

BUSINESS PERFORMANCE EVALUATION THROUGH INTEGRATION OF
BUSINESS MODEL CANVAS (BMC) WITH ANALYTIC HIERARCHY
PROCESS (AHP)

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To my beloved mother and father

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ABSTRACT

In Malaysia, printing service industries are commonly operated by Small and Medium Enterprises (SMEs) either in-house or outsourcing. This study integrates the concepts of Business Model Canvas (BMC) and Empathy Map with Analytic Hierarchy Process (AHP) approach. The purpose of this study is to investigate SME Printing Service Industry operations based on BMC perspectives and choose the best operational alternatives between having in-house, outsourcing or hybrid of both, in-house and outsourcing. BMC and Empathy Map can act as a framework or tool by developing relevant questionnaires and conducting interview sessions. Several printing companies and eight customers as interview respondents and several questionnaires are distributed to studied companies. The results based on BMC perspectives indicated that in certain condition outsource alternative is better than other alternatives. Whilst, the result of Empathy Map has shown that in certain condition the hybrid alternative is a better than the others. The study has provided a guideline on how the combination between BMC and Empathy Map with AHP can guide SMEs in making strategic operational decisions such as either to having in-house operation or outsourcing.

ABSTRAK

Di Malaysia, industri perkhidmatan percetakan biasanya dikendalikan oleh Perusahaan Kecil dan Sederhana (PKS) sama ada melaksanakan operasi secara dalaman atau mendapatkan sumber dari pembekal luar (pemyumber luar). Kajian ini mengintegrasikan konsep Model Perniagaan Kanvas (BMC) dan Peta Empati menggunakan pendekatan *Analytic Hierarchy Process* (AHP). Tujuan kajian ini adalah untuk menyelidik operasi industri perkhidmatan percetakan PKS berdasarkan perspektif BMC dan memilih alternatif operasi yang terbaik antara yang mempunyai pengeluaran sendiri, penyumberan luar atau kedua-duanya (*hybrid*). BMC dan Peta Empati boleh bertindak sebagai alat rangka kerja dengan membangunkan soal selidik berkaitan dan menjalankan sesi temuduga. Beberapa syarikat percetakan dan pelanggan sebagai responden temu bual dan soal selidik diedarkan kepada beberapa syarikat-syarikat yang dikaji. Keputusan berdasarkan perspektif BMC menunjukkan bahawa dalam kondisi tertentu alternatif penyumberan luar adalah lebih baik daripada alternatif lain. Sementara itu, Peta Empati telah menunjukkan bahawa dalam kondisi tertentu alternatif hibrid adalah lebih baik daripada yang lain. Kesimpulannya, kajian ini telah menunjukkan garis-panduan bagaimana gabungan antara BMC dan Peta Empati menggunakan AHP boleh membantu PKS dalam membuat keputusan strategik antaranya samada pengeluaran dilaksanakan di dalam kilang atau diperolehi terus dari sumber luaran.

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CHAPTER 1

INTRODUCTION

1.1 Introduction

This chapter consists of the background of study, problem of statement, objectives of the study, research scope, significant of the study and structure of project. Background of study involves the overview of the study and plan to make this research. In this part, background of study shows a major problem in the operation of Small and Medium Enterprise (SME) and the difficulties they faced to expand. Besides, operational research can be applied to improve their overall business operation. Operational research is a discipline that deals with the application of advanced analytic methods to assist decision-makers to choose better decisions. Mathematical sciences such as mathematical modeling, statistical analysis, and mathematical optimization, operational research arrives at optimal or near-optimal solutions to complex decision-making problems. In addition, operational research overlaps with other disciplines, notably industrial engineering and operations management. It is often concerned with determining a maximum (such as profit, performance, or yield) or minimum (such as loss, risk, or cost). In management science or operational research especially in Industrial Engineering, they can use a variety of methods to solve the problems either in the product or service industry. It is able to be executed because operational research

encompasses a wide range of problem-solving techniques and methods applied in the pursuit of improving decision-making and efficiency, such as simulation, mathematical optimization, queuing theory, Markov decision processes, economic methods, data analysis, statistics, neural networks, expert systems, and decision analysis. The background of study also shows problem in the selection of type of company whether outsource or in-house type is better for a startup or developing company. In this case, entrepreneur mostly confused when they want to start from beginning with types of company based on their preferences and whether a change to in-house for development is necessary or not.

