FIVE PHASES NEW PRODUCT DEVELOPMENT PROCESS FOR BUSINESS-TO-BUSINESS CUSTOMERS IN A TELECOMMUNICATION SERVICE PROVIDER

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DEDICATION

This dissertation is dedicated to my family – Mama, Abah and the other 3Hs

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ABSTRACT

New products are prevalent in technology-intensive industries such as telecommunication industry to stay in business and provides competitive advantage against the competitors. On average, product or service readiness takes more than a year which exceeds customer deadline. The aim of the study is to improve the existing New Product Development (NPD) process for business-to-business customers in one Internet Service Provider (ISP) in terms of shorter lead time and superior product features. The research was conducted using exploratory sequential mixed method – document review, interview and questionnaire. First, relevant documents on NPD frameworks were reviewed. Next, a total of ten participants consisted of account managers, solution consultants and solution integrator were interviewed to understand the issues they faced as well as improvement recommendations with the existing NPD process at the ISP. Thematic analysis was used to analyse the semi-structured interview responses. Then, a questionnaire survey was developed based on the interview analysis, and was distributed to 68 personnel from pre-sales division. Frequency analysis was used to analyse the questionnaire responses. The data from the three sources were triangulated and revealed the issues with the existing NPD process. The main issues highlighted were long productisation duration, inefficient process, limited supported product features, high dependencies on solution integrators, and these caused high out-payment, low profit margin, and long project timeline. Based on the findings, a process flow t-NPD consisting of five phases was proposed. The t-NPD was tested against an Internet-of-Things case study, Smart Home, and the results showed a shorter productisation duration of six months, and an additional revenue stream of RM1million with profit margin of 40% approximately. In addition, the t-NPD was validated by three external product managers. The findings indicate that the t-NPD is beneficial to the ISP in terms of shorter lead time and improved profitability, and also useful to other internet service provider companies in Malaysia.

ABSTRAK

Produk baharu adalah penting dalam industri telekomunikasi yang sentiasa berkembang pesat bagi memastikan kesinambungan perniagaan serta memberikan kelebihan daya saing. Secara purata, kesediaan produk atau perkhidmatan mengambil masa lebih setahun iaitu melangkaui tarikh akhir pelanggan. Kajian ini bertujuan untuk menambah baik proses Pembangunan Produk Baharu (NPD) sedia ada untuk pelanggan perniagaan ke perniagaan di sebuah Penyedia Perkhidmatan Internet (ISP) dari segi masa yang lebih pendek dan ciri produk yang unggul. Kajian ini dilakukan dengan menggunakan kaedah campuran secara eksplorasi berturutan - semakan dokumen, temubual dan soal selidik. Pertama, dokumen berkaitan kerangka NPD disemak. Seterusnya, seramai sepuluh peserta temubual terdiri daripada pengurus jualan, perunding penyelesaian dan penyepadu penyelesaian ditemubual untuk memahami masalah yang mereka hadapi dan mendapatkan cadangan penambahbaikan ke atas proses NPD sedia ada di ISP. Tindak balas temubual separa berstruktur dianalisis mengikut tema yang disimpulkan dari transkrip temubual. Kemudian, tinjauan soal selidik berdasarkan hasil analisis temubual dihasilkan dan diedarkan kepada semua 68 kakitangan di unit pra-penjualan. Analisis frekuensi digunakan untuk menganalisa tindak balas soal selidik. Data dari ketiga-tiga sumber disemak-silang dan mendedahkan masalah yang terdapat pada proses NPD yang sedia ada. Isu utama yang diketengahkan adalah proses yang panjang, proses yang tidak berkesan, ciri produk yang terhad, kebergantungan tinggi pada penyepadu penyelesaian, yang seterusnya mengakibatkan pembayaran keluar yang tinggi serta margin keuntungan yang rendah dan jangka masa projek yang lama. Berdasarkan hasil kajian, t-NPD, yang terdiri dari lima fasa telah dicadangkan. t-NPD kemudiannya diuji ke atas kajian kes Internet Pelbagai Benda, Rumah Pintar, dan keputusan menunjukkan jangka waktu pengeluaran yang lebih pendek iaitu enam bulan dengan aliran pendapatan tambahan sebanyak RM1 juta dan margin keuntungan sekitar 40%. Di samping itu, t-NPD juga disahkan oleh tiga pengurus produk luaran. Hasil pengesahan menunjukkan bahawa t-NPD adalah berfaedah kepada ISP dari segi masa pengeluaran yang lebih pendek dan dapat memperbaiki keuntungan, serta berguna kepada syarikat penyedia Internet lain di Malaysia.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF ABBREVIATIONS

ANN	-	Artificial Neural Network
AM	-	Account Manager
ADSL	-	Asymmetric Digital Subscriber Line
B2B	-	Business-to-Business
B2C	-	Business-to-Consumer
CRM	-	Customer Relationship Manager
ISP	-	Internet Service Provider
IoT	-	Internet of Things
IT	-	Information Technology
ICT	-	Information and Communication Technology
LAN	-	Local Area Network
LOB	-	Line of Business
NPD	-	New Product Development
PO	-	Product Owner
RFP	-	Request for Proposal
RFQ	-	Request for Quotation
RFS	-	Ready for Service
SC	-	Solution Consultant
WAN	-	Wide Area Network
WiFi	-	Wireless Fidelity

LIST OF APPENDICES

CHAPTER 1

INTRODUCTION

1.1 Introduction

Organisations face stiff challenges and competition from both the local and global players in the industry and these must be overcome in order to stay afloat (Dasanayaka, Al Serhan, Glambosky, & Gleason, 2020). Firms are always exposed to competition from new and existing firms in the market. In order to improve performance and remain competitive in the dynamic economic landscape, it is imperative for an organisation to keep on adding value to its business (Bhangu, 2020; Marc & Magdalena, 2013; Yan, Wang, & Xiong, 2017; Yang, Trimi, & Lee, 2016). The ability to develop new products and ensuring they are always relevant determines the success of an organisation. Invention and innovation play an important role in improving performance, ensuring sustainable prosperity in the industry, and thus, achieving growth in the future (Bhangu, 2020; Lee Y.H., 2011; Pitta & Pitta, 2012; Salunke, Weerawardena, & McColl-Kennedy, 2013; Taghizadeh, Jayaraman, Ismail, & Rahman, 2014; Yan et al., 2017; Yang et al., 2016). Constantly introducing products or services to the market has become imperative for an organisation's growth and reputation in the competitive market environment.

