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MASS CUSTOMIZATION IN DE CANS CANS SERVICES SDN BHD

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**A thesis submitted in fulfillment of the requirement for the degree of Bachelor
of Technopreneurship with Honours**



UNIVERSITI TEKNIKAL MALAYSIA MELAKA
Faculty of Technology Management and Technopreneurship

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2024

DECLARATION

I declare that the thesis entitled “Mass Customization in De Cans Cans Services Sdn Bhd” is the result of my research except as cited in the reference. The thesis has not been accepted for any degree and is not concurrently submitted in the candidature of any other degree.

Signature:



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APPROVAL

I hereby declare that I have read this thesis sufficiently in scope and quality for the Bachelor of Technology Management (Innovation Technology) award.

Signature: *BC Chew*

Supervisor Name: PROFESSOR MADYA TS. DR. CHEW BOON CHEONG

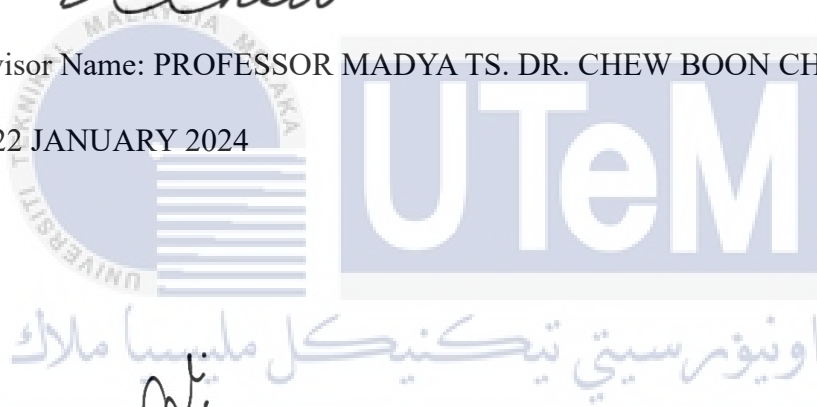
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Date: 22 JANUARY 2024



DEDICATIONS

I would like to sincerely express my appreciation towards my supervisor, Professor Madya Ts. Dr. Chew Boon Cheong, who has guided me along this research journey. I would also like to convey my most profound appreciation towards my family members and friends, who have provided me with moral and emotional support throughout this research. Before I finish, I also appreciate all the participants who assisted me in completing my study.



ABSTRACT

Mass customization is a driving force for businesses that want to keep ahead of the competition. Mass customization is the approach of producing reasonably priced in a market of goods and services customized to meet a specific customer's needs. Companies that provide mass customization have an advantage over competitors that solely provide generic goods. The paper straw market is expected to have considerable sales growth throughout the forecast year. The papers are strong, long-lasting, and absorbent, making excellent straws. Therefore, this study aimed to identify the criteria of paper straw mass customization criteria in De Cans Cans Services Sdn Bhd and to examine the customers' and suppliers' influence on the paper straw mass customization in De Cans Cans Services Sdn Bhd. A descriptive research design and qualitative research method were adopted in this study because it allowed the researcher to better comprehend the existing problem by gaining information from respondents in the De Cans Cans Services Sdn Bhd through interview sessions. The first research objective was achieved as the criteria of paper straw mass customization in De Cans Cans Services Sdn Bhd are product variety, modular design, customer involvement in assembly, innovation ideas, responsiveness to customer needs, readiness for change, and leadership support. The second research objective was also achieved, which was the customers' and suppliers' influence on the paper straw mass customization in De Cans Cans Services Sdn Bhd, which are customer integration, supplier integration, and cooperative relationships (CRs). By gaining insights into each criteria of mass customization and customers' and suppliers' influence on the paper straw mass customization, this research is beneficial to the researcher in order to develop a case study of identical products or services to evaluate mass customization.

ABSTRAK

Penyesuaian besar-besaran adalah daya penggerak untuk perniagaan yang ingin terus mendahului persaingan. Penyesuaian besar-besaran ialah pendekatan untuk menghasilkan harga yang berpatutan dalam pasaran barangan dan perkhidmatan yang disesuaikan untuk memenuhi keperluan pelanggan tertentu. Syarikat yang menyediakan penyesuaian besar-besaran mempunyai kelebihan berbanding pesaing yang menyediakan barangan generik semata-mata. Pasaran jerami kertas dijangka mempunyai pertumbuhan jualan yang besar sepanjang tahun ramalan. Kertasnya kuat, tahan lama, dan menyerap, menjadikan penyedut minuman yang sangat baik. Oleh itu, kajian ini bertujuan untuk mengenal pasti kriteria-kriteria penyesuaian jisim straw kertas di De Cans Cans Services Sdn Bhd dan untuk mengkaji pengaruh pelanggan dan pembekal terhadap penyesuaian jisim straw kertas di De Cans Cans Services Sdn Bhd. Reka bentuk penyelidikan deskriptif dan kaedah kajian kualitatif telah diguna pakai dalam kajian ini kerana ia membolehkan pengkaji lebih memahami masalah sedia ada dengan mendapatkan maklumat daripada responden di De Cans Cans Services Sdn Bhd melalui sesi temu bual. Objektif penyelidikan pertama dicapai kerana kriteria penyesuaian jisim jerami kertas dalam De Cans Cans Services Sdn Bhd ialah kepelbagaian produk, reka bentuk modular, penglibatan pelanggan dalam pemasangan, idea inovasi, responsif kepada keperluan pelanggan, kesediaan untuk perubahan, dan sokongan kepimpinan. Objektif penyelidikan kedua juga dicapai kerana pengaruh pelanggan dan pembekal terhadap penyesuaian jisim straw kertas di De Cans Cans Services Sdn Bhd ialah penyepaduan pelanggan, penyepaduan pembekal, dan hubungan kerjasama (CRs). Dengan mendapatkan pandangan tentang setiap kriteria penyesuaian massa dan pengaruh pelanggan dan pembekal terhadap penyesuaian jisim jerami kertas, penyelidikan ini bermanfaat kepada penyelidik untuk membangunkan kajian kes produk atau perkhidmatan yang serupa untuk menilai penyesuaian massa.

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TABLE OF CONTENT

CHAPTER	CONTENTS	PAGES
	DECLARATION	I
	APPROVAL	II
	DEDICATIONS	III
	ABSTRACT	IV
	ABSTRAK	V
	ACKNOWLEDGEMENT	VI
	TABLE OF CONTENTS	VII-X
	LIST OF TABLES	XI
	LIST OF FIGURES	XII
	LIST OF APPENDICES	XIII
CHAPTER 1	INTRODUCTION	
	1.1 Background of Study	1-3
	1.2 Problem Statement	3-4
	1.3 Research Objectives	4-5
	1.4 Scope and Limitation of the Study	5-6
	1.5 Important of Study	6
	1.6 Summary	7
CHAPTER 2	LITERATURE REVIEW	
	2.1 Introduction	8
	2.2 Criteria of mass customization	8-9
	2.2.1 Product Variety	9
	2.2.2 Modular Design	10-11
	2.2.3 Customer Involvement in Assembly	11

2.2.3.1 The role of the customer in mass customization	12-14
2.2.4 Innovation Idea	14-15
2.2.5 Responsiveness to Customer Needs	15-16
2.2.6 Readiness for Change	16-17
2.2.7 Leadership Support	17-18
2.3 Customer's and supplier's influence the paper straw mass customization	18
2.3.1 Customer Integration	18-20
2.3.2 Supplier Integration	20-21
2.3.3 Cooperative Relationships	21-22
2.4 Summary	23
2.5 Theoretical Framework	24

CHAPTER 3

RESEARCH METHODOLOGY

3.1 Introduction	25
3.2 Research Design	26-27
3.3 Methodological Choices	27-28
3.4 Primary data sources and secondary data sources	28-29
3.5 Method of primary data collection	29
3.6 Research Interview	29-30
3.7 Location of the research	30-32
3.8 Research Strategy	32-34
3.9 Time Horizon	34-35
3.10 Scientific Canon	35
3.10.1 Internal Validity	36-37
3.10.2 External Validity	37
3.10.3 Construct Validity	37-38
3.10.4 Reliability	38-40
3.11 Data Analysis	41
3.12 Interview Protocol	41-44
3.13 Summary	45

3.14 Research Framework	46
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CHAPTER 4 DATA ANALYSIS AND DISCUSSION

4.1 Introduction	47
4.2 Description of Respondents	48-49
4.3 Criteria of Paper Straw Mass Customization	49
4.3.1 Product Variety	49-52
4.3.2 Modular design	52-55
4.3.3 Customer involvement in assembly	55-57
4.3.4 Innovation Idea	58-60
4.3.5 Responsiveness to Customer Needs	60-63
4.3.6 Readiness for change	63-65
4.3.7 Leadership support	65-67
4.4 Customers' and suppliers' influence the paper straw mass customization	73
4.4.1 Customer Integration	73-75
4.4.2 Supplier integration	75-77
4.4.3 Cooperative relationship (CRs)	77-79

CHAPTER 5 CONCLUSION AND RECOMMENDATION

5.1 Introduction	82
5.2 The criteria for paper straw mass customization in De Cans Cans Services Sdn Bhd	83-85
5.3 The customers' and suppliers' influence on the paper straw mass customization in De Cans Cans Services Sdn Bhd	86-87
5.4 Contribution of Study	88
5.5 Future Recommendation	89

REFERENCES	90-107
APPENDICES	108-116



LIST OF TABLES

TABLES	TITLE	PAGES
1	Threats to Internal Validity	36-37
2	Threats to reliability	39-40
3	The four-phase process to interview protocol refinement	43-44
4	Profile of respondents	48-49
5	Thematic Analysis of the Criteria of Paper Straw Mass Customization in De Cans Cans Services Sdn Bhd	68-72
6	Thematic Analysis of the customers' and suppliers' influence the paper straw mass customization in De Cans Cans Services Sdn Bhd	80-81

LIST OF FIGURES

FIGURE	TITLE	PAGES
1	Criteria of mass customization and customers' and suppliers' influence on the paper straw mass customization	24
2	Products paper straws	32
3	Paper straw wrap with print company logo and slogan	53
4	Example of Hungry Jack's straw	56
5	Form of Customer Satisfaction Survey	57
6	FB Posting of Interpack event in Dusseldorf	61
7	Information on customer care	62
8	Example straw of colour	65
9	WhatsApp greeting message	78
10	Criteria of mass customization and customers' and suppliers' influence on the paper straw mass customization	88

LIST OF APPENDICES

APPENDIX	TITLE	PAGES
1	Gantt Chart for PSM 1	108
2	Gantt Chart for PSM 2	108
3	Questionnaires	109-110
4	Proof of Interview Session with Respondents	111-114
5	VIVA PSM 1 and PSM 2	115
6	Request Letter to Collection Data	116

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CHAPTER 1

INTRODUCTION

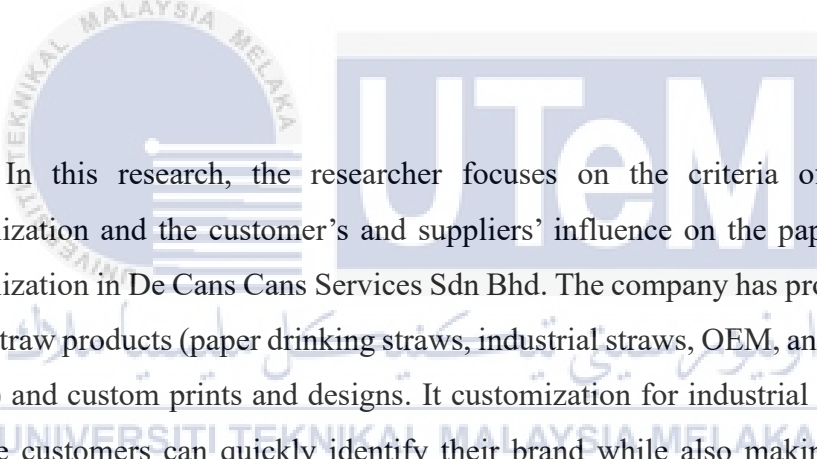
1.1 BACKGROUND OF STUDY

As customers' needs change, competitive intensity increases, requiring companies to evolve their manufacturing strategies to cope with that continuous change (Huang et al., 2010; Jitpaiboon et al., 2013). One of these developed functional strategies is mass customization, which combines the best of two manufacturing approaches: customization and mass production (Ulrich et al., 2003; Comstock et al., 2004; Kamrani et al., 2012). In other words, it provides product variety on a large scale along with succeeding to maintain cost efficiency (Huang et al., 2010; Murat Kristal et al., 2010; Jitpaiboon et al., 2013). However, mass customization without innovation in the process and products will not be able to sustain customer delight (Huang et al., 2010).

Mass customization is a form of micro-segmentation where firms create product or service variants that can be altered or combined to satisfy individual customer needs (Hunt et al., 2013). According to Piller and Müller (2004), mass customization is centered on producing flexible components with economies of scale. Opportunities for customization are being driven by technological advances and improved customer interactions, which have made it easier for brands to offer customization at scale (Fogliatto et al., 2012).

Mass customization addresses customers' needs to personalize the utility to achieve a sense of individuality and uniqueness (Coletti & Aichner, 2011). Since mass customization capability (MCC) is the ability of an enterprise to quickly provide customized products or services on a large scale at the cost compared to mass production, it has become a crucial factor influencing the competitive advantage in the uncertain and competitive market (Qi et al., 2020).

Mass customization can be defined as a business strategy that aims to fulfill the distinct needs of customers at affordable prices and time (Ullah and Narain, 2020). The adoption of mass customization has been stated as an approach to combat environmental uncertainties and become a customer-centric organization by offering differentiated products and services to the customers (Trentin et al., 2019; Suzić et al., 2018).



In this research, the researcher focuses on the criteria of paper straw customization and the customer's and suppliers' influence on the paper straw mass customization in De Cans Cans Services Sdn Bhd. The company has produced various paper straw products (paper drinking straws, industrial straws, OEM, and shaped paper straws) and custom prints and designs. It customization for industrial straws ensures that the customers can quickly identify their brand while also making a conscious choice to support the environment.

De Cans Cans Services Sdn Bhd provides eco-friendly straws to reduce waste and support sustainable agriculture. Hence, it produces paper straws using 100% biodegradable and compostable materials. The material is biodegradable and compostable, which means it can break down much faster than plastic straws and will not contribute to plastic pollution.

In a nutshell, the company's mission is to reduce the impact of single-use plastics on the environment by providing high-quality, sustainable paper straws, and the vision is to be the leading provider of sustainable paper straw solutions in Southeast

Asia and to inspire global shift towards eco-friendly alternatives. From that case, the researcher identified the criteria of paper straw mass customization and the customers' and suppliers' influence on the paper straw mass customization in De Cans Cans Services Sdn. Bhd.