Currently, most of the present researches (Dewobroto and Siagian, 2015), (Rothenberg *et al.*, 2008), (Pasi Kuparinen, 2011) and (Romero *et al.*, 2015) are more interested on the service industry using the Industrial Engineering. Service industries not only serve their service, but they also produce products. SME is selected for this case study because nowadays, SME industries are mostly lack in knowledge towards industrial engineering such as operation research, supply chain, production and operation management, planning of production control and other knowledge which can be applied to improve the company. As (Themaat *et al.*, 2013), they done the research on Bottom of the Pyramid (BOP) company however SME is a better option to be studied in Malaysia.

1.2 Background of study

Currently, SME service industries are developing but it is difficult for them to compete with the larger enterprises especially on quality, pricing and customer trust. These industries can be classified as manufacturing (or operation) industries and service industries. Service industries are an industry comprising of companies that primarily earn revenue by providing intangible products and services (Jukka and

Katri, 2015). They involved in many areas such as retails, hospitals, insurance, car rentals, advertisement, transportation distribution, and printing. According to (Rothenberg *et al.*, 2008), a service company is a business that generates income by providing services instead of selling physical products. Service industries are very profitable; however, it is very competitive, especially in Malaysia.

Due to the high number of competitors, SME companies should construct a business model to evaluate their performance and to figure out the effectiveness of the model in helping them to survive and compete with other companies. They must establish a strategy on how to increase their profits with lower cost of production. Based on the problem statements, the biggest question to be answered is what are the essential elements required to develop a proper Business Model Canvas (BMC) for SME service industry (Spanu ,2013), (Fritscher and Pigneur, 2014), (Dewobroto and Siagian, 2015).

Operational research encompasses a wide range of problem-solving techniques and methods applied in the pursuit of improving decision-making and efficiency, such as simulation, modelling, mathematical optimization, queuing theory, Markov decision processes, economic methods, data analysis, statistics, neural networks, expert systems, and decision analysis (inform.org, 2016). BMC falls under a modelling technique that used to design the flow of company supply chain system. Empathy Map as a method to help the BMC study. According to Dewobroto and Siagian, (2015), an empathy map is a collaborative tool that can be used to gain a deeper insight of their customers. Much like a user persona, an empathy map might represent a group of users, such as a customer segment. The empathy map was originally created by Dave Gray and has been gaining popularity with the agile community. Dewobroto and Siagian, (2015) again used Empathy Map in their research to find the data based on customer desire toward transportation service company and BMC was used for evaluation towards transport service performance. Combination between BMC and Empathy Map to find the data in service industry research are shown by previous authors.

Usually, SME service companies can be categorized into low production volume and high variety product category because the service is a process-focused as shows in Figure 1.1. Nowadays, SME service companies should be in mass customization which falls in high production volume and high variety product category to tackle current demand. Customers demand on products varying and they are more interested in customizing their own design with fluctuations in volume ordered (ordering big volume and small volume). (Themaat *et al* ,2013), to fulfill the inconsistency of demand, companies must be flexible enough in the production aspect and must think further about the mass customization. The products based on service often related with mass customization. Every customer has their own unique design and the company must follow the customer request.