With the advancement of technology, products are innovated and invented at a relatively faster pace. This is especially true in a technology-intensive industry such as telecommunication where the technology changes faster than the service development in the service provider environment. As technology evolves rapidly, obsolesce is inevitable. Therefore, a shorter product life cycle can be seen on the existing product offering (Yan et al., 2017). This fast-changing pace requires organisations to be on par with the technology development and customers' demands. Companies that have faster time-to-market gains first mover advantage (Adiele & Amue, 2012; Yang et al., 2016; Yeh, Pai, & Yang, 2008). As a result, firms are looking at ways and methods to reduce

the time-to-market in order to gain competitive advantage (Dasanayaka et al., 2020). Time to market has proven to be a huge challenge as the organisation races against time to catch up with the rapid technology changes to cope with demanding customers.

New product development (NPD) may involve developing a new-to-the-market service or innovating existing product packaging and offerings. Organisations adopt the NPD process in developing the new product. A new product can either be tangible or intangible, depending on the industry the organisation is in. Achieving innovations in service or product development by integrating external stakeholders such as customers, suppliers or distributors will enable service-oriented firms to achieve its business performance goals and maps its business direction (Busagara, Mori, Mossberg, Jani, & Andersson, 2020; Salunke et al., 2013; Yan et al., 2017).

In the case of the telecommunication industry, new product is often referred to as intangible product, whereby these organisations will develop new services to serve the market's demand and needs. Organisations in the telecommunication industry may adopt the same method in developing or improving their existing services offering. Telecommunication service providers aiming to improve their business performance have to take strategic moves and coordination as well as focus on integration tasks in order to reap the full benefits of service innovation (Taghizadeh et al., 2014; Yan et al., 2017).

This chapter is structured as follows. Section 1.2 introduces the research background followed by the problem statement in Section 1.3. Based on the problem statement, the research objectives and questions were developed and highlighted in Section 1.4 and Section 1.5 respectively. The scope and limitations of the study are discussed in Section 1.6, followed by the significance of the study in Section 1.7. Finally, the terms used in this study are explained in Section 1.8.

1.2 Research Background

The telecommunication industry in Malaysia consists of the Network Service Provider (NSP), Network Facilities Provider (NFP), Application Service Provider, and Content Application Service Provider (CASP) (MCMC, 2020). The NSP, widely known as Internet Service Provider (ISP), is divided into two categories; mobile or fixed-line providers. ISP A provides services to the consumers in the Business-to-Consumer (B2C) segment as well as services to the enterprise or public sector customers in the Business-to-Business (B2B) market segment. This study will focus on a privatised ISP, ISP A that provides both fixed and mobile network services in Malaysia.

ISP A is headed by a Group CEO who reports directly to the Board of Directors (ISP-A, 2020). The high-level organisation chart is depicted in Figure 1.1. In ISP A, the business-to-consumer market is operated by the Mass Market. Business-to-consumer services include telephone lines, fixed and mobile broadband currently enjoyed by consumers nationwide. The business-to-business (B2B) market segment, on the other hand, is operated by its enterprise and public sector business solutions arm of ISP A, also known as the Line of Business (LOB) hereafter. The customers in the B2B market segments include government agencies, ministries, public and private universities, property developers, financial services institutions, broadcast and media companies, and other medium enterprise businesses (MEB). The LOB offers seamless and complete digital solutions using state-of-the-art technology to its customers. The LOB provides guaranteed dedicated services to these corporate customers, unlike the Mass Market segment. Among the services provided in this segment are Virtual Private Network, Network Security, Direct Internet Access, Software-Defined Network, Internet of Things, Unified Communications and Contact Centre, and others.