1.2 PROBLEM STATEMENT

Previously, mass production dominated the manufacturing industry to ensure the process brought out high efficiency and higher productivity with minimal costs involved. This is particularly true for standard products like straws that have gained wide acceptance and are widely used.

Comparatively, mass customization is an emerging trend that has gained acceptance and popularity over the years. The customization process can also promote interface and value creation with customers through communication and can enhance the integration of market knowledge from customers. This may be an appropriate strategy for manufacturing firms from emerging markets to increase their product innovation (Hong, A., Li, X., Wang, Y., & Shi, M., 2023).

While the global trend is transforming single-used plastic straws into biodegradable, paper, or stainless-steel straws, this total switch cannot utilize the mass production method. Instead, biodegradable, or stainless-steel straws must be produced massively via customized production to cater to different market needs.

Furthermore, Malaysia set an ambitious roadmap in 2018 to eliminate single-use plastics by 2030 (MESTECC, 2018). Malaysia plans to address single-use plastics by encouraging the plastic industry to transition to eco-friendly products (MESTECC,

2018). The Asia Pacific Economic Cooperation (APEC) has estimated a USD13 billion impact on marine (MESTECC, 2018). As biodegradable paper straws are easy to mass-produce, they are expected to be implemented in response to the regulations on plastic straws.

Therefore, the researcher needs to identify which criteria of mass customization in the De Can Cans Services Sdn Bhd when providing the sustainable paper straw that enhances each customer's distinctive experience and positively impacts the environment. Besides that, the researcher needs to determine the customers' and suppliers' that influence the mass customization in De Can Cans Services Sdn Bhd, which interacts with its customers and suppliers to gather specific information to meet the customer's practical needs. The research questions are constructed as below:

- i. What are the criteria for paper straw mass customization criteria in De Cans Cans Services Sdn Bhd?
- ii. How do customers' and suppliers' influence the paper straw mass customization in De Cans Cans Services Sdn Bhd?



1.3 RESEARCH OBJECTIVES

De Cans Cans Services Sdn Bhd, a leader in Southeast Asia's paper straw industry, leads toward a greener future. Where this company is committed to providing eco-friendly alternatives to traditional single-use plastics. Research objectives derived from the formulation of problem statements are to identify the mass customization in the De Cans Cans Services Sdn Bhd and examine how the customers' and suppliers' influences paper straw mass customization. By studying mass customization, this research will benefit the local straw company in delivering customized goods and

services to the market to satisfy a specific customer's needs. The research objectives of this research are stated below:

- i. To identify the criteria of paper straw mass customization criteria in De Cans Cans Services Sdn Bhd.
- ii. To examine the customers' and suppliers' influence on the paper straw mass customization in De Cans Cans Services Sdn Bhd.

1.4 SCOPE, LIMITATION AND KEY ASSUMPTION

The scope of this research focuses on studying the criteria of paper straw mass customization and customer's and supplier's influence paper straw mass customization. First, the researcher will identify the criteria of mass customization when designing and producing various customer products. Next, the researcher will examine the customers' and suppliers' influence on paper straw mass customization, which can result in high integration. The research case study is conducted in a straw company, De Cans Cans Services Sdn Bhd. Based on the company website of this company, it is a pioneer in Southeast Asia's paper straw industry. De Cans Cans Services Sdn Bhd is a custom-printed and manufactured straw provider offering paper straws that are biodegradable and compostable, which protect the environment and preserve the planet for future generations. This research is carried out using a qualitative method, and the respondents include sales and marketing, sales admin, general staff, quality assurance, etc., working in De Cans Cans Services Sdn Bhd.

A few limitations existed in performing and identifying this study. First and foremost, the limitation of this study is that the researcher only focuses on De Cans Cans Services Sdn Bhd, located in Malaysia. Therefore, all the findings and conclusions will be based on Malaysian business context, business culture, and organizational behavior, which cannot be generalized to all other De Cans Cans Services Sdn Bhd elsewhere. Furthermore, the respondent's knowledge of mass

customization might be lacking, and they could not provide the proper and formal answers to the theoretical questions during interview sessions.

The key assumption of this study is that the researcher believes that the respondents with the designations or job titles selected for this study should have adequate knowledge about the topic that the researcher wants to investigate. Besides, the researcher trusts that these respondents are well-versed in their knowledge and skills and can respond to all questions during the interview sessions. The researcher hopes these respondents could provide truthful and honest answers and responses within their best comprehension of mass customization.

1.5 IMPORTANCE OF THE STUDY

This research discusses the criteria of paper straw mass customization theory and how the customers' and suppliers' influence the paper straw mass customization. This finding helps the researcher gain information on the criteria for paper straw mass customization and examine the customers and suppliers that influence paper straw mass customization. The researcher focuses on De Cans Cans Services Sdn Bhd to determine the details and accurate knowledge of the mass customization of paper straws. It would allow other companies in the straw industry to learn from this case study and tailor their products to meet their customers' unique needs at a low cost.

1.6 SUMMARY

In summary, this research aims to generate the criteria of paper straw mass customization in a company that provides high-quality paper straws and customized solutions. In addition, it is also designed to examine the customer and supplier influence of paper straw mass customization in this company. Mass customization plays a vital role in a company because it allows customers to custom design product features while keeping costs closer to that of mass-produced products.

The scope of this research focuses on studying a mass customization theory. The researcher will determine which mass customization strategy is used when delivering customized goods for every customer's needs specific to that product with near mass production efficiency. This research is being conducted with some limitations. First, the researcher only focuses on De Cans Cans Services Sdn Bhd, located in Malaysia, as the subject of the research. Secondly, the respondents' knowledge of mass customization might be lacking. As a result, they may be unable to provide the proper and formal answers to theoretical questions during the interview sessions. The key assumption of this research is that the researcher believes that the respondents have adequate knowledge about the topic that the researcher wants to investigate and provide truthful and honest answers and responses within their best comprehension of the mass customization involved in the primary data collection. This would help the researcher obtain accurate data, findings, and results.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The study's literature review will be introduced. The criteria of the paper straw mass customization in the company to provide customizing products and services to fulfill the requirements of each customer is discussed. Furthermore, it also discusses the customers' and suppliers' influence on paper straw mass customization that can convert customer requests into product requirements and designs. The theoretical framework of this study will also be included in the last part of this chapter 2.

2.2 Criteria of mass customization

First developed in the manufacturing industry, mass customization refers to an adaptable, systematic framework for customizing processes, programs, and offerings (within a given set of parameters) to simultaneously meet and match employee needs with business performance goals, ideally without adding to the cost of those processes, programs, and offerings (Benko and Weisberg, 2007; Schwahn and McGarvey, 2011). Mass customization is concerned with customers at its core – maintaining the relationship between the producer and consumer of those goods is a key focal point. It is meant to give the customer the greater flexibility they desire while allowing the

manufacturer to maintain order and control over those options (M. Golay, L., and H. Church, A., 2013).

2.2.1 Product Variety

Mass-customization strategy was defined as the ability to offer product variety on a large scale while succeeding in maintaining cost efficiency (Huang et al., 2010; Murat Kristal et al., 2010; Jitpaiboon et al., 2013; Zhang et al., 2015). It merges the best of two manufacturing approaches: customization and standardization or mass production (Ulrich et al., 2003; Comstock et al., 2004; Kamrani et al., 2012). Some scholars operationalized the mass-customization capability regarding cost efficiency, volume effectiveness, and responsiveness. Moreover, Tu et al. (2001) concluded its direct positive effect on the value of customers, which they defined as the degree to which the products offered by organizations can benefit and satisfy their customers. With different empirical findings, Squire et al. (2004) tested the exact relationship between mass customization and value customers. Still, they argued that mass customization could increase value customers for only specific markets or customers.

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Product variety is defined by the number of products a company offers consumers (Brun and Pero, 2012). This variety emerges as an option to generate greater competitiveness and is directly linked to companies' strategies to meet customer preferences and increase sales performance (Yu, 2012). The term “product variety” is employed by academics and industry with several different conceptual meanings (Stablein et al., 2011).

2.2.2 Modular Design

Product modularity or modular design tactic satisfies organizational functions, production, and operations management in addition to marketing because it saves manufacturing costs better than the customization approach and augments customer delight more than the standardization strategy (Duray, 2002; Stevenson, 2018). However, Ahmad et al. (2010) addressed the importance of effective synchronization between these two organizational functions in addition to R&D to ensure that the product modules satisfy customers' needs. Product modularity can facilitate customers' assembly or reassembly processes according to their preferences or tastes. Thus, modular product design can lead to unlimited varied and individualized products (Bask et al., 2011).

Product modularity is an attribute of the product that characterizes the ability to mix and match independent and interchangeable product building blocks with standardized interfaces to create product variants. The one-to-one mapping between functional elements and physical building blocks is desirable. However, it refers to an extreme and ideal form of modularity that is generally difficult to achieve in practice (Blecker and Abdelkafi, 2006).

In today's customization era, firms cannot focus on mass production strategy but provide products better adapted to individual customers' aesthetic and functional preferences (Piller, 2007; Franke and Schreier, 2008). To fulfill the requirements of mass customization, firms need to consider several development strategies such as modularity, product family, platform, standardization, etc. (Karandikar and Nidamarthi, 2007; Antonio et al., 2007; Zacharias and Yassine, 2008). All these strategies need to be implemented according to the objectives and goals of individual firms based on their customer requirements, production complexities, and volumes. Individual firms might adopt and implement a single or multiple strategies according to their market requirements.

The generic concept of modular products is to create product variety, which is a key concept of mass customization. Developing product variety triggers high complexity over the production line and needs to be efficiently managed (Scavarda et

al., 2010). In order to minimize complexity and to achieve the advantages of a mass production strategy, a mass customizer needs to develop modular products (Blecker et al., 2003; Starr, 2010). In modularity, product variety can be managed at a relatively low cost by assembling the variants from different combinations of standard modules (Salvador, 2007). The cost of modularity can be reduced further if it is possible to offer a high number of individual products using only a few common or standard modules or sub-assemblies. Efficient and well-formulated modular product architecture can satisfy a higher customization process (Mikkola, 2007).

2.2.3 Customer Involvement in Assembly

Prior authors (Duray et al., 2000; Choy and Loker, 2004; Tu et al., 2004; Abdallah and Matsui, 2008) contended that the level of customer involvement in the different phases of the production process is considered a required dimension in the effectiveness of mass-customization and the personalized value received by each customer. Customer engagement in the production process phases was also pinpointed in the literature by co-creating mass-customization (Loef et al., 2017). Within one research model, Abdallah and Matsui (2008) assessed the impact of product modularization and customer involvement in production as one factor in mass customization and value customers. They asserted that product modularity and customer involvement are two important factors for maintaining a comprehensive approach toward mass customization that enhances the distinctive experience of each customer (Adel et al.; R.A.A., 2019).

Mass customization often involves the customer in multiple and various ways, and it was deemed important to synthesize existing research to understand better the customer's role in mass customization (Pallant et al.; I.O., 2020).

2.2.3.1 The role of the customer in mass customization

Most researchers have dealt with each of these mass customization types individually and inconsistently (Duray et al., 2000; Franke et al., 2010) without considering their interdependencies or conceptual relatedness. The degree of customer involvement is likely a continuum, with involvement possible for different customization opportunities.

(1) Customer as “assembler” (co-production)

It relates to a mass-customization strategy where the product design is firm-driven, with the customer involved only at the product implementation stage. That is, the customer assumes the role of assembler at a relatively late stage of the mass-customization process, the assembly phase (Pallant et al.; I.O., 2020).

There are three main streams of co-production research (Haumann et al., 2015). The first focuses primarily on the firm, identifying the benefits of firms engaging customers in the production process (Mills et al., 1983; Mills and Morris, 1986). The second relates to why customers engage in co-production activities (Dabholkar and Bagozzi, 2002), while the third focuses on the psychological consequences of such participation (Atakan et al., 2014). Previous researchers have investigated ways to improve customers' efficiency in their role as partial employees via employee management models (Kristensson et al., 2008), which include addressing the practical applications and limitations of these models. Furthermore, some researchers have suggested that customers who actively engage in the co-production experience derive more benefits than those who do not (Haumann et al., 2015). However, while such active customer engagement in the co-production process can enhance the evaluation of the product or service (Atakan et al., 2014; Troye and Supphellen, 2012), this is not always the case. Greater intensity levels can sometimes lead to less satisfactory experiences with the co-production process (Haumann et al., 2015; Troye and Supphellen, 2012).

(2) Customer as “inputter” (co-construction)

Co-construction is characterized by a firm-driven design with customers involved in the development stage of the customization process. Co-construction has been widely studied in the marketing literature (Pralhad and Ramaswamy, 2004; Tumbat and Belk, 2013), with such research typically focused on how consumers’ active participation plays out in a firm-designed environment (Tumbat and Belk, 2013). Additional research has found that without the customer’s involvement, a firm could not adequately customize and individualize to fulfill customer demands (Ulrich et al., 2003). Without such input, the firm is likely to be ‘guessing’ and may not be able to meet individual customer needs satisfactorily. This is why, in this study, co-construction was identified as the second critical quadrant of mass customization, relating to customer involvement in the early development stage despite the firm-driven design strategy (Pallant et al.; I.O., 2020).

(3) Customer as “designer” (co-design)

Co-design relates to customers’ involvement at the development stage, where they may also control the design (Pallant et al., I.O., 2020). Much of the literature has investigated corresponding satisfaction from the customer and firm perspective, highlighting that early customer involvement can improve satisfaction for both parties. This is likely due to customers communicating directly with the firm rather than allowing information to be filtered and distorted through less direct channels (Kujala, 2003). In line with this, Kristensson and Magnusson (2010) found that customers can generate more innovative ideas that are better matched to their needs than those done by professional developers.

Co-designing offers many benefits, such as a broader source of customer experiences that enhance idea generation, higher quality products that drive higher customer satisfaction, and increased customer loyalty (Roser and Samson, 2009). Furthermore, positive effects are realized at the organizational level regarding the impact on traditional innovation processes, the quality and speed of decision-making

to filter ideas, and the creativity at both the individual and group levels (Roser and Samson, 2009).

(4) Customer as “selector” (co-configuration)

Co-configuration involves the customer at the implementation stage but gives the customer design control (Pallant et al., I.O., 2020). The firm often selects a ‘base’ product with various attributes or components for the customer to choose from to develop their customized product or service (Pallant et al.; I.O., 2020).

2.2.4 Innovative Idea

Innovation is a crucial pillar that enables organizations to survive, change, and improve their performance in a competitive market, especially during challenging times (Liao et al., 2007; Tejeiro Koller et al., 2017; Younis, 2019). It helps firms in delivering the required value to their customers by flexibly adapting to new market changes by introducing new products or improving the current ones (Wang et al., 2016). Wang et al. (2016) view innovation as the new employment of knowledge and approaches which can produce developed processes or products to achieve stakeholders’ delight. Scholars (Dambiski et al., 2017; Younis, 2019) advocated that innovation should be investigated for its fruitful outcomes and inputs.