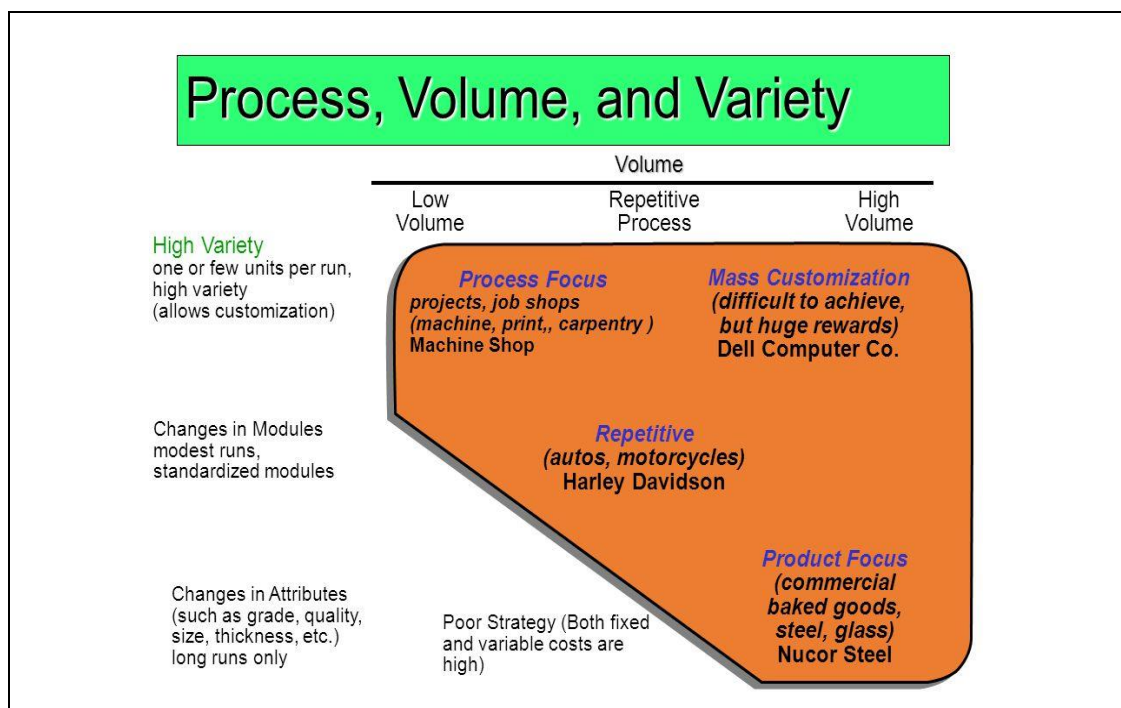


Figure 1.1 Varies Product and Production Volume (Willis, 2016)

On the other hand, SME service industry is torn between a better approach, whether to imply in-house service or outsourcing the work. Do establishing their own facilities by buying their own machines with complete tools able to maximize company's profit or will it increase the company's cost? (Pasi Kuparinen,2011). If the company chooses to establish their own facilities, the company will be able to

control the quality of their product according to their Standard of Procedure (SOP) and to reduce the response time because they are in control of all of the activities involved in the service. By this, companies can increase their customers trust. In outsourcing service, returning defect products is time-consuming while in-house service, they will be able to provide faster returning time due to less party involved in the production. Furthermore, in-house service can provide cheaper products and they can stick to the market price and gain more profits due to higher product margin. In-house service makes more profits but it has some weaknesses. The company must have consistent monthly profit to cover up all of the tangible and intangible cost like labor costs, rents, machine depreciation, raw materials, utilities and machine maintenance. Moreover, company also needs to spend extra money and time to give continuous training to their labors. Other than that, the company must concern on the availability of the raw materials from the suppliers.

Outsourcing is a strategy that can benefit a company's bottom line (Grimsley, 2003). The researcher claimed that more outsourcing occurs when a company retains another business to perform some of its work activities. Outsourcing gives advantage to the company to focus on their management by giving the company more time to think about the company development process. By outsourcing, they can avoid production cost like raw material cost, machine maintenance cost, labor cost, extra space for machine and machine depreciation cost. By outsourcing, they can minimize staffing cost by hiring crucial functional staff like purchasing staff, designer and customer service. Due to the lesser number of staffs, company can also avoid training and development costs for their staffs. Even though they manage to minimize production, staffing, training and development costs, there are some disadvantages in the outsourcing approach. However, outsourcing makes it harder to control the product quality which depends on the suppliers. To tackle this problem, the companies must select the best and qualified outsources to take care of the product quality. Another issue in outsourcing is it is not time-friendly. Sometimes, companies won't be able to deliver on time due to the problem with outsource, and customer response time is longer than in-house service. A company needs to wait for the response from the supplier first before able to update the customers to avoid

misunderstanding and loss of information regarding the cost of the materials and type of materials used.