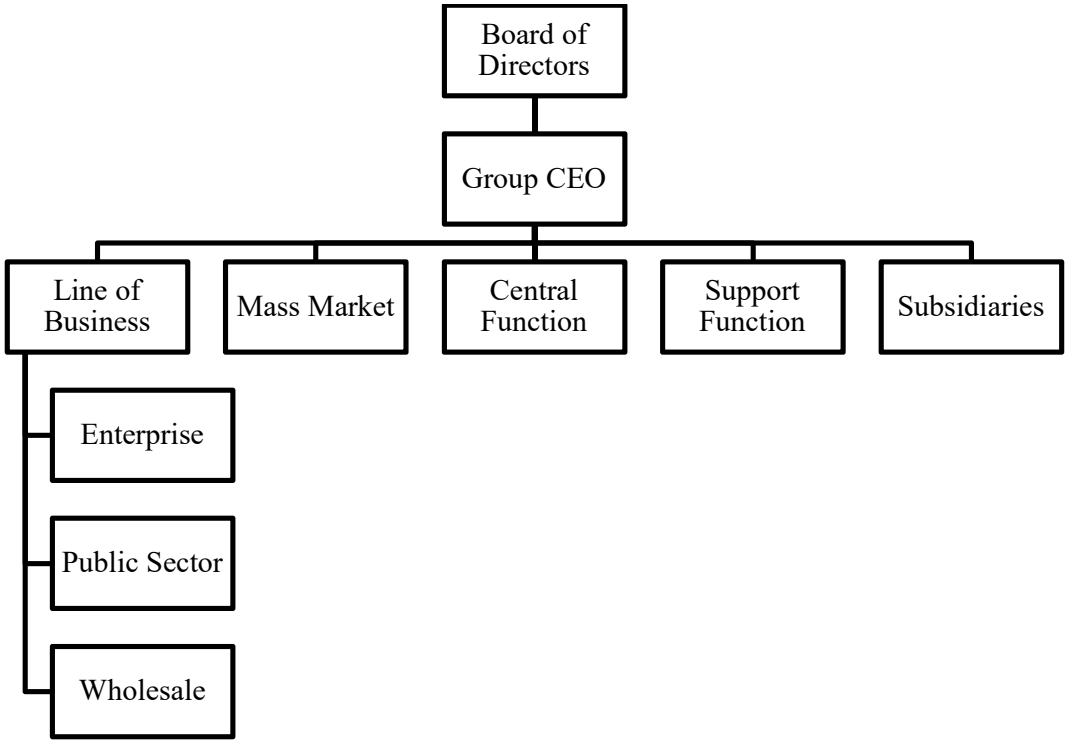

Figure 1.1 High-Level Organisation Chart of ISP A (ISP-A, 2020)

Figure 1.2, on the other hand, focuses on the divisional structure within the LOB. Since the LOB offers guaranteed and dedicated services to the customers, dedicated teams from each unit will be assigned for each particular customer. The sales and pre-sales teams are the front-liners for each of the assigned dedicated customers. While the sales team handles commercial aspects, the pre-sales teams on the other hand deal with the technical aspects. The pre-sales team consist of engineers who are required to be technically sound and understand ISP A's offering very well. They are termed as ISP A's front-liners, who represent ISP A when meeting the customers (Hsieh, 2016; Karlsson & Skålén, 2015; Santos-Vijande, López Sánchez, & Rudd, 2015). Whenever there is a new requirement from a customer, the pre-sales teams are required to address and respond to these requirements by preparing technical proposals. The Sales teams on the other hand prepare the commercial proposals and official quotations for the customers.

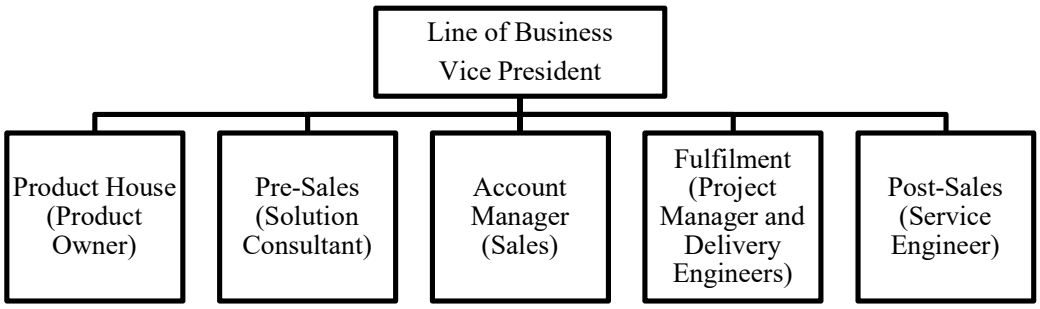

Figure 1.2 Divisional Structure in the Line of Business (LOB, 2019a)

ISP A is known to be providing a broad portfolio of standardised services and solutions to its B2C and B2B customers. However, ISP A also provides customised solutions and services in the B2B market segments. Ensuring accurate information when gathering B2B customers' (referred to as customers hereafter) requirements are important. Responding well and above the customers' needs and wants is even more desirable. Pre-sales teams, regarded as the Solution Consultants (SC) in ISP A, acts as the main contact person for all technical requirements from the customers. SCs are expected to have a very good understanding of the customers' requirements as part of the revenue-generating team. The Account Managers (AM), on the other hand, manage the customer's relationship and handles the commercial aspects of all requirements.

The B2B customers may approach any of their preferred service providers and ask for a technical proposal or invite potential service providers to participate in a tender. A proposal request will be the best option from ISP A's point-of-view as this will guarantee a new revenue stream. However, to ensure integrity and avoiding corruption, large organisations and government agencies are always bound by procurement governance and processes (Muhamad & Gani, 2020; Yap, Lee, & Skitmore, 2020). Therefore, tender is usually the chosen method of procuring a telecommunication service. ISP A, when invited to participate, has to compete with other ISPs or Solution Integrators in the market. In responding to the tender, ISP A's internal stakeholders will collaborate with full control by the SC and AM. This includes the back office and the Product Owners (PO). The SC will seek advice from the PO on ISP A's capabilities in providing the services based on tender specifications. The PO is responsible in ensuring the current product lines are competitive and ahead

of their competitors. As ISP A operates in the service industry, product refers to the intangible products which are services. Therefore, products and services may be used interchangeably from this point onwards.

Service or product development is essential in ensuring business continuity (Diaw & Asare, 2018; Hajar, Ibrahim, & Al-Sharafi, 2019; Khan, Akram, Shah, & Khan, 2017). The essence of being ahead in the market is a shorter development process and faster time-to-market (Adiele & Amue, 2012; Dasanayaka et al., 2020; Yeh et al., 2008). In ISP A, new products are developed based on a seven-stage process depicted in Figure 1.3.