In addition to idea generation and creativity, innovativeness includes idea promotion, development, and realization. Most works on innovation acknowledge that creativity is only half the deal and that the generation and the implementation of ideas warrant consideration (Garcia and Calantone, 2002; Von Stamm, 2003; Trott, 2005). The term innovation is quite varied, and thus, the term can be ambiguous. We adopt the vocabulary found in the review of Garcia and Calantone (2002) and define innovation as being about some tangible distributable product, service, or behaviour.

People, processes, and the ideas that drive innovation stand out as three key dimensions when capitalizing on creativity (Skerlavaj et al., 2017). Similarly to this, it can be noted that the literature focusing on idea development mainly addresses three aspects, including the idea itself (Chan et al., 2018; Li et al., 2016), contributors (Beretta et al., 2018) as well as feedback (Hoornaert et al., 2017; Zhu et al., 2019). A standard view emphasizes that the successful implementation of ideas requires processes, procedures, and structures that “allow a timely and effective execution of projects” (Von Stamm, 2003), and a significant amount of effort has been put into producing prescriptive systematic models and processes for organizing innovation

2.2.5 Responsiveness to Customer Needs

According to Holweg and Pil (2001), responsiveness is the ability of the manufacturing system or organization to respond to customer requests in the marketplace. To achieve responsiveness, certain types of flexibility are required of the manufacturing system and the supply and logistics subsystems. The types of flexibility required to achieve such responsiveness in the supply chain are contingent upon the system's structure and environment (Holweg, M., 2005).

Customer responsiveness includes value-adding activities such as solving customers' problems (Matthyssens and Vandenbempt, 2008), building relationships with customers (Storbacka and Nenonen, 2009), and customizing the offering (Schlegelmilch and Ambos, 2004). As the intention of market orientation as a whole is to create superior value in comparison with value created by competitors, the customer responsiveness activity may be an effective strategy for the industrial firm to differentiate from competitors (Norman et al., 2007; Sorensen, 2009; Ulaga and Eggert, 2006).

Bernardes and Hanna (2009) stated, "Customer responsiveness is a firm's propensity to act on market knowledge to anticipate and rapidly address modifications in customers' expectations." One of the five service quality dimensions influences the overall customer perception or evaluation of experience (Santos, 2003). Meehan and Dawson (2002) defined customer responsiveness as "accurately and insightfully giving customers what they need, want or do not yet know they want. It is about consistently doing so more quickly than anyone else and rapidly enough to retain the value of the decision or idea for the customer."

2.2.6 Readiness for change

Pioneering applications of mass-customization have suggested three major inconveniences that customers are likely to face: mass-customized products are more expensive than standardized products (Kotha, 1995), a customized product cannot be delivered to the customer at the time of purchase, and, since the customer initiates the design process, the customer is required to invest time in "designing" the product (Pine et al., 1995). Thus, customers' readiness may be determined as follows:

- (1) Are customers willing to pay a premium for a customized product?
- (2) Are customers willing to wait to receive their customized product?
- (3) Are customers willing to invest time in "designing" the product?

Readiness may be defined through a positive response to all three questions. This is to say that, provided customers are willing to accept all three inconveniences of mass customisation, they will be considered "ready" for customization (Bardakci and Whitelock, 2003).

A related concept is the issue of customer customization sensitivity (Hart, 1995). Two basic tenets determine customer customization sensitivity, the uniqueness of the customer's needs and the customer sacrifice gap. The uniqueness of the customer's needs is a function of the relevant demand pattern. Customers do not care whether they are offered customized solutions if the demand pattern is primarily functional. On the other hand, if the demand pattern is innovative, customers are more likely to pay attention to customization. The customer sacrifice gap is between the desired and available products in the market (Bardakci et al.; J., 2005).

2.2.7 Leadership support

Cheung and Wong (2011) determine that supervisors who encourage and maintain cooperative interpersonal relationships can influence employees' engagement in the creative process by enhancing their self-efficacy. Tierney and Farmer (2004) contend that employees with higher levels of self-efficacy tend to be more creative if they are aware of their supervisors' expectations of their creative behaviors. Employees thus engage in creative behavior as long as supervisors' expectations for creativity are clear (Carmeli and Schaubroeck, 2007). Thus, leadership support should relate significantly to employees' creative behavior (Shalley and Gilson, 2004).

According to Vroom and Jago (2007), creative supervisors interact with their employees and motivate them to work collaboratively to achieve new, valuable outcomes. De Jong and Den Hartog (2007) find that the leader's role is essential for creating a climate for creativity by stimulating knowledge diffusion. Similarly, strong ties between experienced supervisors and employees facilitate exchanges of creative information and support, increasing the likelihood that supervisors and employees think in broader ways and channel their thoughts toward common creative goals (Erdogan et al., 2004).

Organizations might rely on supervisor encouragement or leadership support to signal their creativity value, which refers to how employees perceive their leaders actively engage in the creative process (Zhang and Bartol, 2010). When employees perceive their contributions are valued, supported, and rewarded by supervisors, they likely exhibit creative behavior (Zhou and Shalley, 2003; Kossek et al., 2011). Next, Eisenberger et al. (2002) find that employees who perceive their supervisor as supportive and caring about their well-being are more likely to increase their level of engagement with the organization. This relationship between supervisor support and employee engagement can be viewed in light of social exchange theory (Shore et al., 2006)

2.3 Customer's and supplier's influence the paper straw mass customization

The ability of managers to handle individual short and long-term network relationships between suppliers and customers determines a company's ability to compete (Palmer et al., 2005). The integration between parties can bring interesting results for both sides because the better and more aligned this relationship is, the more effective transactions are, and the more can be extracted from this business environment. Results can be enhanced when all chain links cooperate and share information, planning, goals, strategy, and innovations (Cao & Zhang, 2011; Martins et al., 2017).

2.3.1 Customer Integration

Customer integration is defined as the extent to which a customer participates in activities and processes exclusively in the producing firm's domain as industrial value creation (Wikstrom, 1996). Zipkin (2001) argued that a firm must interact with

its customers to gather specific information for defining and transforming customer expectations into product specifications and designs. Customer integration aims to assess customer needs and tailor internal activities to meet those needs (Koufteros et al., 2005). As firms get to know their customers and become committed to understanding and meeting their needs, strong bonds are forged between them and their customers. Integration ensures that the voice of the customer plays a vital role in the firm's innovative processes (Jitpaiboon et al., J., 2009).

Customer integration requires a clear understanding of all interactions between a customer's business and the firm's products and processes (Wisner et al., 2008); the firm is obligated to devote attention and resources to these activities to help the customer improve its competitive standing (Yu et al., 2013). Also, it requires involving customers in decisions related to the products sold by the firm and includes the methods and strategies applied to achieve better coordination between the trading partners (Frohlich and Westbrook, 2001). Customer integration increases by sharing information between customers and the organization, improving the relationship and efficiency (Hamilton-Ibama and Ogonu, 2021).

As customer integration increases, structural and relational gaps between the firm and target customers are narrowed, enabling the firm to appreciate better changing customer requirements and demands (Wong et al., 2011). greater customer integration helps enhance customization of market offerings, which improves customer assessment and perception of value associated with a firm's market offering (Chang et al., 2016). Additionally, because customer integration is characterized by increased customer engagement and interactions, this may help improve customers' ownership of the value creation process. Increased customer participation and ownership of the value-creation process may generate a favorable customer perception of the value created by the firm (Blocker et al., 2011). Next, greater customer integration bridges the structural and relational gaps between the firm and target customers; it may help firms be more responsive to addressing customer requirements, thus increasing customer time utility (Flynn et al., 2010). Furthermore, greater customer integration

may help reduce stockout (or overstocking) and associated costs due to the increased customer involvement in market demand determination (Flynn et al., 2010).

Customer integration improves operational performance by providing opportunities for leveraging information embedded in collaborative customer processes, thereby helping firms to minimize costs, create superior customer value, and rapidly detect changes in demand (Zhao et al., 2015). Customer integration additionally aids firms in providing varied and valuable information to realize swift responses to customer requests, leading to higher customer satisfaction and, ultimately, higher firm performance (Zhao et al., 2015). Previous empirical studies have also observed that higher levels of customer integration result in higher levels of firm performance (Flynn et al., 2010; Hendijani and Saei, 2020).



2.3.2 Supplier Integration

Supplier integration can be defined as the extent to which suppliers participate in activities and processes the firm had formerly done through customer relationships. Supplier integration is characterized by a long-term commitment among the collaborators through open communication and mutual trust. Supplier partnerships involve participants early in the product life cycle. Thus ensuring early supplier involvement in product design and access to superior supplier technologies (Petersen et al., 2005a, b). describes supplier integration as a managerial perception of the level of participation suppliers have with the firm's value-added processes such as order fulfillment, planning and scheduling, new product developments, and logistics. A firm must communicate and coordinate activities with its suppliers to avoid delays in responding quickly and effectively to the needs of the ultimate customer (Petersen et al., 2005a, b; Sanders, 2005; Sanders and Premus, 2005).

Supplier integration examines the Coordination and information-sharing activities with key suppliers that provide the firm with insights into suppliers' processes, capabilities, and constraints, ultimately enabling more effective planning and forecasting, product and process design, and transaction management (Schoenherr and Swink, 2012).

Supplier integration enables close partnerships with suppliers, allowing firms to leverage the resources and capabilities available in their external supplier networks for superior performance (Asamoah et al., 2021; Xu et al., 2014). Supplier integration helps firms obtain more significant information about the status of orders, potential delays and stock-outs, enabling better planning and coordination of operations (Huo, 2012; Swink et al., 2007). Supplier integration also enables the development of strategic solid supplier partnerships, positively impacting operational and firm performance through minimized transactions and purchasing costs, customized services and other value-added services (Zhao et al., 2015; Huo, 2012). Additionally, mutual understanding is facilitated with suppliers through supplier integration, enabling firms to become more responsive to customer demand, resulting in better firm performance (Asamoah et al., 2021; Flynn et al., 2010).



2.3.3 Cooperative Relationships (CRs)

Cooperative relationships are how a firm coordinates activity with suppliers and customers. Cooperative relationships result when a firm coordinates activity with suppliers and customers (Jitpaiboon et al.; J., 2009). Cooperative relationships link a firm with its customers, suppliers, and other channel members by integrating their relationships, activities, functions, processes, and locations. An integrated network of customers and suppliers enables the network to outperform rivals on product price and delivery (Lee and Billington, 1995). The high level of cooperative relationships can be accomplished through continuous automation and standardization of internal logistics

functions, efficient information sharing, and strategic linking with suppliers and customers.

Narasimhan and Kim (2002) examined the effect of integration on the relationship between diversification and performance. Their instrument had three dimensions:

- (1) integration across the supply chain;
- (2) a company's integration with customers; and
- (3) a company's integration with suppliers.

Developing enterprise-wide information systems that provide seamless integration of data flows among the firm and its trading partners enables better decision-making by all. They participate in a process built on cooperation and co-creation, resulting in high integration (Piller et al., 2004). Supplier integration and customer integration activities enable firms to get access to valuable resources outside the organizations' boundaries, which can be bundled and deployed for sustainable competitive performance (Xu et al., 2014)

2.4 Summary

Mass customization that allows for personalized products tailored to the customer's needs and wants. There are criteria for mass customization of products, such as product variety, modular design, customer involvement in assembly, innovative ideas, responsiveness to customer needs, readiness for change, and leadership support. The customer and supplier can influence the mass customization when producing the custom product. Generally, there will be many challenges when it does not meet customer requirements or the customer needs to customize the complex requirements of the product; therefore, the company will face different situations.



2.5 Theoretical Framework

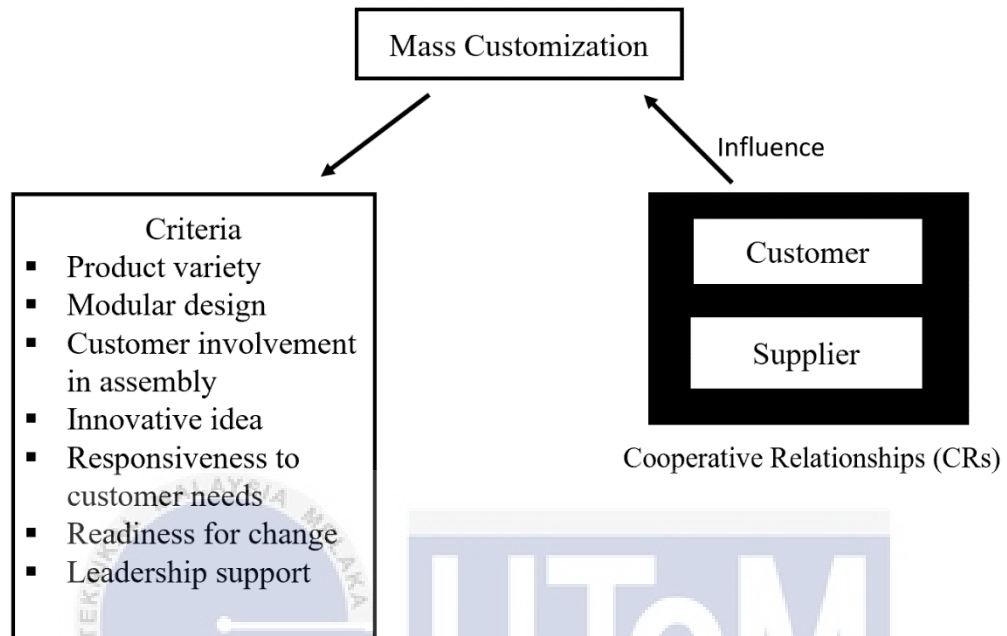


Figure 1: Criteria of mass customization and customers' and suppliers' influence on the paper straw mass customization


Source: Jitpaiboon, T. et al (2013) and Adel, H.M. et al (2019)

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

CHAPTER 3

RESEARCH METHODOLOGY

3.1 INTRODUCTION



Research methodology is defined as the method conducted by the researcher during the research study (Leedy & Ormrod, 2001). In this chapter, the researcher will focus on and comprehensively discuss the study's research methods. In this chapter, the researcher has formulated by explaining the research design to answer the research questions and accomplish research objectives. In this study, descriptive research design was used. Next, the methodological choice of this study was discussed. The researcher utilized the qualitative data collection method in this study. Next, the primary and secondary data resources were discussed in the next section.

The reasons for the research being carried out in a specific location were also explained. Besides, the methods of analyzing the collected data were described. Research strategy, time horizon, and scientific canons were clarified. In addition, the whole of Chapter 3 was summarised, and finally, the research framework of this study was in the last section.

