary sources with alternative objectives
  - Reveal additional useful information that may not have been the direct intention of the interview
  
- Despite the incomparable benefits, interviews also bear the following disadvantages:
  - Employs vast resources
  - Interviewees bias towards particular beliefs and practices
  - Results are subject to the interviewer's inference of the responses
  - Inappropriate sample size and interviewee subjects
  - Unavailability of targeted interviewees



## Appendix F

### Research Limitations

- The following list includes both internal and external limitations consisted with research:
  - Lack of books, journals and articles specifically related to the survey
  - Restricted resources and limited scopes
  - Exploratory study; developed instrument is new
  - Contracting with organization; take appointment
  - Lack of understanding; language barrier
  - Interviewee availability and sample size
  - None of the previous studies tackle specific question
  - Impossible to do a systematic comparison across stratified samples
  - Real trends underlying the data masked by headline grabbing figures
  - Literature insensitive to diverse approaches, challenges, and contexts
  - No academically converged definition of servitization
  - Scarcity of literature and confidentiality of available data
  - Possible generalization of findings, variable quality of acquired data
  - Lack of funding; obstacle to go abroad and survey there
  - Time limitations and others.

# Appendix G

## Lists of Software

- The following software mainly used for our analysis:

### ***For Qualitative***

- NVivo software, QSR International, Australia

### ***For Quantitative***

- SPSS software, PASW Statistics Student Version 18, SAGE