Figure 1.3 New Product Development Phases in ISP A (LOB, 2019a)

This seven-phase process is owned by the PO and governed by the product creation framework (LOB, 2019a). They are fully responsible in ensuring the to-be-productised solutions go through all the phases as per the governance's requirements. The process to productise begins in Phase 1. This is where ideas are generated and market trends are studied, evaluated and presented to the committee. The high level productisation plans are also to be presented to the committee. At Phase 2, the PO is expected to obtain approval to proceed with productisation from the General Manager of Product House. The outcome of stage 1 activities must be presented in detail using

the provided checklist and presentation template. Approval is given after a thorough evaluations using pre-defined criteria and scoring sheet are done.

At Phase 3, the PO must develop a complete business case comprising of both the technical and financial aspects of the product. They combined the input obtained from both the internal and external stakeholders. The information gathered include the best technology to be deployed together with the potential partner, the cost elements, the internal resources' capability to undertake, the product and technology roadmap, the future enhancements and new target market segments. This is to ensure that the product to be developed can serve the target market's requirements. At Phase 4, the business case is presented to the Product and Solution Committee (PSC), chaired by the VP of the LOB. During this sitting, the PSC chairman together with the rest of the committee members will determine if the business case is deemed as viable or otherwise

At Phase 5, the final technology partner selection is made before the detailed technical design is finalised. Once the decision is made, the design and product features are tested in a laboratory environment to ensure all the technical aspects and configuration meet the product's technical features. After which, the PO is expected to establish the product's process and procedure (P&P) as well as work instructions (WI) documents to govern the product's sales and deployment processes. At Phase 6, the product's final pricing and packaging are done. Some products will have more than one pricing options, while some may have only one. The product that has only one pricing option using one technology partner only is deemed as rigid and will not be able to cater to some customers' budget constraints. With the pricing in place, the go-to-market (GTM) approach is tabled out and finally presented for final approval prior to product launch. Product launch, a full introduction to the market, finally happens in Phase 7. Some products undergo soft product launch before the full product launch. The soft launch stage acts as a platform to gauge market acceptance. Various approvals are imposed before the product can be launched resulting in a long timeline.

1.3 Problem Statement

The process to develop a new B2B product in ISP A uses the existing seven phases, which is long and usually took more than a year. The seven phases include the following activities; idea generation, concept approval, business case development, product and solution committee approval, product development and product launch (LOB, 2019a). According to an internal report presented during a closed event townhall, the average productisation duration is 12 to 18 months (LOB, 2018, 2019b). Sometimes, the products requested by the B2B customers are not ready or still under development. In 2018, 70.8% of the requested solutions are non-productised. In 2019, the percentage of non-productised requirements is 68.2%, a 2% reduction from the year before. High percentage of non-productised technical proposals is translated to approximately 60% of out-payment to external parties engaged by ISP A to complete the technical proposal and solution, thus eating up ISP A's overall earnings before interest and tax (LOB, 2019a). These figures, rounded up to the nearest number, are depicted in Table 1.1 below.

Table 1.1 Percentage of Non-productised Technical Proposals and the Corresponding Out-payments to External Parties (LOB, 2019b)

Year	Total number of Technical Proposals Submitted to Customers	Total Number of Non-productised Technical Proposals	Percentage of Non-productised Technical Proposals	Percentage of Out-Payment from Total Annual Revenue
2018	2400	1700	70.8%	65%
2019	2200	1500	68.2%	60%

The B2B customers acquire managed and dedicated services via procurement governance which can be via open or closed tender to avoid corruption and other integrity issues. This means that the customers have a fixed project delivery timeline and Ready for Service (RFS) date which must be managed and met by ISP A. More often than not, the customers' requirements are developed together with technology partners, thus, bearing the latest technology which has never been incorporated in the

products being developed by the PO. Customers' needs and requirements evolve as technology evolves.

Responding to the customers' requirements is essential in maintaining the customers' relationship and managing the overall organisation's financial performance. The inability to respond to the requirements may lead to revenue leakage and a potential reduction in ISP A's market share. The business opportunity may have fallen to ISP A's competitors. Therefore, in responding to the non-productised requirements, the accounts' teams, comprising of AM and SC, will work with Solution Integrators (SI), an external stakeholder. This subsequently involves out-payment to the SI, reduced profit margin, delayed project delivery, and delayed revenue collection. Customer satisfaction remains as the utmost priority in most organisations as this will guarantee positive cash flow and future growth.

In short, the current NPD process has flaws which lead to revenue leakage and inability to respond to customers' requirements. The purpose of this phenomenological study is to understand the issues faced by the Account Managers and Solution Consultants in ISP A's headquarters in Klang Valley for a period of 15 months between October 2018 to March 2020. The central phenomenon will be generally defined by their experiences in the existing NPD process flow when finalising technical proposal to the B2B customers. Because there are a few studies exploring the NPD process in a telecommunication industry, this phenomenological study was devoted at understanding and improving the NPD process flow in ISP A by understanding the experiences of the personnel involved in engaging the B2B customers. A shorter and simpler NPD would help to ease the problem currently faced by ISP A. A new approach to NPD is vital to grasp the business opportunity that comes by.

1.4 Research Objectives

The main objective of this phenomenological research is to modify the existing gated process of NPD for shorter lead time and superior product features. In order to achieve this objective, the following are the sub-objectives of this research:

1) To review the existing NPD process flow

2) To assess the awareness and the issues with the existing NPD process flow

3) To propose an improvement to the existing NPD process flow

4) To validate the new NPD process flow with a case study and by external product managers

1.5 Research Questions

In answering the research objectives, the research question of the phenomenological study was developed and as follows:

1) What is the existing NPD process flow?

2) What are the awareness level and the issues with the existing NPD process flow?

3) What is the improvement on the existing NPD process flow?

4) What is the outcome of case study and external product managers validation on the new NPD process flow?