3.2 RESEARCH DESIGN

The research design is the general plan of how you will go about answering your research questions (Saunders et al., 2019). It will contain clear objectives derived from the research question, specify the source or sources from which to collect data, propose to collect and analyze these, and discuss ethical issues and the constraints that will inevitably be encountered (Saunders et al., 2019). According to Yin (2012), research purpose and questions are the suggested starting points to develop a research design because they provide important clues about the substance a researcher aims to assess.

According to Saunders et al. (2019), four research designs are exploratory, descriptive, explanatory, and evaluative. The researcher chose descriptive research to accurately profile events, persons, or situations. Descriptive research may be an extension of a piece of exploratory research or a forerunner to a piece of explanatory research. It is necessary to have a clear picture of the phenomenon on which you wish to collect data before the collection of the data (Saunders et al., 2019). Therefore, this research would benefit De Cans Cans Services Sdn Bhd in understanding its business strategy to provide custom products to customers.

To begin with, descriptive research questions are likely to include 'Who,' 'What,' 'Where,' 'When,' or 'How' (Saunders et al., 2019). In this research, the research question is: What are the criteria for paper straw mass customization in De Cans Cans Service Sdn Bhd? Second, how do customers and suppliers influence the paper straw mass customization in De Can Cans Service Sdn Bhd?

Research would undertake descriptive research that is necessary to comprehend and define the setting of the research investigation. According to Atmowardoyo H., 2018, descriptive research is a method used to describe existing phenomena as accurately as possible. The phenomena observed in descriptive research are already available (Atmowardoyo, H., 2018). This justified that this research on

mass customization can help organizations gain more information about mass production efficiency with the ability to customize custom products for delivery to the customers.

3.3 METHODOLOGICAL CHOICES

According to Saunders et al. (2019), the methodological choices consist of three types which are the quantitative method, qualitative method, and mixed method research design. Researchers need to choose the most reliable and suitable investigation technique to interpret the data collection.

This research involved a qualitative research method. According to Saunders et al. (2019), the meanings are expressed through words and images, not numbers, in qualitative research. Words and images will have several meanings as well as unclear meanings. So, it is important to discuss and clarify them with participants. Besides, interpretive philosophy tends to be associated with qualitative research (Denzin and Lincoln, 2018). Researchers need to understand and investigate how the event under research can be interpreted in terms of its subjective and socially generated meanings.

Qualitative research is often used as a synonym for data collection methods, such as interviews (Saunders et al., 2019). Therefore, the qualitative research method utilized for this study is conducting interviews so that the researcher has better comprehended the respondents' opinions and points of view. The researcher interviewed 14 respondents to collect textual descriptions and literacy data during the research. For the researcher to accomplish the purpose of this research, various questions are asked of the respondents when the interview session is conducted to gather relevant information depending on the research topics.

In this research, the researcher was required to identify the paper straw mass customization criteria in De Cans Cans Services Sdn Bhd and to examine the customers and suppliers influence the paper straw mass customization in De Can Cans Services Sdn Bhd.

3.4 PRIMARY DATA SOURCES AND SECONDARY DATA SOURCES

According to Douglas (2015), there are different methods used to collect information in research, which are primary data and secondary data. Primary data is a set of data the researcher collects for the first time, while secondary data are those others have already collected. Primary data refers to data that is gathered by the researcher directly. Primary data can be gathered through surveys, observations, questionnaires, interviews, etc. In this research, the researcher targeted 14 respondents for an interview session. The respondents may include sales and marketing, sales admin, quality assurance, general assistant, production operator, warehouse assistant, and engineering operator. The researcher will set up a questionnaire for the respondents to collect data more accurately.

In contrast, secondary data refers to information that has already been collected. Secondary data can be found on government websites, books, journal articles, internal records, etc. The researcher obtained journals and scholarly books on mass customization that were sourced from the internet and libraries.

Also, the researcher will collect past articles and company reports to understand the mass customization information about De Cans Cans Services Sdn Bhd company. In addition, the researcher can access information using social platforms and the official websites of De Cans Cans Services Sdn Bhd company to understand and

know the background of the company's product and service information and the relationship between customer and supplier.

3.5 METHOD OF PRIMARY DATA COLLECTION

According to Douglas (2015), there are different methods used to collect information in research, which are primary data and secondary data. Primary data is a set of data the researcher collects for the first time, while secondary data are those others have already collected. Primary data refers to data that is gathered by the researcher directly. Primary data can be gathered through surveys, observations, questionnaires, interviews, etc. This research used a semi-structured interview to gather data from 14 respondents at De Cans Cans Services Sdn Bhd. The respondents may include sales and marketing, sales admin, quality assurance, general assistant, production operator, warehouse assistant, and engineering operator. The main reason for using semi-structured interviews is to provide the staff involved in the De Cans Cans Services Sdn Bhd an open room to explain how the paper straw mass customization is implemented. The researcher also set up a questionnaire for the respondents to collect data more accurately.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

3.6 RESEARCH INTERVIEW

Research interviews may be classified into different types. There are 5 types of research interviews that are classified into structured interviews, semi-structured interviews, and in-depth interviews. The qualitative data collection method used in this research is open-ended questionnaires through semi-structured interviews to identify the criteria of paper straw mass customization and examine the customers' and suppliers' influence on paper straw mass customization in De Cans Cans Services Sdn Bhd.

According to Saunders et al. (2019), semi-structured interviews start with a predetermined list of themes and possibly some key questions related to these themes to guide the conduct of each interview. Open questions, sometimes referred to as open-ended questions, allow respondents to give answers in their own way (Fink, 2016).

A semi-structured interview was conducted within 30 minutes to 1 hour, and the respondent involved the staff of De Cans Cans Services Sdn Bhd. The 14 respondents in this company were selected as respondents based on designations or job titles and knowledge in a semi-structured interview. The respondents are sales and marketing, sales admin, quality assurance, general assistant, production operator, warehouse assistant, and engineering operator, who work in De Cans Cans Services Sdn Bhd.

The interview guide for this type of interview will also likely contain some comments to open the discussion, a possible list of prompts to promote and further discussion, and some comments to close it (Saunders et al., 2019). Data from a semi-structured may be audio-recorded, then produced a transcription and recorded by making notes.

3.7 LOCATION OF THE RESEARCH

Research for this study focused on De Cans Cans Services Sdn Bhd, where the company sells various types of paper straws to its customers. The company is located at Lot 2645 & 2646, Jalan Krubong, Jln PK 33, Kawasan Perindustrian Krubong, 75260 Melaka. De Cans Cans Services Sdn Bhd is a leader in the paper straw industry of Southeast Asia. This company is committed to responsible production practices and uses only biodegradable, recyclable materials in our products. With a team of dedicated individuals, De Cans Cans Services Sdn Bhd strives to be the leading paper straw

manufacturer in Malaysia, delivering high-quality products that align with our core values.

At De Cans Cans Services Sdn Bhd, they specialize in paper straws for the beverage industry. In addition to beverage straws, De Cans Cans Services Sdn Bhd also offers industrial straws for a variety of uses. The company also offers OEM (Original Equipment Manufacturer) services for clients. The company also provides U-shaped paper straws in various sizes to cater to clients' needs. Not only that, De Cans Cans Services Sdn Bhd has offered custom print and design options for industrial straws. The straws are made from eco-friendly materials that are 100% biodegradable and compostable.

The researcher has chosen De Cans Cans Services Sdn Bhd to collect data because the company is suitable for researchers to study and examine the topic of mass customization. Additionally, De Cans Cans Services Sdn Bhd is an environmental company that saves the world by providing top-notch products and services that are both eco-friendly and high-quality. Furthermore, De Cans Cans Services Sdn Bhd is a valuable company because it has gained achievements such as the Sustainable Brand Award and SME100 Awards.

The De Cans Cans Services Sdn Bhd company is committed to continual improvement and customer satisfaction by ensuring employees possess high levels of competence and effectively communicating internally and externally. They strive to provide hygienic, high-quality products while complying with legal requirements. De Cans Cans paper straws are ethically manufactured and professionally accredited with ISO 22000, FSC, BRC, HACCP, and Halal certifications, assuring the safety and quality of our products for our consumers.

The researcher interviewed respondents from De Cans Cans Services Sdn Bhd, which will be conducted using the mass customization theory. The researcher can collect data pertinent to the study's objectives from the interviews. These actions were

to get accurate data and information from the respondents to understand the criteria of mass customization to meet customer needs.



Figure 2: Products paper straws

Source: De Cans Cans Services Sdn Bhd



3.8 RESEARCH STRATEGY

As Saunders et al. (2019) explain, a research strategy is a plan for how a researcher will answer their research question. It is a framework that includes gathering, analyzing, and interpreting data. Different research strategies include experiment, survey, archival and documentary research, case study, ethnography, action research, grounded theory, and narrative inquiry. In contrast, each part of the research strategy typically researches methodologies used in business and management. A case study will be used among these methodologies as it allows the researcher to gather data and information regarding the criteria of paper straw mass customization and the customer and supplier influences the paper straw mass customization at De Cans Cans Services Sdn Bhd. In essence, this can assist the researcher in addressing the research questions and achieving the research objectives by outlining the specific research strategies the researcher intends to use.

According to Harling (2012), a case study thoroughly investigates a current phenomenon in its natural context. A holistic investigation involves gathering extensive, detailed information from various sources, including direct observation, participant observation, interviews, audio-visual material, documents, reports, and physical artifacts. The numerous sources provide the broad information required to present an in-depth picture. Moreover, Yin (2018) also stated that a case study is an in-depth into a topic or phenomenon within its real-life setting. A critical factor in defining a case study is selecting the case to be studied and determining the study's boundaries. (Flyvberg, 2011). In this case study, the researcher will look into the criteria of paper straw mass customization and how the customer and supplier influences the mass customization that De Cans Cans Services Sdn Bhd implemented to provide customized goods and services that best meet individual customer's needs.

Flyvberg (2011) recognized that case studies are primarily based on positivist criticisms of using small samples and interpretive, qualitative research. However, case studies are closely related to qualitative methods. In this case study, the researcher will use a qualitative method to ensure that the research findings are well-developed to directly connect the research study's findings with reality and demonstrate the validity that De Cans Cans Services Sdn Bhd adopted for the criteria of paper straw mass customization and the customer and supplier influences the mass customization.

Moreover, Saunders et al. (2019) note that the term 'case' in case study research can refer to a person, a group, an organization, an association, a change process, an event, or a variety of other case subjects. In this study, the researcher chose De Cans Cans Services Sdn Bhd as a case study subject to research the criteria of paper straw mass customization and the customer and supplier influences the mass customization. Yin (2018) asserts that the purpose of a case study is to comprehend the uniqueness of a specific example about a specific research issue. As Saunders et al. (2019) mentioned, the volume of data collected could be reduced by collecting data from a specific subgroup rather than all potential participants. Hence, the researcher chose the managers, executives, general staff, and others involved in the mass customization

operation at De Cans Cans Services Sdn Bhd to gather quality and accurate data for this research study.

On top of that, the researcher also used the judgmental sampling technique to select the best possible candidates to answer the research questions. Saunders et al. (2016) recommend that researchers should use their best judgement when selecting cases and respondents to answer the research questions. In this study, the researcher will select a sample group of 14 people as participants or informants that includes sales and marketing, sales admin, quality assurance, general assistant, production operator, warehouse assistant, and engineering operator involved in the mass customization operation. The researcher can better understand and develop more reliable research findings by purposefully sampling qualitative responses. Consequently, this helps provide adequate information on the research topic and produce remarkable results.

Ultimately, some target population members are subjected to a pilot test to assess their dependability. According to Saunders et al. (2019), a pilot test of the questionnaire with respondents who are similar to those who will fill it out should be conducted before data collection. The pilot test aims to fine-tune the questionnaire so that respondents can quickly answer questions and record the data. Before distributing the questionnaire to the respondents, the researcher chose two participants for De Cans Cans Services Sdn Bhd to process in the pilot study.

3.9 TIME HORIZON

In research, the time horizon is when the study is done, or the data is collected. The time horizon can change based on what kind of study is done and what questions are asked. Saunders et al. (2009) say that the time it takes to study a phenomenon is the same no matter which research method or technique is used. In the study onion,

there are two types of time frames: cross-sectional and longitudinal, according to Bryman (2012). A cross-sectional time frame is a research plan or study that takes data at a certain point or over a short time, usually a few days or weeks. Cross-sectional studies show a picture of a community at a specific time. This differs from ongoing investigations, which follow people or groups over a long period.

Saunders et al. (2019) say cross-sectional studies can be done in most academic research projects. This is because most academic research projects have a limited amount of time and require the researchers to study a specific situation in a certain amount of time. A researcher must also investigate a specific topic within a particular time. The researcher must do this college research between March 2023 and January 2024 to meet the research goals. Cross-sectional studies, like the one used in this study, are chosen by the researcher. This study used 14 interviews with sales and marketing, sales admin, general staff, engineering, quality assurance, and others from the De Cans Cans Services Sdn Bhd in a short period for this research.

3.10 SCIENTIFIC CANON

In the scientific canon, internal validity, external validity, construct validity, and reliability are essential factors contributing to the research's overall quality and credibility. These are crucial concepts for modern studies since they help to improve the accuracy of the assessment and evaluation of studies (Tavakol & Dennick, 2011). Saunders et al. (2019) emphasize that reliability and validity are essential for evaluating the quality of research in the natural sciences and quantitative social sciences. Validity and reliability enhance transparency and reduce the chances of researcher bias in qualitative research (Singh, 2014).

3.10.1 Internal Validity

Saunders et al. (2019) explain that internal validity refers to the extent to which the researcher's findings can be attributed to the intervention the researcher is researching rather than flaws in the research design. When an intervention can be statistically shown to produce an effect rather than this being caused by another confounding variable functioning concurrently, internal validity is proven (Saunders et al., 2019).

Researchers can reduce the possibility of ancillary variables and improve the study's internal validity by limiting the investigation's scope to the research topic, question, and objective. This research identifies the paper straw mass customization criteria and examines how customers and suppliers influence the paper straw mass customization in De Can Cans Services Sdn Bhd. The researcher may resist the urge to discuss unrelated or tangential issues by concentrating on the study questions and objectives. As shown in Table 1 below, some factors might influence the internal validity of the researcher's work.

Table 1: Threats to internal validity

Source: Saunders et al. (2019). Research Method for Business Students.

Threat	Definition and explanation
Past or recent events	A situation that alters participants' perspectives. For instance, the company recalling its paper straw for safety modifications may affect its customers' views about product quality and have an unforeseen effect on a planned study (unless the objective of the research is to find out about post-product recall opinions).
Testing	The impact of testing on participants' views or actions. For example, repeatedly asking the same question to

	participants is likely that they will do better as they know, causing them to answer differently.
Maturation	The impact of a change in participants outside of the influence of the study that affects their attitudes or behaviors, etc. For instance, during the time of research, the participants may be in a good mood one day and a bad mood the next, which will affect the result of the research.