Based on Figure 1.2, an SME service company operates as a retailer and also a manufacturer. As a retailer, they need to ensure the sales by finding potential customer and choose the best supplier to maintain their competency to bid for each project. There are many types of products and services provided in the business, thus, this study focuses on identifying company approach to develop their supply chain, thus helping them to improve their productivity and profit by using BMC and finally to see how far BMC helps them in solving the problems.

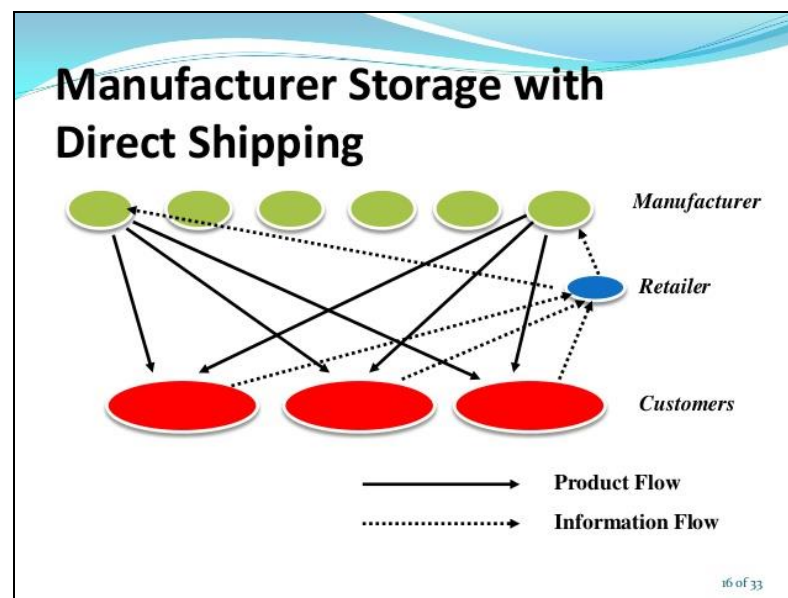


Figure 1.2 Manufacturing Storage with Direct Shipping network (Hassan, 2014)

In this research, service industry focuses on Printing Service Industry. According to Rothenberg *et al*, (2008), the printing industry has characteristics similar to both manufacturing and service industries. They add more printers to produce tangible goods but as a service, the product is often highly customizable requiring co-production by the customer and printer. Well-known, printing services industry has a very high demand, but the question is how are they capable in competing with other competitors. Unlike the other types of service industry, printing service industry mostly run by SMEs company in Malaysia especially. Therefore, the

types of business is categorized into small business. This statement is agreed by Rothenberg *et al.* (2008) where industry structure is highly fragmented, with a very large number of small firms. As a result, any increase in cross-border trades, especially with China and India, will affect the printing industry in distinctive ways as compared to other sectors.

1.3 Problem Statement

Before carrying out this research, this research should identify the issues to be studied. In this research, there are several problem statements based on SME service industry. Most of studies have been conducted on development and construction of the SME service industry. However, less studies have been conducted in Malaysia. SME service industry faces difficulty in competing with larger companies especially in price and quality (Rothenberg *et al.*, 2008). In addition, SME service industry has difficulty to expand and develop (Dewobroto and Siagian, 2014). SME service industry also face difficulty in choosing between in-house and outsourcing as the platform of operation (Rothenberg *et al.*, 2008).

Many researchers have done their research in service industry, but all of them only focused on one company only. BMC helps to have a view of company operational system (Osterwalder and Pigneur, 2009). So, BMC is important to be applied to assess thoroughly the overview of operation before making a decision to choose the most suitable type of company. Analytic Hierarchy Process (AHP) is a method to help them in selection of decision process based on BMC perspective. A comprehensive BMC with AHP is applied to fulfill the mentioned gap. The previous researchers only focused on one company in their research whilst this research involved AHP as a method to help BMC in making a selection in decision process. The research questions of this project are as follow:

1. How does an integration between BMC and AHP can be represented for a service industry?
2. How to making decision to select alternative for SME between In-house, Outsource or Hybrid company?