1.6 Scope and Limitations of Work

This research was conducted on the existing NPD process in a telecommunication company, ISP A, with the emphasis on account managers and pre-sales' experience and views on dealing with NPD when responding to a business opportunity from customers in the B2B market segment. The account managers and pre-sales' personnel are from the organisation's headquarters in the Klang Valley between June 2018 to June 2020. They are the "front-liners" who are the main person in charge when dealing with the customers' requirements. Also, the case study used is an Internet of Things product development, which took twelve months, to be productised. The total research duration is 24 months.

This study, however, presents some limitations. The findings only reflect a certain aspect of the NPD process and tested against a case study, which is an Internet of Things requirement. The proposed enhancement was also validated by external product managers in the telecommunication industry. Therefore, the study might not be relevant in other divisions, other industries, or B2B market segment in other sectors other than the one mentioned above. It should not be generalised for all ISPs and all divisions. There is also the possibility of omitted variables such as customers' spending and market share.

1.7 Significance of Study

The study has managed to uncover the issues with the existing NPD process as experienced by the account managers and pre-sales personnel in ISP A. The existing NPD process has average awareness among the personnel. The main issues with the existing NPD process are long process resulting in long productisation duration, inefficient and ineffective, does not meet the customers' requirements with limited product features currently productised and supported. This subsequently resulted in high dependency on SI when offering non-productised services to the B2B customers. The high dependency on SI has then caused delayed project delivery with high out-payments and low profit margins which needed to be overcome by ISP A.

Based on the data collection and analysis, a modification to the existing process was made and proposed to the PO. The modified NPD process, named as t-NPD, has been shortened to five phases, instead of the initial seven. The proposed t-NPD encourage collaborative efforts between the stakeholders involved in the NPD activities. The proposed t-NPD also commands some activities to be conducted in parallel thus lessening the number of phases required to productise a service or product. A case study was then selected to test t-NPD since there was an urgent customer's requirement requiring immediate action by the account's team. The requested product, Smart Home, was still under development at the time of receiving customer's requirements. With the modified and shortened process, the duration to productise a service from getting customers' requirements which is incorporated as idea generation to testing at customer's premise as part of product development and until full product launch is less than a year (Product Owner, 2020). The customer and technology partner were involved from the first day of the productisation activity took place. t-NPD has helped ISP A to deliver the specific solution within the RFS date stipulated by the customer.

The case study has helped ISP A to obtain an additional revenue stream of close to RM1Million with a profit margin of approximately 40% (Product Owner, 2020). The revenue and cost breakdown leading to high profit margin is summarised in Table 1.2 The high profit margin was due to savings achieved by ISP A by incurring less than 50% out-payment to SI and technology partners as more of the works were done by internal resources. The possibility of combining multiple activities in a single phase within the development process has also helped to shorten the duration, from the initial twenty-four months to six months, thus, minimising the operating cost incurred by the internal resources (Product Owner, 2020).

Table 1.2 Revenue and Cost Breakdown of the Smart Home Product Development and Deployment (Product Owner, 2020)

Revenue and Cost Element	Approximate Amount (RM)	Approximate Percentage (%)
Total Contract Value (Revenue)	RM 1,000,000	N/A
External Cost (Equipment and Partner Engineering Services)	RM 350,000	35%
Internal Cost (Fiber and Infrastructure Development)	RM 100,000	10%
Internal Human Resource Cost (Consultation, Deployment, Project Management, Assurance Services)	RM 150,000	15%
Profit	RM 400,000	40%

In conclusion, it was proven that the modification could shorten the productisation process and can be adopted by the product team of ISP A. As validated by external product managers, the enhancement is deemed useful and can be adopted by other ISP. Therefore, the implications of the finding of this study are not only beneficial for ISP A, but also for other firms in the telecommunication industry. Other firms could take the suggested improvement plans and adopt them in their NPD process. In the future, the study can be replicated in other ISP's environment for further validation and become a part of industry benchmarking practice.

1.8 Definition of Terms

The following defines the terms used in ISP A and mentioned in the dissertation:

(a) Internet Service Provider – the telecommunication service provider providing telecommunication infrastructure and services in the B2B and B2C market segment (Usikalu & Ilesanmi, 2018; Yang et al., 2016)

(b) Customers – customers in the B2B market segment subscribing to the telecommunication services (Hajar et al., 2019)

(c) Product – refers to the service being developed and offered by ISP A as the output of an NPD activity (Adiele & Amue, 2012)

(d) Technology partners – the suppliers providing network elements in the telecommunication industry (Dasanayaka et al., 2020)

(e) Solution Integrators – small-medium enterprises working in the telecommunication industry to provide services but do not own any of the telecommunication infrastructures (Dasanayaka et al., 2020)

(f) Innovation – an improvement on the existing product to integrate new features and technologies (Tourabi, Fouad, & Lakhnati, 2018)

1.9 Dissertation Organisation

Chapter 1 is an introductory chapter that discusses the research background and scope of the study, problem statement, research aims, and the scope and limitations of the study.

In Chapter 2, a review of the existing relevant literature on the telecommunication service provider, NPD process, and the stakeholders' involvements were reviewed.

Chapter 3 discusses the research methodology, the research design, respondent sampling and population, data collection which involved document review, interview, and questionnaire. The analysis methods using computer-aided software, case study verification, and expert reviews were also explained.

Chapter 4 presents the main findings of the research from the data analysis. The chapter ends with a modified NPD process flow which was later tested using a case study and reviewed by external product managers.

Finally, Chapter 5 will conclude the dissertation with a summary and the recommendations for future research works that can be undertaken by practitioners and academics.

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Appendix A Interview Questions Validator Appointment Letter

PM Dr Morina,
Razak Faculty of Technology and Informatics,
Universiti Teknologi Malaysia,
Kuala Lumpur.