3.10.2 External Validity

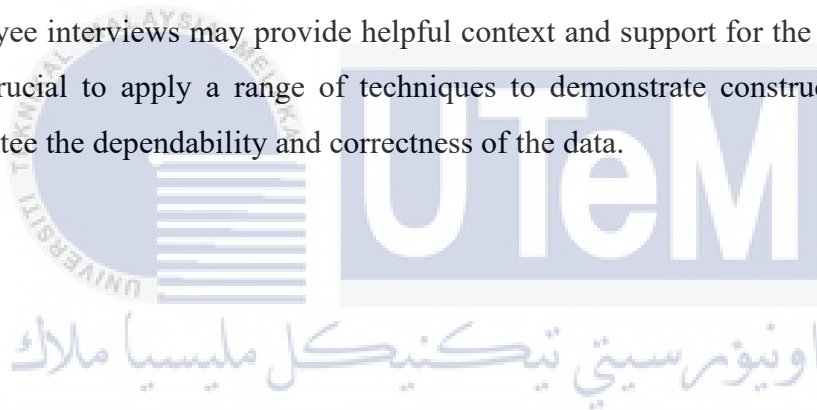
Saunders et al. (2019) mention that external validity concerns whether a study's research findings can be generalized to other relevant contexts. Validity describes how successfully a research study's findings may be applied to settings and situations. The researcher will choose participants with characteristics relevant to the research question. The researcher ensures that the study participants represent interest to ensure external validity in examining whether the De Cans Cans Services Sdn Bhd case study reflects the hypothesis interaction links inherent in the criteria of mass customization theory.

3.10.3 Construct Validity

According to Saunders et al. (2019), construct validity is the degree to which a collection of questions captures the presence of the construct the researcher sought to

test. Therefore, minimizing each scale item depends on lexical and sentinel miscomprehension.

Through job analysis, task analysis, and curriculum analysis, one may examine the boundaries and organizational structure of a construct domain and establish construct validity. These techniques entail dissecting the concept into its components and analyzing how it manifests in various circumstances. Before distributing the measure to the study participants, the researcher can pre-test the standard with a sample of respondents to determine any possible issues or misunderstandings with the items and make any required adjustments. Besides that, the researcher interviewed 14 employees with experience in the company. Researchers claim that this is because they possess both theoretical and practical talents. While the data collected through employee interviews may provide helpful context and support for the study's results, it is crucial to apply a range of techniques to demonstrate construct validity and guarantee the dependability and correctness of the data.



3.10.4 Reliability

Consistency and replication are terms related to reliability. A research project would be dependable if the researcher could duplicate a previous study design and provide the same results (Saunders et al., 2019). Sometimes, a difference between internal and external reliability is established when reliability is considered. To ensure uniformity across a research project is to provide internal reliability (Saunders et al., 2019). External reliability refers to whether the data collection techniques and analytic procedures would produce consistent findings if the researcher repeated them on another occasion or replicated them by a different researcher (Saunders et al., 2019). Since any bias or inaccuracy will impact the findings and subsequent interpretation and raise questions about the methods used to quantify the phenomena being examined, unreliable research will also be ineffective (Saunders et al., 2019). To ensure reliability

in the study, the researcher compiled a table of concerns that should be examined in the De Cans Cans Services Sdn Bhd case study. By addressing these concerns, the researcher can improve the accuracy and validity of the results.

Table 2: Threats to reliability

Source: Saunders et al., (2019). Research Method for Business Students.

Threat	Definition and explanation
Participant error	Any factor that negatively affects a participant's performance or response. One common cause of participant error is timing. When a person is asked to complete the questionnaire right before lunch, it could result in hurried or careless answers, increasing the risk of errors or inaccuracies in the data. To minimize participant error, the researcher chooses a less sensitive time between 10 am and 11 am and avoids scheduling interviews when participants are likely to be busy or distracted, such as at the beginning or end of a workday. Instead, scheduling interviews may be more effective when participants are more likely to be relaxed and focused, such as mid-morning. Other than that, the researcher uses shorter interview sessions rather than longer ones. Shorter sessions may help to maintain participants' attention and concentration.
Participant bias	Any factor that may influence a participant to provide an incorrect response. This can occur when a participant feels pressure or desires to give a specific answer, even if it may not be true or accurate. For example, when an interview is conducted in an open space where, the participant may feel uncomfortable or self-conscious about being overheard. The researcher makes sure that the interview takes place in a setting that is quiet and private (the participant does not have to worry about being overheard). Thus, during the interview, they feel

	more comfortable sharing their honest opinions and experiences.
Researcher error	Any factor that alters the researcher's interpretation. This error can arise for several reasons, such as the researcher being tired, distracted, or unprepared to conduct the study. The researcher should clearly understand the research questions and be well-prepared throughout the interview to ensure their data interpretation is accurate. During the interview, the researcher had to actively listen to the participant's responses and probe further to understand their opinions. Each sentence started or responded to by the respondents had to be written down by the researcher.
Researcher bias	Any factor which induces bias in the researcher's recording of responses. A researcher's personal beliefs, values, and experiences can potentially affect their interpretation of data, which can lead to inaccurate. The researcher must acknowledge that beliefs and assumptions may impact the data collection and analysis. It is critical for the researcher to have an unbiased perspective and to abstain from any personal biases that can affect the findings. The researcher was not permitted to influence the respondents' thinking, point of view, or opinion. To avoid research bias, the researcher should approach the research with an open mind and use objective measures and methods for collecting and analyzing data.

3.11 DATA ANALYSIS

According to Saunders et al. (2019), data analysis consists of eight types, which are thematic analysis, template analysis, explanation building and testing, grounded theory method, narrative analysis, discourse analysis, visual analysis, and data display and analysis. Researchers used thematic analysis to analyze qualitative data.

According to Saunders et al. (2019), thematic analysis focuses on finding themes or patterns in data (such as interviews, observations, documents, diaries, or websites). This method is used to code qualitative data to identify themes or patterns to be further analyzed related to the research question. According to Braun and Clarke (2006), thematic analysis allows researchers to analyze qualitative data in a systematic but flexible and accessible manner. Moreover, it can be used to analyze large qualitative data sets and smaller ones, leading to a wealth of explanations and theorizing.

Briefly, thematic analysis was used to analyze the qualitative data collected in this study. Using this analysis, the researcher collected relevant and essential information related to the research questions and accomplished the study's objectives.

3.12 INTERVIEW PROTOCOL

An interview guide includes a list of the topics or questions that will be covered during the interview. An interview guide is created to ensure that each interviewee receives the same fundamental lines of questioning. The interviewer can investigate, delve into, and ask questions that will further clarify and highlight the subject within the context of the subjects or areas provided by the interview guide (Rubin & Rubin,

2012; Seidman, 2013). Thus, the interviewer is still free to develop a discussion around a specific issue, ask questions informally, and maintain a casual tone while emphasizing a predefined subject. Using the instructions as a checklist will ensure that all pertinent questions are answered during the interview.

The benefit of an interview guide is that it ensures that the interviewer or evaluator has carefully considered how to utilize the constrained time available in an interview setting. By defining the topics to be covered in the interviews, the guide aids in making the process more systematic and thorough. Focus group interviews need a guide to keep the discussions on topic while allowing for the emergence of individual opinions and experiences. With an interview plan, the investigator may arrange the interview using a tentative travel route (Brinkmann & Kvale, 2015; Patton, 2015). It does not explain in detail what will occur at each step of the travel, how long each stopover will take, or where the investigator will be at any given time. Still, it does provide a strong sense of the direction of the journey and the final terrain it will cover.

To have high-quality qualitative data on interview protocol, a trustworthy interview protocol is essential. The preceding delimitation of the subjects to be addressed simplifies the interview process involving multiple groups of individuals in a methodical, consistent, and thorough way (Gugiu & Rodriguez-Campos, 2007; Patton, 2015). Additionally, by ensuring thorough information is gathered within the allotted time, an interview protocol improves the efficacy of the interview process. By using rich qualitative data, the researchers may better comprehend the respondents' experiences and pinpoint critical components pertinent to the topic.

Table 3: The four-phase process of interview protocol refinement

Source: Yeong et al. (2018)

STEPS	EXPLANATION	EXAMPLE
Aligning the Interview Question to the Research Question	<ul style="list-style-type: none"> - Increase the usefulness of interview questions - Ensure that the study's questions are necessary 	<p>Instead of wasting time, the researcher will not want to interview the respondents with all the questionnaires that discuss the criteria of paper straw mass customization and the customers' and suppliers' influence on paper straw mass customization. However, the respondent will select related questions relevant to the respondent's position and knowledge.</p>
Creating an inquiry-based conversation	<ul style="list-style-type: none"> - Interview questions are distinct from research questions - Conversational social rules - Prompt questions 	<p>The researcher will construct a list of questions based on the research question. At the same time, the researcher will not want to ask the new questions in isolation from the respondents and will want to ensure that the earlier questions obtain guidance to ask further questions.</p>
Getting Feedback from the Interview Protocol	<ul style="list-style-type: none"> - Expert opinion on the interview protocol - Expect responses from respondents 	<p>After completing the questionnaires, the researcher will consult with an expert to ensure that the questions are not considered sensitive or unsuitable for data collection. As</p>

	<ul style="list-style-type: none"> - Ensure understandability 	<p>a result of the expert feedback, the questionnaires will be more reliable, and the researcher will be able to obtain relevant data for the criteria of paper straw mass customization and the customers' and suppliers' influence on paper straw mass customization.</p>
<p>Piloting the Interview Protocol</p>	<ul style="list-style-type: none"> - Feedback from actual respondent - Gaining interview experience - Interview scenario testing 	<p>The researcher will design a short interview section test to determine whether the questions are successful and easy to understand for the respondent. Following that, the researcher will investigate whether the respondents can map their 'in mind' answers onto the available answer categories.</p>

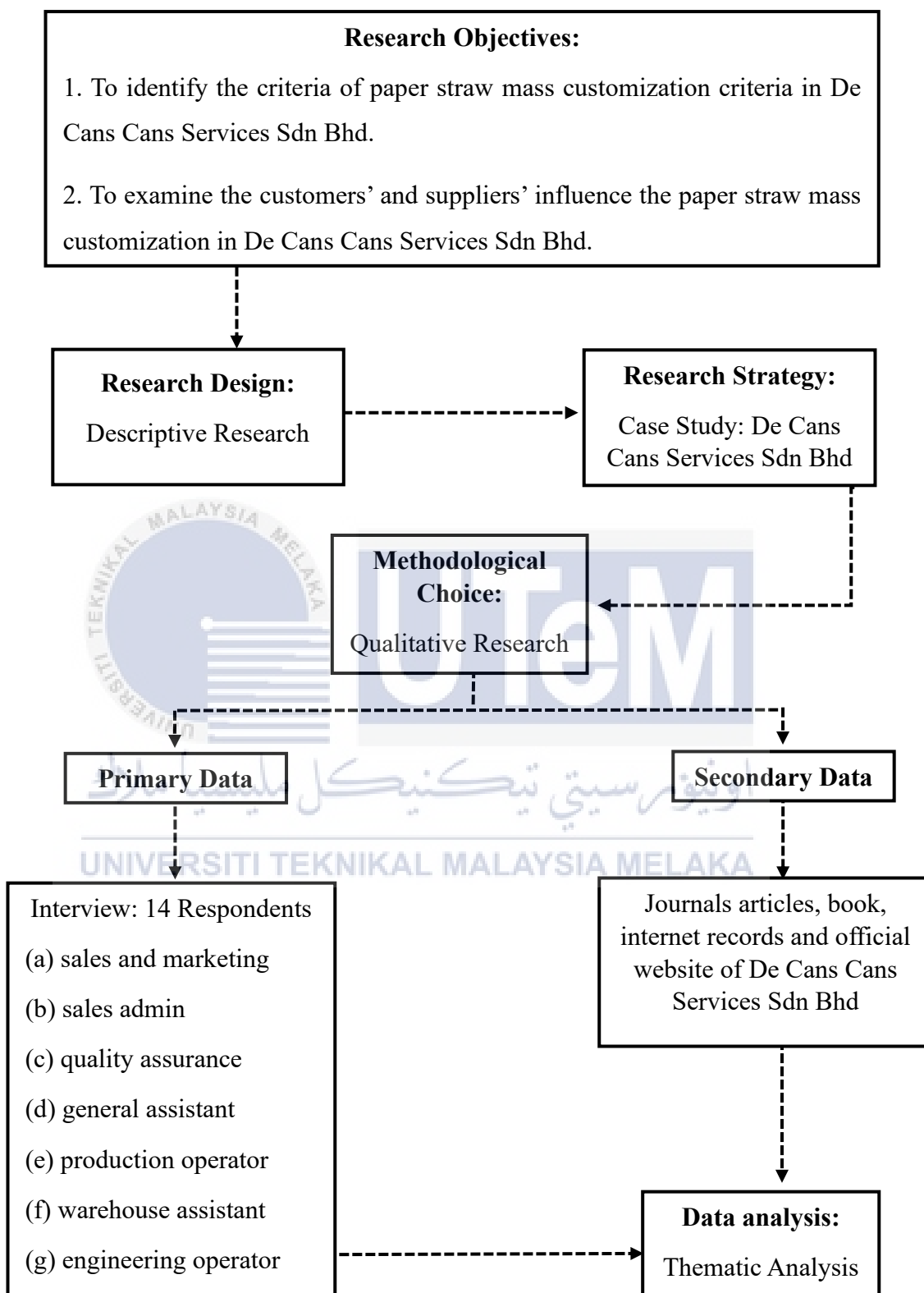
3.13 SUMMARY

This chapter discusses the research methodology that the researcher will use for this research. First, the research design was descriptive, which determined the research objectives from the research questions.

Besides, the researcher utilized the qualitative method to conduct this research. Second, in this research, the researchers will set up questionnaires for De Cans Cans Services Sdn Bhd employees to collect the primary data more accurately. The researcher will conduct an interview section with 14 respondents. Next, the secondary data of this research were the government websites, books, and journal articles regarding the topic of mass customization sourced from the internet by the researcher.

For this study, the researcher focused on De Cans Cans Services Sdn Bhd, located in Melaka. The company offers custom print and design options for our industrial straws with biodegradable and recycled materials. Next, the case study was used as the research strategy in this research. A case study in De Cans Cans Services Sdn Bhd, which enabled the researcher to focus on collecting data and information related to mass customization. This research was conducted with a cross-sectional time frame, which is a short period between March 2023 and January 2024, to meet the research goals.