1.4 Objectives of the Study

Based on the problem statements mentioned above, this research encompasses a set of objectives that is associated with the milestones of the research process. The research's objectives are mentioned below:

- I. To develop BMCs for printing services based on Malaysian SME's companies.
- II. To investigate SME Printing Service Industry operations based on a developed BMC perspective.

1.5 Research Scopes

The study is limited to printing service industry in Johor to investigate which type of company is more suitable for SMEs to generate profile and also cost-effective. The scopes are listed as below:

- The present study focusing on SME in Malaysia printing service industries.

- The performance of BMC evaluation integrated with AHP.
- The participated respondents are based in Johor, Malaysia.

1.6 Significant of Study

BMC is used in Business Administration or Technology Management. For this study, this study used BMC in Industrial Engineering like the other previous researches (Spanu , 2013; Dewobroto and Siagian,2015; Nilsson and Söderberg, 2015). According to Klang (2010), a BMC component is independent. Thus, the significance of this study is to help the SME service industry that deals with variety of products. Occasionally, SME service industry holds two roles as the manufacturer and also the retailer. Companies that carry role as a manufacturer focus only on one product, for example; paper printing, where they will focus on producing one type of product and sell it at a cheaper price. The manufacturer usually does not sell product to end-user customers. This is to avoid the price disturbance in the market and to ensure the non-manufacturer company able to make sales. The manufacturer has their regular customers among the companies that outsourcing their service to produce the final products. Like SME-status companies, they don't have huge capital. They don't have the capabilities to own those expensive machines. Owning a machine is an advantage for a company thus allowing them to produce their products at a lower cost and as the result, they can increase the margin profit. This study is aimed to identify which approach is the best for the SME companies in gaining profit by producing product at a lower cost to be competence in the market. The significances of study are listed below:

- To assist the SME service industry, use the model to evaluate the performance between in-house and outsourcing alternative.

- To guide the SME service industry in selecting the best between in-house or outsourcing.
- To show the overall view in SME service industry like customer perception, activity needed, and others using BMC.
- To integrate the BMC concept with AHP.

1.7 Structure of Project

This research will be completed using five chapters: Introduction, Literature Review, Research Methodology, Results and Analysis, Conclusion and Discussion.

Chapter one explains about the broad area in this study, background of study and problem statement, research gap, objectives of study, scope and significant of this study. The background in conjunction with the problem statement is presented at the onset. The significance of this research is explained to get the reader abreast as he/she moves on. This chapter also discusses about the importance of using BMC to design a model of business operation that gives impact to company's Cost Structure and Revenue Stream. System Dynamic Model (SDM) will be used to analyze and give results of the BMC model designed. The material for the company introduction was gathered from the unofficial interviews and meetings, where the information was gathered from the managers and representatives.

Chapter two is dedicated to the literature review, to find the knowledge and review of preview studies. As it has become apparent, business modeling is the main concept of the thesis. The first part in this chapter is to describe the definition of BMC and the importance of the BMC model. Secondly, this part shows the

components present in BMC. This part also explains the functions of each component present in BMC and how that helps the companies to solve their problems. This chapter also covered a wide range of the business model literature. The purpose of the evaluation is to clarify how the current literature deals with networks and its elements.

In Chapter three, it presents information and initial findings through interviews and documentations of the studied companies. It gives a brief explanation of the companies' operation flow, the presence of BMC variable influence the research, and main problem to be investigated. In this section, researcher includes research procedures, case study description, identification of the problems of the research, variables of BMC model for case study and interpretation of questionnaire.

Chapter four presents the research methodology that is going to be used to perform the investigation. Strategy design and procedures for case study analysis is presented, together with the case study approach and selection of the studied companies. Research instruments that will be used are discussed. A summary of the chapter then follows.

Chapter five gives conclusion to the present proposed work and what the researcher intended to achieve at the end of the project.

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