Dear Madam,

APPOINTMENT AS RESEARCH INTERVIEW QUESTIONS VALIDATOR

I am an Engineering Doctorate (Engineering Business Management) student from Razak Faculty of Technology and Informatics, Universiti Teknologi Malaysia. I am conducting a research entitled "Enhancement to New Product Development Process in a Telecommunication Service Provider" as part of my course requirements.

2. The research is aimed at improving the existing New Product Development process flow in the Telecommunication Service Provider. The expected outcome of this research will be a modification to the process flow which can be adopted by the Product Development team. The main data collection method for this research is interview. The interview participants will be the personnel in the Telecommunication Service Provider.

3. In view of this, I am appointing you as one of the interview questions validators. I am seeking your expertise in reviewing the interview questions which were developed based on the research objectives. I believe your valuable comments will help to improve the drafted interview questions.

4. Appended herewith is the validation form detailing the research objectives and the list of the interview questions for your further review.

5. I highly appreciate your positive response on this. Kindly return the filled form via e-mail to hafizah.za@gmail.com

Thank you very much for your cooperation.

Kind regards,

HAFIZAH ZAINOL ABIDIN

Appendix B Interview Questions' Validator's Response

Evaluation:

The end product of the student research is producing a framework on New Product Development process. Correct me here, is the existing process used in NPD is called 10 gated process. Now the student is trying to find out the issues and problem with this process. It is so? If it is so the objectives and RQ should be different. Because the student has already identify there is problem in existing NPD .

Validator:

Prof Madya Dr.Morina Abdullah _____ Date: 27th Feb 2018

Sign & Stamp

Appendix C Interview Protocol

Background

The interview protocol is derived based on the following research objectives and research questions;

Research Objectives:

(f) To discover the existing NPD process flow in ISP S

(g) To gauge the awareness on existing NPD process flow among Account Managers and Solution Consultants

(h) To assess the issues with the NPD existing process flow faced by the Account Managers and Solution Consultants

(i) To propose an improvement to the existing NPD process

(j) To validate the outcome of the proposed process against a case study

(k) To gauge external product managers' views on the modified NPD process flow

Research Questions:

(l) What is the existing NPD process flow in ISP A?

(m) Are the Account Managers and Solution Consultants aware of the existing NPD process flow?

(n) What are the issues with the existing NPD process flow faced by the Account Managers and Solution Consultants of ISP A?

(o) How can the existing NPD process flow be improved?

(p) What is the outcome of the modified process flow when tested against a case study?

(q) What are external product managers' views on the modified process flow?

Five Phases New Product Development Process Flow for Business-to-Business Customer in a Telecommunication Service Provider

Razak Faculty of Technology and Informatics, Universiti Teknologi Malaysia

Introduction

Hello, my name is Hafizah, I am an Engineering Doctorate candidate from Razak Faculty of Technology and Informatics, Universiti Teknologi Malaysia (UTM). I am here today to learn more about your experience as Solution Consultant (or Account Manager) in dealing with the productisation process in ISP A. This study is purely for academic purposes. First and foremost, thank you for taking the time to be present today, appreciate your agreement to share about your real-life experience on this topic. I would like you to feel comfortable with saying what you really think and how you really feel.

Recording Consent

Please be informed that I will be recording our conversation. The purpose of this is so that I can capture all the details and allow me to be attentive to our conversation. Please be assured that all your comments will remain confidential. The report will be compiled with all your comments without any reference to individual.

Preamble / Consent Form Instructions

Before we get started, please take a few minutes to read this preamble (read and sign this consent form).

- Hand candidate consent form / preamble
- Once candidate returns preamble / consent form, turn recorder ON.

Appendix D Interview Consent Form

Consent for participation in research interview

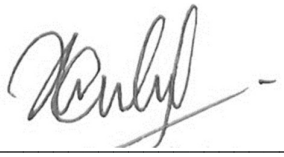
Five Phases New Product Development Process for Business-to-Business Customer in a Telecommunication Service Provider

I agree to participate in a research conducted by Hafizah binti Zainol Abidin (Engineering Doctorate candidate) from Razak Faculty of Technology and Informatics, Universiti Teknologi Malaysia.

1. I have received sufficient information about this research and understand my role. The purpose of my participation as an interviewee of this research and the future processing of my personal data has been explained to me and is clear.
2. My participation as an interviewee in this project is on voluntary basis. There is no explicit or implicit coercion whatsoever to participate.
3. The interview will take approximately 60 minutes. I allow the researcher to take notes during the interview. I also allow the recording of the interview and subsequent dialogue by audio or video tape. It is clear to me that in case I do not want the interview and dialogue to be taped I am fully entitled to withdraw from participation.
4. I have the rights not to answer question that I choose not to answer and not obligated to provide justification to my choice to the researcher. If I feel uncomfortable in any way during the interview session, I have the rights to withdraw from the interview and ask that all data collected prior to the withdrawal to be deleted.
5. I have been given the full guarantee that the researcher will not identify me by name or function in any reports using information obtained from this interview.

My confidentiality as a participant in this study remains secure. Personal data will be processed in full compliance with the Personal Data Protection Act.

6. I have carefully read and fully understood the points and statements of this form. All my questions were answered to my satisfaction, and I voluntarily agree to participate in this study.
7. I obtained a copy of this consent form co-signed by the interviewer.



Participant's Signature
Date: 2nd Dec 2018

Researcher's Signature
Date: 2nd Dec 2018

Appendix E Interview Questions

Section A - Introduction

1. How long have you been in this ISP? How long have you been in Pre-sales/Sales?
2. What is the current assignment that you are involved in?