3.14 RESEARCH FRAMEWORK



CHAPTER 4

DATA ANALYSIS AND DISCUSSION

4.1 Introduction

In this chapter, the results of the research in De Cans Cans Services Sdn Bhd are discussed. First, the data was collected by conducting the one-time semi-structured interview on 15 September 2023. Table 4 shows the number of interviewees and their respective designations, with one from sales and marketing, one from the sales admin, four from quality assurance, one from the general assistant, five from production, one from the warehouse assistant, and one from the engineering, which focuses on the research in De Cans Cans Services Sdn Bhd. The findings are then analyzed using thematic analysis.

There are two research objectives for this research, which are (1) -to identify the criteria for paper straw mass customization and (2) to examine the customers' and suppliers' influence on the paper straw mass customization in De Cans Cans Services Sdn Bhd. Therefore, the first section presented the job profile of the respondents. The second section discussed findings on the criteria of paper straw mass customization, and the third section presented the results of the customers' and suppliers' influence on paper straw mass customization in the straw industry.

4.2 Description of Respondents

The profiles of respondents from each respective respondent are presented in the table below. In addition, the respondents' names are listed in the table below:

Table 4: Profile of Respondents

Experienced Managerial Executives and Industrial Experts			
RESPONDENT	QUANTITY OF RESPONDENTS	CODE	JOB DESCRIPTION
Sales and Marketing	1	S&M 1	-Promote and sell the straw production to local and overseas markets.
Sales Admin	1	SA 1	-Maintained the customer database, tracked orders, ensured the products were delivered on time, and processed paperwork.
Quality Assurance	4	QA 1 QA 2 QA 3 QA 4	-Monitoring operations to ensure processes meet the specific standards that include Hazard Analysis Critical Control Points (HACCP), ISO 22000:2018, Institute cyclos-HTP, Manufacturing Practices (GMP), Gluten Free, BPA Free, and free from harmful compounds such as 3-MCPD and MOAH/MOSH.
General Assistant	1	GA 1	-Provides support to managers, executives, or departments. -Responsibilities in administrative duties

Production Operator	5	PO 1 PO 1 PO 2 PO 3 PO 4 PO 5	-Produce and assemble products in factories -Utilise machinery to assist the production process.
Warehouse Assistant	1	WA 1	-Monitor and processing of inventory -Ensuring that the stock is safely and properly stored.
Engineering Operator	1	EO 1	-Evaluating the equipment's durability and efficiency and replacing or repairing it as needed

4.3 Criteria of Paper Straw Mass Customization

The first objective of this research was to identify the criteria for paper straw mass customization in De Cans Cans Services Sdn Bhd and other straw industries. The seven criteria included product variety, modular design, customer involvement in assembly, innovative ideas, responsiveness to customer needs, readiness for change, and leadership support.

4.3.1 Product Variety

Mass-customization strategy was defined as the ability to offer product variety on a large scale along with succeeding to maintain cost efficiency (Huang et al., 2010; Murat Kristal et al., 2010; Jitpaiboon et al., 2013; Zhang et al., 2015).

PO 1 explained that producing mass customization can increase manufacturing efficiency with lower costs and eliminate inventory. In addition, PO 1 mentioned that the clients should decide on the straw, and then they will try to provide it for them. The company will reduce costs when producing or storing inventory by enabling customers to customize the straw. This is because the company only makes the items that customers request. Based on Zoran, A. (2013), mass customization technologies allow companies to create a cost-efficient value chain while increasing flexibility toward answering customers' needs from heterogeneous market demands.

Product variety is defined by the number of products a company offers consumers (Brun & Pero, 2012). This variety emerges as an option to generate greater competitiveness and is directly linked to companies' strategies to meet customer preferences and increase sales performance (Yu, 2012). De Cans Cans Services Sdn Bhd has four types of products in this company. The general type of straw available is paper, which has two types, straight straw, and u-shaped straw, which are the most popular for mass customization.

In addition, S&M 1 has mentioned that they have different sizes for different products. The beverage straw has three dimensions: 197mm in length, with a 6mm outer diameter for Juices, Shakes, or Smoothies. Second, 197mm in length with an 8mm outer diameter for Milkshakes or Smoothie. Last, 210mm in length with a 12mm outer diameter for boba tea.

In the researcher's opinion, different dimensions exist for different uses to get the right beverage size and meet the market needs. Due to the market having a variety of beverages, the company needs to provide different straw sizes. Drinking straws are available in a variety of sizes. Each is intended to be used for a different type of beverage because of its varied diameter.



Figure 3: Difference in size of straw

Source: De Cans Cans Services Sdn Bhd (2023)

S&M 1 added that the company had offered a selection of wrapped straws, allowing it to provide its customers with the cleanest straw and the safest options. The straws are individually wrapped in paper to avoid the spread of germs while delivered to customers with hygienic packaging. Wrappers keep the straws from contaminating the germs, which keeps the food safe. “Hygiene problem being the first reason, which comes to mind. People would not want to put their lips to a glass used by others even though it is washed,” said S&M 1 at De Cans Cans Service Sdn Bhd.

In the researcher’s opinion, paper straws with wrapping are helpful in the fight against COVID-19. This is because COVID-19 has changed society's lifestyle with the need for more hygiene care. Smithsonian Magazine (2020) stated that plastic products are not always safer than reusable substitutes with COVID-19. The virus survives the same amount of time on plastic as on other materials, such as stainless steel. Therefore, De Cans Cans Service Sdn Bhd provides paper straws with a wrap that can protect from the novel coronavirus and is the most hygienic or beneficial to public health.

In addition, QA 3, and QA 4 mentioned that De Cans Cans Services Sdn Bhd provided hygienic products while following all necessary regulations. This means the straw had been certified to comply with the international food safety management system with BRC Packaging Certified from the British Retail Consortium, in partnership with the Institute of Packaging, ensures that the production process adheres

to strict safety and hygiene standards, Hazard Analysis and Critical Control Points (HACCP) from Global Institute of Credit Professionals (GICP) to producing safe and high-quality products for our customers, and ISO 22000:2018 providing a sense of trust and security within the global food supply chain. With this accreditation, customers can ensure that the straws are made in a hygienic and safe environment. Sustainability certifications are commonly used to satisfy consumer demand for more sustainable business practices and increase product preference. The certifications generally increase the preference for certain products over similar products that have no certification (Prell, M. et al. 2020).

4.3.2 Modular Design

Product modularity or modular design tactic satisfies organisational functions, production, and operations management in addition to marketing because it saves manufacturing costs better than the customization approach and augments customer delight more than the standardization strategy (Duray, 2002; Stevenson, 2018). Thus, modular product design can lead to unlimited varied and individualized products (Bask et al., 2011).

PO 2 said that the straw modular design uses the same materials and designs to the same standards as conventional straw production. Based on Tseng et al. (2018) modular design, all product components are divided into variants and standard modules constructed in a core platform. The modular design was conducted in three different modules:

1) Design Concepts

PO 2 mentioned that the design of straws like beverage straws and u-shape straws can be independently created and then used in various sizes of straw. In addition, customized lengths for all straws are also available for this modular design. This type of straw is commonly used in soft packaged beverages, making it easier for consumers to enjoy their drinks.

2) Wrap straw Material

PO 2 stated that the wrapping material of straw uses paper to make it, and recycling is possible. The straw in wrap will increase the cost. However, customer can print their business name on the wrapping paper. The customer wants to print their company name to ensure that their customers can quickly identify their brand, helping to differentiate the product from competitors and leaving a lasting impression on customers.



Figure 3: Paper straw wrap with print company logo and slogan

Source: De Cans Cans Services Sdn. Bhd. (2023)

3) Product (straw) Material

PO 2 mentioned that paper straws are made from high-quality, biodegradable, and compostable materials, which means they will decompose much faster than plastic straws, reducing waste in landfills and oceans.

PO 3 also explained that each module is combined to create the finished product (straw) after this. To save time, each modular part is designed, produced, and tested independently before being assembled to create the finished product. The company can make mass customization for customers at a lower cost by utilizing modularity to produce the option of mass customization. Based on Miyajima et al. (2019), modular design methods primarily focus on reducing the lead time or costs associated with designing an entire family of products.

Firms cannot focus on mass production strategy but provide products better adapted to individual customers' aesthetic and functional preferences (Piller, 2007; Franke & Schreier, 2008). To fulfill the requirements of mass customization, firms need to consider several development strategies such as modularity, product family, platform, standardization, etc. (Karandikar & Nidamarthi, 2007; Antonio et al., 2007; Zacharias & Yassine, 2008). All these strategies need to be implemented according to the objectives and goals of individual firms based on their customer requirements, production complexities, and volumes. Individual firms might adopt and implement a single or multiple strategies according to their market requirements.

In the interview session, S&M 1 mentioned that they will determine the customization options to provide customers with appropriate value. From this, De Cans Servies Sdn Bhd used different methods to personalize the paper straws, such as printing customer logos, messages, or slogans on the selected straw. The customer plans a special event such as a charity event, environmental awareness project, promoting their business event, etc. Customers need a differentiated design, and the sales and marketing department will propose a proposal to De Cans Cans

Services Sdn Bhd. Then S&M 1 and Director will get them custom-tailored with aseptic package solution and beverage solution.

The generic concept of modular product is to create product variety, which is a crucial concept of mass customization. Developing product variety triggers high complexity over the production line and needs to be efficiently managed (Scavarda et al., 2010). To minimize complexity and achieve the advantages of a mass production strategy, a mass customizer needs to develop modular products (Blecker et al., 2003; Starr, 2010).

In addition, PO 3 mentioned that they, as a production line staff, must produce and assemble products in factories and utilize machinery to assist in the straw production process. With the modular design of straw, the production saved the time and the cost. This is because they managed the production process efficiently, and the quantity produced depends on machine quality. For this point, EO 1 mentioned that he would repair machines, improve machines, and perform preventive maintenance as scheduled. In addition, he handled machine-specific tasks like setting up the machinery, loading and running the machines, and maximizing efficiency.

UNIVERSITI TEKNIKAL MALAYSIA MELAKA

4.3.3 Customer Involvement in Assembly

Prior authors (Duray et al., 2000; Choy & Loker, 2004; Tu et al., 2004; Abdallah & Matsui, 2008) contended that the level of customer involvement in the different phases of the production process is considered a required dimension in the effectiveness of mass-customization and the personalized value received by each customer. Customer engagement in the steps of the production process was also pinpointed in the literature by the term co-creating mass-customization (Loef et al., 2017).

In the interview session, GA 1 mentioned that it includes interacting with customers to determine their requirements, preferences, and expectations to customize products to meet their needs more effectively. GA 1 then said that the company “Hungry Jack’s” is one of the customers, and he will communicate with them by emailing them to follow up on the customer's needs and wants. This is because the customer needs to choose the spec and send them the sample of straw. Hungry Jack’s is an Australian fast-food franchise of the Burger King Corporation. Therefore, the customer will co-design products with the company using the size or colour of the straw.



Figure 4: Example of Hungry Jack’s straw

Source: De Cans Cans Services Sdn Bhd (2023)

Most researchers have dealt with each of these mass customization types individually and inconsistently (Duray et al., 2000; Franke et al., 2010) without considering their interdependencies or conceptual relatedness. The degree of customer involvement is likely a continuum, with involvement possible for different customization opportunities.

According to SA 1, gather customer feedback on their interactions with goods and services to better know their perception or satisfaction. Customer participation is

frequently used in businesses that can enhance and improve their customer services. De Cans Cans Services Sdn Bhd analyzed the customer satisfaction survey results to know customer satisfaction. For example, product quality, on-time delivery, reliability, cooperation, fast feedback, technical support, communication, and price. After that, SA 1 will conclude the survey to determine customer service after sales and product satisfaction. Based on Mourtzis D. et al. (2018), manufacturers need to get meaningful customer feedback on the provided products and the complementary services to cope with the intense competition and diversity in customers’ opinions. The collected feedback is analyzed to prioritize modules considered in the product as poor design, cover design, and frugal design and to compute corrections needed for the product and product-service design.

DE CANS CANS SERVICES SDN BHD		Doc No:	F43
		Issue No:	1
CUSTOMER SATISFACTION SURVEY		Issue Date:	4 th of Sept 2023
		Page:	1 of 1

CUSTOMER SATISFACTION SURVEY

Company Name : _____

Contact Person : _____

Telephone No : _____

Date of Survey : _____

Survey Parameters : (Please circle (O) where appropriate)

Rating	Very Poor	Poor	Average	Good	Excellent
1. Product Quality	1	2	3	4	5
2. On Time Delivery	1	2	3	4	5
3. Reliability	1	2	3	4	5
4. Co-Operation	1	2	3	4	5
5. Fast Feedback	1	2	3	4	5
6. Technical Support	1	2	3	4	5
7. Communication	1	2	3	4	5
8. Price	1	2	3	4	5
Total Points					
Comment/Feedback:					

Overall Rating	35 – 40	Excellent
	30 – 34	Good
	20 – 29	Average
	10 – 19	Poor
	0 – 9	Very poor

Evaluated By : _____ Company Stamp : _____

Position : _____

Thank you for valuable feedback for our action / improvement on our product / service.

Figure 5: Form of customer satisfaction survey

Source: De Cans Cans Services Sdn. Bhd. (2023)

4.3.4 Innovation Idea

Innovation is a crucial pillar that enables organizations to survive, change, and improve their performance in a competitive market, especially during challenging times (Liao et al., 2007; Tejeiro Koller et al., 2017; Younis, 2019). It helps firms in delivering the required value to their customers by flexibly adapting to new market changes by introducing new products or improving the current ones (Wang et al., 2016).

According to S&M, De Cans Cans Services Sdn Bhd allows mass customization that offers many types of straws, enabling customers to customize products tailored to their tastes. The company offers beverage paper straight straws and U-shaped straws for customized lengths. It provides customers with custom colours, sizes, and designs. The paper drinking straws come in various lengths and diameters, making them suitable for beverages, from smoothies to iced coffee and soft drinks. QA 1 also mentioned that De Cans Cans Services Sdn Bhd will not produce the S-shaped straw due to the limited machines. This is because the company needs to purchase that machine to produce it, which will be costly. Product innovation can improve the firm's competitiveness, increase resource utilization efficiency, increase investment and sales profits, develop the latest market, and improve the firm image (Dangelico et al., 2010).

Based on S&M 1, the company has an innovative paper material that uses biodegradable and compostable materials that are sustainable. This means that the material will decompose much faster than plastic straws, reducing the amount of waste in landfills and oceans. The company will develop techniques to make the paper straw smooth, silky, highly durable, and water resistant. QA 2 stated that the materials were bought from Taiwan with some trustworthy company or supplier. Innovation of eco-friendly products helps preserve the environment and benefit the community (Triguero et al., 2013). According to Soylu and Dumville (2011), innovative ideas, product design, production, and marketing of new eco-friendly products can be said to be products with eco-friendly innovation.