Section B - Non-Productised Requirements

1. Have you dealt with non-productised requirements? How many of these are repetitive (i.e same requirements by different customers)? Do you have any suggestions on this sort of requirement?
2. Is there a process to productise these non-productised requirements?
3. How well are these proposals received by the customers? What's the approximate % of non-productised PO received?

Section C - Partner's Involvement

1. Was any partner involved in the development of solutions proposal?
2. What was the extent of partner involvement while crafting the solutions proposal?
3. Was there any issue while working with the partner/vendor? Timeline? Quality of proposal? Was the proposal comprehensive?

Section D - Other Matters

1. What are the impact of the project to ISP A (i.e. revenue, timeline, product support and maintenance)?
2. What are the impact of the project to customers (i.e. revenue, timeline, product support and maintenance)?
3. What are your suggestions to improve the product development?

Appendix F Questionnaire

SURVEY QUESTIONNAIRE

Title of Research: New Product Development Process in the Organisation

Introduction:

The objective of this survey is to gauge your opinion and understanding on the new product development process [redacted] as part of a postgraduate research study.

Commented [H1] [redacted]

Instructions:

- This questionnaire consists of three parts; Part A, Part B and Part C. Please respond to all questions in accordance with the instructions given in each part.
- Please answer all questions honestly. All information is used for research purposes only.
- The survey should not take more than 5 minutes.

Thank you very much for your cooperation

PART A – RESPONDENT'S BACKGROUND

Please mark [x] in the appropriate box.

1.	Gender	:	Male ☐	Female ☐
2.	Job Role	:	Solution Consultant ☐	Account Manager ☐
3.	Job Position Band	:	Band 1 ☐	Band 2 ☐
			Band 3 ☐	
4.	Years of service [redacted]	:	≤ 5 years ☐	6 – 10 years ☐
			> 10 years ☐	

Commented [H2]: Why only 3 ranges for years of service in TM?

Commented [H3]: [redacted]

PART B – EXISTING PRODUCT DEVELOPMENT PROCESS

Commented [H4]: Existing or New Product Development Process ??

This section discusses the existing product development processes.

Commented [H5]: 'discusses' seems not appropriate in this context

This section seeks opinion and understanding .....

Commented [H6]: Existing or new???

No	Question	Validator's Comments
1.	Are you aware of the existing Product Development Gated Process? ~~(RQ1)~~ Yes ☐ No ☐ If 'No', you have come to the end of the survey.	• existing or new? • delete RQ1 – bit confusing • RQ1 – research question 1??? • could highlight RQ1 on front page or page cover
2.	Is the existing process useful? ~~(RQ1)~~ Yes ☐ No ☐	• existing or new? • delete RQ1 – bit confusing
3.	Is the time taken to productise a service or product reasonable? ~~(RQ1)~~ Yes ☐ No ☐	• productise – correct word ?? • delete RQ1 – bit confusing
4.	Have you dealt with customised (non-productised) solutions? Yes ☐ No ☐	Ok
5.	If 'Yes', please give examples: _____ If 'No', proceed to the next question	

4.	Please tick all the issues applicable to the existing product development process. ~~(RQ1)~~ i. Does not meet customers' requirements ☐ ii. Limited supported features ☐ iii. Inefficient and ineffective ☐ iv. Long process ☐ Others: _____	• existing or new? • delete RQ1 – bit confusing • give numbering to all 4 items.
5.	Can the existing process be improved? ~~(RQ2)~~ Yes ☐ No ☐	• existing or new? • delete RQ2 – bit confusing • RQ2 – research question 2??? • could highlight RQ2 on front page or page cover
6.	If 'Yes', please provide your suggestion. ~~(RQ2)~~ _____ If 'No', proceed to the next section.	• delete RQ2 – bit confusing

PART C – PARTNER'S INVOLVEMENT

This section ~~is to~~ gauges your satisfaction when dealing with partners to propose customised solutions.

Commented [H7]: Satisfaction or Partner's involvement ???

The sentence needs some revision

No	Question	Validator's Comments
1.	Have you ever engaged and relied on Partners in order to complete your proposal? ~~(RQ1)~~ Yes ☐ No ☐	• delete RQ1 – bit confusing
2.	If yes, how many times in the past 6 months? ~~(RQ1)~~ 1-5 times ☐ 6-10 times ☐ >10 times ☐	• delete RQ1 – bit confusing

	If no, proceed to the next section.	
3.	Are you satisfied with the Partners' proposals? ~~(RQ1)~~ Yes ☐ No ☐	• delete RQ1 – bit confusing
4.	Please tick all the problems you have ever faced when dealing with Partners. ~~(RQ1)~~ ☐ Late submission ☐ Incomplete proposals ☐ No after sales support ☐ Limited assurance coverage ☐ No room for high profit margin ☐ Minimal support during delivery ☐ Delayed delivery Others: _____	• delete RQ1 – bit confusing

'This is the end of the questionnaire. Thank you for your time'.

Overall Validator's Comments:

(i) RQ1 and RQ2 need to be mentioned / highlighted in this questionnaire
(ii) Give definitions to the two constructs - 'new product development process' and Partner's involvement'
(iii) Overall, the survey questionnaire is appropriate for the study. However, comments given as above need to take into consideration

Validator:

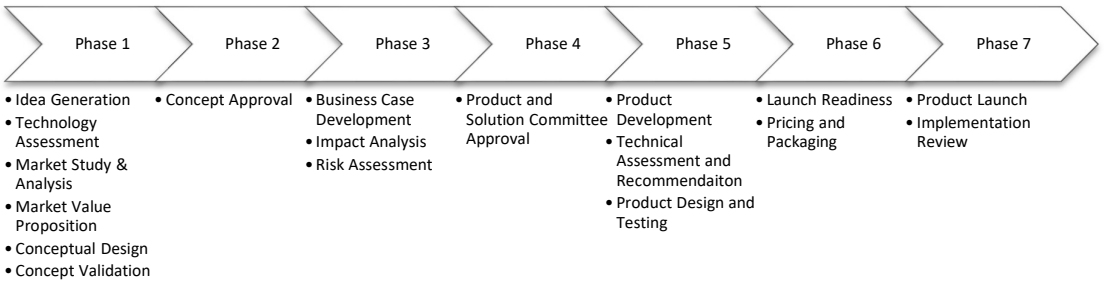
Date: 1 st. August 2019

Assoc. Prof. Ts. Dr. Maslin Masrom
Razak Faculty of Technology and Informatics
Universiti Teknologi Malaysia
Jalan Sultan Yahya Petra
54100 Kuala Lumpur

Appendix G External Product Manager Validation

A study was carried out at a Telecommunication Service Provider environment on the existing Product Development process flow. This process flow is currently used to developed products (services) for the Enterprise segment customers. There were grouses from the working level on the long duration and ineffective process flow resulting in unreadiness of certain services to cater the Enterprise customers' needs. This prompted the study to be carried out to offer an enhancement to the existing process flow. This study was mainly for academic purposes.

The existing New Product Development process flow is as follows:



All seven stages are owned and led by the respective product owner (PO).

The activities involved in each phase is as below:

- Phase 1
    - Market analysis and info which includes industry needs, customer needs analysis and competitor analysis.
    - Internal capability (manpower) assessment
    - High level conceptual design and validation
    - Roadmap

- Phase 2
    - Concept approval by GM of Product

- Phase 3
    - Business case development – financial and technical
    - Internal impact analysis – financial and technical
    - Financial analysis
    - Risk assessment – technical, technological and financial
    - Technology partner assessment
    - High level technical design
    - Product roadmap

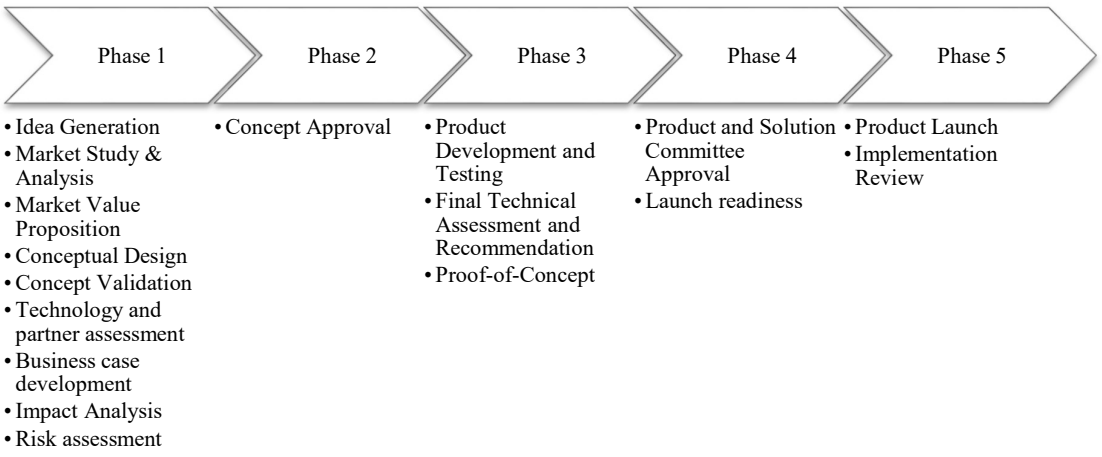
- Phase 4
    - Product and Solution Committee approval on the technical design and assessment
    - Detailed business case
    - Risk mitigation plans
    - Product roadmap

- Phase 5
    - Technology partner selection
    - High level technical design
    - Product technical documents, process & procedure (P&P) finalisation

- Phase 6
    - Pricing structure and packaging
    - Go-to-market plans and internal training readiness

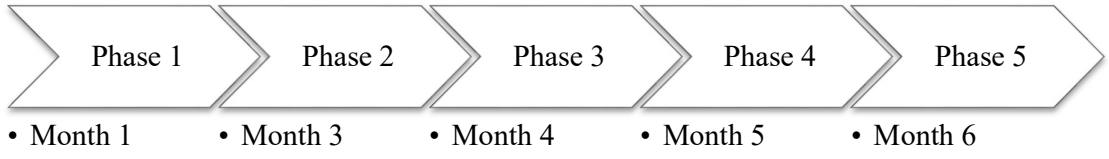
- Phase 7
    - Product launch
    - Campaign launch

Considering the long duration and high number of gates involved, the study was initiated. Based on the interview feedbacks, survey responses and case study evaluation, the proposed enhanced New Product Development process is:



In the enhanced process flow, idea generation and market study started with integrating actual customer's requirements. Understanding what the market and industry really needs is the cornerstone in ensuring a successful and shorter time-to-market product development. Besides that, Proof-of-Concept is part of the development hence integrating the technical assessment and lab testing into a single activity, further shortening the whole development process.

Based on a case study, the phases were tested and implemented on the following dates. The whole process took about 6 months, a reduction of 18 months from the initial plan of productising this particular product.



Seeking your expertise to give feedback and comments on the proposed enhancement and shortened process flow to less than a year.

Comments:	
Validated by:	
Name:	
Position:	
Date	

LIST OF PUBLICATIONS

Abidin, H., Dziyauddin, R., & Radin-Salim, K. (2020). Issues with New Service Development Process in a Telecommunication Service Provider. Journal of Advanced Research in Business and Management Studies, 19, 29-41. doi:10.37934/arbms.19.1.2941