Future Market Insight (2023) states that the food service sector will dominate this materials market. Due to the single-use items made of plastic being replaced with more environmentally friendly alternatives, growing environmental consciousness is expected to drive significant growth in the paper straw market over the next few years. For example, Nestle Malaysia transitioned to paper straws for their product, the MILO UHT range with U-shaped straws. In addition, Starbucks offers straws made from alternative materials, including paper or compostable plastic.

According to S&M 1, De Cans Cans Services Sdn Bhd follows lean production principles to minimize waste. This approach is not limited to the quality assurance (QA) team but extends to the production team, which adheres to standardized operating procedures (SOPs) to prevent material wastage throughout the production process. For instance, the oven stage is critical as paper straws, after the gluing process, must undergo precise drying times. If the drying time is excessive, the paper straws become prone to cracking, making them challenging to bend, particularly for U-shaped straws. This could complicate the packaging process and lead to breakage. Based on Kaneku-Orbegozo et al. (2019), lean manufacturing techniques are the most successful improvement concepts that many companies can apply to eliminate waste and non-value-added activities related to manufacturing. It also standardizes work, reduces waste, eliminates machine failures, and develops correct planning guidelines for quality requirements.

In addition, S&M 1 stated that the company invested in specialized machinery such as paper-slitting machines and resources like edible glue and ovens to make paper straws stronger and more durable. The process of producing paper straws differs significantly from that of plastic straws. The production involves paper slitting, gluing, and oven drying, while plastic straws require molds to achieve their shape. The production side primarily oversees the progression of paper straws, ensuring a seamless transition from raw materials to the finished product. A critical factor determining the durability of paper straws is the quality of the paper, including its grammage.

Based on the discussion, the researcher believes innovation is important for companies since it enables strategic advancement and expansion. The world constantly changes, and companies must eventually adjust to the market to be advantageous and relevant.

4.3.5 Responsiveness to customer needs

Customer responsiveness includes value-adding activities such as solving customers' problems (Matthyssens & Vandembemt, 2008), building relationships with customers (Storbacka & Nenonen, 2009), and customizing the offering (Schlegelmilch & Ambos, 2004). As the intention of market orientation as a whole is to create superior value in comparison with value created by competitors, the customer responsiveness activity may be an effective strategy for the industrial firm to differentiate from competitors (Norman et al., 2007; Sorensen, 2009; Ulaga & Eggert, 2006).

In the interview session, S&M 1 mentioned that the sales and marketing department would create, promote, and sell their product or service to the public and existing customers to build relationships with customers. At this moment, S&M 1 said that if the company does not have a promoting event, the business expansion will slow down and possibly even stop. There will not be new customers, and existing customers might not be aware of upcoming sales or new products, which reduces the chance of becoming repeat customers.

In addition, SA 1 explained that the company would create a marketing event. It is a brand, product, or service being advertised as an entire event. To effectively promote themselves to the public and explain specific products or services, the sales and marketing department will directly explain their brand to people. De Cans Cans Services Sdn Bhd had created a booth for the Interpack event in Dusseldorf. The booth

aimed to provide expert consultation and showcase paper straw solutions. Moreover, they also took the opportunity to educate attendees about the importance of transitioning to paper straws. According to Ibojo et al. (2014), product awareness is the knowledge about a company's products, especially compared to competitors. When one first hears about promotional products as part of a marketing campaign, one might think it is a pen with the company's name.



Figure 6: FB Posting of Interpack event in Dusseldorf

Source: Official Facebook De Cans Cans Services Sdn Bhd (2023)

Bernardes and Hanna (2009) stated, "Customer responsiveness is a firm's propensity to act on market knowledge to anticipate and rapidly address modifications in customers' expectations." One of the five service quality dimensions influences the overall customer perception or evaluation of experience (Santos, 2003). Meehan and Dawson (2002) defined customer responsiveness as "accurately and insightfully giving customers what they need, want, or do not yet know they want. It is about consistently doing so more quickly than anyone else and rapidly enough to retain the value of the decision or idea for the customer."

In the interview session, QA 2 mentioned that De Cans Cans Services Sdn Bhd will build strong customer relationships. To capture the market, the company should concentrate on developing customer relationships, which will increase customer loyalty. It keeps current customers from switching to other competitors. It also uses word-of-mouth marketing, in which loyal customers recommend the brand to people surrounding them, such as friends and family. Based on Maciej Mitreęga (2006), to develop meaningful customer relationships, they should concentrate more on rendering services at an expected (promised) level than establishing formal barriers preventing customers from defecting. For example, De Cans Cans Services Sdn Bhd provides customer care as a way for businesses to respond to the concerns of current and potential customers and clients. The key areas where customer service is provided are email support, phone calls, WhatsApp chat, and social media interaction.



Figure 7: Information on customer care

Source: Website of De Cans Cans Services Sdn Bhd

From the discussion, the researcher found that straw manufacturing needs to maintain high customer responsiveness, which indicates how fast and efficiently a company responds to customers and builds strong relationships. In this way, the company can succeed in today's competitive marketplace.

4.3.6 Readiness for change

Pioneering applications of mass-customization have suggested three major inconveniences that customers are likely to face: mass-customized products are more expensive than standardized products (Kotha, 1995), a customized product cannot be delivered to the customer at the time of purchase, and, since the customer initiates the design process, the customer is required to invest time in “designing” the product (Pine et al., 1995).

During the interview session, QA 3 mentioned that the product the customer ordered could not be delivered to the customer at the time. The company would offer a discount to customers whose deliveries were late to show the company's value and not cause the customer not to choose the company anymore. These small actions can help the company retain customers who otherwise may not return. According to Rajesh et al. (2015), delivering products to customers in the shortest possible time is challenging for all manufacturing industries. In contrast, most inventory problems arise because of the interval between the decision to place an order and the stock availability to meet the customer's demand or for production setup.

In addition, PO 4 has explained that the company will waive the export fee to compensate the customer when the order is not delivered due to unavoidable problems. Waiving export fees can help reduce customer dissatisfaction with a company. Later, the company would confirm the time for the order to arrive and follow up on customer issues with a fast response. Based on Casado Díaz et al. (2002), to make consumers more tolerant of delayed delivery, the sellers often charge a lower price to influence consumers' value perceptions through the cost-benefit trade-off.

In addition, WA 1 mentioned that the stock also needs to be safeguarded when it is at the warehouse. De Cans Cans Services Sdn Bhd uses the security system, a thumbprint system for authorized people to enter the warehouse. As a warehouse assistant, I will also receive and process incoming stock and materials, pack and ship

orders, and manage the warehouse to ensure they are stored safely and correctly. Based on Rocha e Oliveira et al. (2012), safety has always been a critical facet of quality management, but operations management needs to focus more on safety issues.

A related concept is the issue of customer customization sensitivity (Hart, 1995). Two basic tenets determine customer customization sensitivity: the uniqueness of the customer's needs and the customer sacrifice gap. The uniqueness of the customer's needs is a function of the relevant demand pattern. Customers do not care whether they are offered customized solutions if the demand pattern is primarily functional. On the other hand, if the demand pattern is innovative, customers are more likely to pay attention to customization. The customer sacrifice gap is between the desired and available products in the market (Bardakci et al.; J., 2005).

In the interview session, QA 4 explained that the customer needs a customization straw for the functional type. In addition, QA 4 said that the market only looks into the length and size, but the customer looks for the colour and the brand. Several functional needs could be associated with the type of straw, such as the features, size, diameter, and colour. This is because different straws have different sizes and other kinds of outer dimensions. Therefore, this is decided by the customers themselves, and then the company will try to provide for them. Thus, the company will have different sizes and see that our specifications can fit customer needs.



Figure 8: Example straw of colour

Source: De Cans Cans Services Sdn. Bhd. (2023)

From the discussion, the researcher believed that the company must be ready for change to minimize the problem. This is how businesses retain their existing customers and keep improving the service and product to customers.

4.3.7 Leadership support

Cheung and Wong (2011) determine that supervisors who encourage and maintain cooperative interpersonal relationships can influence employees' engagement in the creative process by enhancing their self-efficacy. Tierney and Farmer (2004) contend that employees with higher levels of self-efficacy tend to be more creative if they are aware of their supervisors' expectations of their creative behaviours. Employees thus engage in innovative behaviour if supervisors' expectations for creativity are clear (Carmeli & Schaubroeck, 2007). Therefore, leadership support should relate significantly to employees' creative behavior (Shalley & Gilson, 2004).

During the interview, GA 1 mentioned that the Director of De Cans Cans Services Sdn Bhd is a transformational leader. The company's leadership style constantly pushes staff to think about how to solve customer problems and new ideas for their product. This leadership style encourages staff to be creative and find new solutions to problems. Based on Yao, G. et al. (2023), employees are encouraged to share their knowledge to stimulate creativity and innovation. However, individuals may hide their knowledge to pursue personal interests.

In addition, GA 1 stated that the Director will manage everything for the measurement. Directors are responsible for making important decisions that impact the business and its shareholders. Therefore, Directors oversee managers and may assist them in managing a department, team, or project. The leader in the department

seeking approval from the Director for important decisions and leading with confidence and purpose is essential to building positive relationships, maintaining independence, and leading your team effectively. Based on Taghavi Moghaddam et al. (2018), the board of directors' primary responsibility is to set up efficient governance of the firm affairs in alignment with shareholders' interests and balance the interests of its different beneficiaries, including customers, staff, investors, and local societies, to provide independent supervision on executive directors' function, and to challenge the commercial decisions and strategy of executive management.

According to Vroom and Jago (2007), creative supervisors interact with their employees and motivate them to work collaboratively to achieve new, valuable outcomes. De Jong and Den Hartog (2007) find that the leader's role is essential for creating a climate for creativity by stimulating knowledge diffusion. Similarly, strong ties between experienced supervisors and employees facilitate exchanges of creative information and support, increasing the likelihood that supervisors and employees think in broader ways and channel their thoughts toward common creative goals (Erdogan et al., 2004).

At the interview session, EO 1 mentioned De Cans Cans Services Sdn Bhd is a company that encourages teamwork between all the staff and the department. The company enables collaboration among staff to increase performance as it has reduced feelings of being alone and increases staff involvement with jobs. Moreover, the company conducted activities for team-building, such as annual dinners, break rooms, company trips, etc, to provide opportunities for staff to connect with other teams. Based on Hout (2021), when team members collaborate towards a common purpose, experience flows together, the team, as a performing unit, improves its performance and delivers individual happiness to its members.

Moreover, EO 1 stated that teamwork improves workplace culture. This is because when employees collaborate and achieve as a team, they create connections that eventually develop into friendship and trust. Based on De Cans Cans Services Sdn

Bhd, they create a dynamic and inclusive work environment. In order to make sure that everyone is valued and can actively contribute to accomplishing the company's goals, they accept variety and value different points of view. In addition, they encourage their team members to contribute their unique skills and talents toward the company's common objectives and achieve extraordinary results together.

The researcher believed solid leadership may foster teamwork, create motivated teams, and allow employees to make decisions. Therefore, the company needs a leader to guide the team, encourage cooperation, and give attention to the relationships among team members.



Table 5: Thematic Analysis of the Criteria of Paper Straw Mass Customization in De Cans Cans Services Sdn Bhd

Criteria	Theory	Primary Data	Secondary Data
Product Variety	<p>the ability to <u>offer product variety</u> on a large scale and to maintain cost efficiency (Huang et al., 2010; Murat Kristal et al., 2010; Jitpaiboon et al., 2013; Zhang et al., 2015).</p> <p>The number of products a company offers consumers (Brun & Pero, 2012).</p>	<p>Production operator team & Sales and marketing:</p> <p>(a) <u>Reduce costs</u> when producing or storing inventory by enabling customers to customize the straw</p> <p>(b) Offered a selection of wrapped straws, allowing the company to provide their customers with the <u>cleanest straw and the safest options</u>.</p>	<p>Zoran, A. (2013). Smithsonian Magazine (2020)</p> <p>(a) Create a <u>cost-efficient</u> value chain while increasing flexibility towards answering customers' needs</p> <p>(b) Plastic products are not always safer than reusable substitutes with COVID-19.</p>
Modular Design	<p><u>unlimited varied and individualized products</u> (Bask et al., 2011).</p> <p>Creates <u>product variety</u>, a crucial mass concept (Scavarda et al., 2010).</p>	<p>Production operator team:</p> <p>(a) <u>uses the same materials and designs</u> to the same standards as conventional straw production</p> <p>(b) Modular design was conducted in</p>	<p>Tseng et al. (2018)</p> <p>Miyajima et al. (2019)</p> <p>(a) All components in different products are divided into variants</p>

		design concepts, wrap straw material, and product (straw) material.	(b) reducing the lead time or costs associated with designing an entire family of products
Customer Involvement in Assembly	The <u>level of customer involvement</u> in the different phases of the production process (Duray et al., 2000)	Sales Admin: (a) gather <u>customer feedback</u> on their interactions (b) customer satisfaction survey (c) For example, Hungry Jack's is one of the customers, and the company will communicate with them by emailing them to follow up on the customer's needs and wants.	Mourtzis D. et al. (2018) (a) get <u>meaningful customer feedback</u> on the provided products and the complementary services
Innovation Idea	Enables organizations to survive, change, and improve their performance (Liao et al., 2007)	Sales and Marketing: (a) <u>allow mass customization</u> that offers many types of straws, enabling customers to customize products tailored to their tastes. (b) <u>innovative paper material</u> that uses	Dangelico et al., (2010). Triguero et al., (2013) Kaneku-Orbegozo et al. (2019) (a) <u>Product innovation</u> can improve the firm's competitiveness.

		<p>biodegradable and compostable material for paper straws</p> <p>(c) follows <u>lean production principles</u> to minimize waste</p>	<p>(b) <u>Innovation of eco-friendly products</u> helps preserve the environment and benefit the community.</p> <p>(c) <u>lean manufacturing techniques</u> are the most successful improvement concepts that many companies can apply to eliminate waste.</p>
<p>Responsiveness to customer needs</p>	<p><u>value-adding activities</u> such as solving customers' problems (Matthyssens & Vandenbempt, 2008)</p> <p><u>building relationships with customers</u> (Storbacka & Nenonen, 2009)</p> <p><u>customizing the offering</u></p>	<p>Sales Admin:</p> <p>(a) create a <u>marketing event</u></p> <p>(b) build strong customer relationships</p>	<p>Ibojo et al. (2014). Maciej Mitreğa (2006)</p> <p>(a) product awareness is the knowledge about a company's products</p> <p>(b) develop <u>meaningful customer relationships</u> needs to concentrate more on rendering services at an expected</p>

	(Schlegelmilch & Ambos, 2004)		
Readiness for change	<p><u>inconveniences</u> that <u>customer</u> (Kotha, 1995)</p> <p>The customer sacrifice gap is between the desired and available products in the market (Bardakci et al.; J., 2005).</p>	<p>Quality Assurance team & Production operator team & Warehouse Assistant:</p> <p>(a) <u>ordered could not be delivered</u> at the time</p> <p>(b) <u>waive the export fee</u> when the order is not delivered</p> <p>(c) <u>stock also needs to be safeguarded</u> when it is at the warehouse</p>	<p>Rajesh et al. (2015)</p> <p>Casado Díaz et al. (2002)</p> <p>Rocha e Oliveira et al. (2012)</p> <p>(a) <u>delivering products to customers in the shortest possible time is challenging</u></p> <p>(b) often <u>charge a lower price</u> to influence consumers' value perceptions</p> <p>(c) <u>safety</u> has always been a critical facet of quality management</p>
Leadership support	<p><u>influence employees' engagement</u> in the creative process by enhancing their self-efficacy (Cheung and Wong (2011)).</p>	<p>General Assistant & Engineering Operator:</p> <p>(a) <u>pushes staff to think</u> about how to solve customer problems and new ideas</p>	<p>Yao, G. et al. (2023)</p> <p>Hout (2021)</p> <p>(a) <u>encouraged to share their knowledge</u> to stimulate creativity and innovation.</p>

	<p><u>interact with their employees and motivate them to work collaboratively</u> Vroom and Jago (2007).</p>	<p>(b) <u>encourages teamwork</u> between all the staff and the department</p>	<p>(b) team members who <u>collaborate</u> lead to improvement in performance</p>
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4.4 Customers' and suppliers' influence the paper straw mass customization

As stated in Chapter 1, the second objective of this research was to examine the customers' and suppliers' influence on the paper straw mass customization in De Cans Cans Services Sdn Bhd. The generated results are discussed in the following.

4.4.1 Customer integration

Customer integration aims to assess customer needs and tailor internal activities to meet those needs (Koufteros et al., 2005). As firms get to know their customers and become committed to understanding and meeting their needs, strong bonds are forged between them and their customers. Integration ensures that the voice of the customer plays a vital role in the firm's innovative processes (Jitpaiboon et al.; J., 2009).

By conducting the interview sessions, PO 1 mentioned that the sales and marketing departments had collected and stored their customers' data. They collect contact information, buying behaviors, and preferences for products. The company needs to follow customer demands. It can help companies improve services, understand consumer needs, and improve business strategies. The client demand is significant because the company needs to meet customer expectations such as branding, outstanding, and other expectations. Based on Taherdoost, H. (2023) (2023), collecting, storing, and analyzing customer information to gain insights into their preferences, behaviors, and needs.

Customer integration requires a clear understanding of all interactions between a customer's business and the firm's products and processes (Wisner et al., 2008). The

firm must devote attention and resources to these activities to help the customer improve its competitive standing (Yu et al., 2013). Customer integration increases by sharing information between customers and the organization, improving the relationship and efficiency (Hamilton-Ibama & Ogonu, 2021).

In the interview session, GA 1 mentioned that De Cans Cans Services Sdn Bhd is a customer-centric company. The key to the company's focus on customers has been truly listening to them to provide them with what they want. De Cans Cans Services Sdn Bhd is committed to providing customers with experiences, products, and services that exceed their expectations while understanding their needs and preferences. GA 1 stated that the ways to improve customer experience are offering a wide selection of products, providing fast and reliable shipping, and using customer feedback to improve product quality or customer retention. Based on Flores, F. (1993), listening establishes and builds rapport to create a different, more collaborative relationship with the customer. Listeners concentrate on the key distinctions that can serve as a bridge between their world and the customer's.

As customer integration increases, structural and relational gaps between the firm and target customers are narrowed, enabling the firm to appreciate better changing customer requirements and demands (Wong et al., 2011). Greater customer integration helps enhance the customization of market offerings, which improves customer assessment and perception of value associated with a firm's market offering (Chang et al., 2016). Next, greater customer integration bridges the structural and relational gaps between the firm and target customers, and it may help firms be more responsive to addressing customer requirements, thus increasing customer time utility (Flynn et al., 2010).

According to PO 5, De Cans Cans Services Sdn Bhd uses the market-oriented priority that focuses on determining and satisfying the preferences and wants of customers in the market. According to The Star (2023), Malaysia set an ambitious roadmap in 2018 to eliminate single-use plastics by 2030. Based on the

implementation of stringent government regulations against the consumption of single-use plastic, several straw manufacturers are introducing reusable straws, thereby fuelling the demand for their products. From this, De Cans Cans Services Sdn Bhd provides a sustainable alternative to traditional plastic straws to market needs. PO 5 mentioned that the company offering paper straws in bulk in quantities with customization could ensure a steady supply of these eco-friendly straws while offering cost savings by reducing packaging waste.

From the discussion, the researcher believes that customer integration allows firms to understand customers and respond to their specific needs. Consequently, the company integrates with key customers to learn more about their requirements and to promote collaboration between companies to generate value for customers.



4.4.2 Supplier integration

Supplier integration can be defined as the extent to which suppliers participate in activities and processes the firm had formerly done through customer relationships. Supplier integration is characterized by a long-term commitment among the collaborators through open communication and mutual trust. Supplier partnerships involve participants early in the product life cycle. Thus, ensuring early supplier involvement in product design and access to superior supplier technologies (Petersen et al., 2005a, b) describes supplier integration as a managerial perception of the level of participation suppliers have with the firm's value-added processes, such as order fulfilment, planning and scheduling, new product developments, and logistics. A firm must communicate and coordinate activities with its suppliers to avoid delays in responding quickly and effectively to the needs of the ultimate customer (Petersen et al., 2005a, b; Sanders, 2005; Sanders & Premus, 2005).

In the session interview, S&M 1 mentioned the importance of maintaining a good relationship with suppliers to continue business. A good working relationship with a supplier will enhance customer satisfaction and minimize costs, delays, and quality problems because investing in key suppliers will manage operations proactively. According to S&M 1, there will be times when problems occur, and the supplier relationship could take a wrong turn. However, he added that they would call their supplier rather than correspond with them via email if they had any problems. As a result, the business would ensure that any issues or problems with their suppliers are resolved. Based on Kim, Y., & Choi, T. Y. (2018), the relationships that firms have with their suppliers provide access to suppliers' competencies and resources, which can be leveraged to improve firm-level performance.

Supplier integration examines the coordination and information-sharing activities with key suppliers that provide the firm with insights into suppliers' processes, capabilities, and constraints, ultimately enabling more effective planning and forecasting, product and process design, and transaction management (Schoenherr & Swink, 2012).

In the interview session, SA 1 highlighted that the company will receive more value to the business. De Cans Cans Services Sdn Bhd can receive personalized service, discounted prices, or special beneficial terms from the key supplier. Therefore, the production will be more efficient or cost-effective. SA 1 illustrated that De Cans Cans Services Sdn Bhd would sign a non-disclosure agreement (NDA) with their suppliers to formalize and enforce the terms and conditions of the information sharing. For example, the information protected by a confidentiality agreement can include product specs and supplier information to protect sensitive and confidential information.

Supplier integration enables close partnerships with suppliers, allowing firms to leverage the resources and capabilities available in their external supplier networks for superior performance (Asamoah et al., 2021; Xu et al., 2014). Supplier integration helps firms obtain more significant information about the status of orders, potential

delays, and stock-outs, enabling better planning and coordination of operations (Huo, 2012; Swink et al., 2007). Supplier integration also enables the development of strategic solid supplier partnerships, which positively impact operational and firm performance through minimized transactions and purchasing costs, provision of customized services, and other value-added services (Zhao et al., 2015; Huo, 2012).

According to the interview with PO 4, he said De Cans Cans Services Sdn Bhd needed an effective integration with suppliers, usually involving communication and follow-up to create a long-term relationship. He believed that keeping good supplier relationships requires frequent communication. Furthermore, they will take quick action if a problem arises. Call the supplier as soon as possible to discuss the problems. Proactive problem-solving involves addressing minor problems before they worsen. The communication included delivery schedules and quality requirements. This is why De Cans Cans Services Sdn Bhd wanted to build relationships with the suppliers to achieve long-term success. Based on Rebelo et al. (2019), companies started focusing on exchanging information with their suppliers, improving communication, and introducing new techniques to increase product quality.

From the discussion, the researcher believed that straw manufacturing must collaborate with suppliers. This helps companies and suppliers understand each other's responsibilities while building practical cooperation.

4.4.3 Cooperative Relationships (CRs)

Cooperative relationships are how a firm coordinates activity with suppliers and customers. Cooperative relationships result when a firm coordinates activity with suppliers and customers (Jitpaiboon et al.; J., 2009). Cooperative relationships link a firm with its customers, suppliers, and other channel members by integrating their

relationships, activities, functions, processes, and locations. An integrated network of customers and suppliers enables the network to outperform rivals in product price and delivery (Lee & Billington, 1995). The high level of cooperative relationships can be accomplished through continuous automation and standardization of internal logistics functions, efficient information sharing, and strategic linking with suppliers and customers.

GA 1 has mentioned having good, effective relationships with suppliers and customers. De Cans Cans Services Sdn Bhd did not exchange gifts with suppliers and customers during the festival. A well-written greeting is a warm greeting that gives suppliers and customers an impression of appreciation and value. This good first impression can establish the foundation for a successful business partnership while having how customers evaluate the company. Based on Smith, A. P. B. (2020), greeting can serve numerous functions, including “revealing information about the state of the relationship, maintaining relationships, and indirectly creating a symbolic bond between parties.”

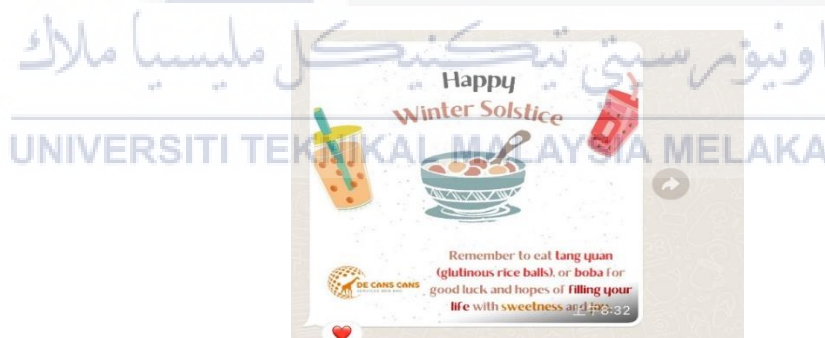


Figure 9: WhatsApp greeting message

Source: De Cans Cans Services Sdn Bhd (2023)

In addition, GA 1 believed that the most effective way to inform customers about these deals and conditions is to send them holiday or festive season greetings. GA 1 indicates they never gave or received presents from their suppliers or clients. He emphasizes that a present will be considered a bribe regardless of its size, type, or value if it can be proven that it was given to influence behaviour.

Developing enterprise-wide information systems that provide seamless integration of data flows among the firm and its trading partners enables better decision-making by all. They participate in a process built on cooperation and co-creation, resulting in high integration (Piller et al., 2004). Supplier integration and customer integration activities enable firms to get access to valuable resources outside the organizations' boundaries, which can be bundled and deployed for sustainable competitive performance (Xu et al., 2014)

In the interview session, SA 1 described De Cans Cans Services Sdn Bhd collaborating with a select few thrust suppliers rather than many. Because of this, it is easier for them to communicate with each other, ask questions about any issues that occur, and rapidly fix problems by exchanging information about market trends and delivery schedules. De Cans Cans Services Sdn Bhd grows with its suppliers because it believes in them and develops trust. Based on Jain V. et al. (2009), the company seeks strong cooperation with its principal suppliers. This cooperation requires a small number of suppliers. Indeed, a strong cooperation with many suppliers is complicated to manage.

The researcher believed that De Cans Cans Services Sdn Bhd could work with each other for a long time so that the customer and the suppliers meet common goals and expectations and get a win-win situation.

Table 6: Thematic Analysis of the customers' and suppliers' influence the paper straw mass customization in De Cans Cans Services Sdn Bhd

Influence	Theory	Primary Data	Secondary Data
Customer integration	<p><u>assess customer needs and tailor internal activities</u> to meet those needs (Koufteros et al., 2005).</p> <p>Requires a <u>clear understanding</u> of all interactions (Wisner et al., 2008).</p>	<p>Production team & General Assistant:</p> <p>(a) <u>collected and stored their customers' data</u></p> <p>(b) <u>truly listening</u> to them to provide them with what they want</p>	<p>Taherdoost, H. (2023)</p> <p>Flores, F. (1993)</p> <p>(a) <u>collecting, storing, and analyzing customer information</u> to gain insights into their preferences, behaviors, and needs.</p> <p>(b) <u>listening</u> is establishing and building rapport with the customer</p>
Supplier integration	<p><u>participants early in the product life cycle</u> (Petersen et al., 2005a, b)</p> <p><u>coordination and information-sharing activities</u> with key suppliers (Schoenherr & Swink, 2012)</p>	<p>Sales and Marketing & Production operator team:</p> <p>(a) <u>investing in key suppliers</u> will manage operations proactively</p> <p>(b) involving <u>communication</u> and follow-up to create a long-term relationship</p>	<p>Kim, Y., & Choi, T. Y. (2018)</p> <p>Rebelo et al. (2019)</p> <p>(a) can be leveraged to <u>improve firm-level performance</u>.</p> <p>(b) <u>improved communication</u> and introduced new techniques to</p>

			increase product quality.
Cooperative Relationships (CRs)	<p>coordinates activity with <u>suppliers and customers</u></p> <p><u>link a firm with its customers, suppliers, and other channel members</u> by integrating their relationships (Jitpaiboon et al.; J., 2009).</p>	<p>General Assistant & Sales Admin:</p> <p>(a) <u>warm greeting</u> that gives suppliers and customers an impression of appreciation and value</p> <p>(b) select <u>few thrust suppliers</u> rather than many</p>	<p>Smith, A. P. B. (2020)</p> <p>Jain V. et al. (2009)</p> <p>(a) <u>greetings</u> can maintain relationships</p> <p>(b) cooperation requires a <u>small number of suppliers</u>. Indeed, a strong cooperation with many suppliers is complicated to manage.</p>

CHAPTER 5

CONCLUSION AND RECOMMENDATION

5.1 Introduction

The two key objectives of this research are to identify the criteria for paper straw mass customization and examine the customers' and suppliers' influence on the paper straw mass customization in De Cans Cans Services Sdn Bhd. The researcher selected De Cans Cans Services Sdn Bhd to achieve these research objectives. The findings have already been discussed in the preceding chapter and will be concluded in this chapter. Besides, the researcher proposes a theoretical framework based on the findings. Future recommendations for further study are also included in the last section of this chapter.

5.2 The criteria for paper straw mass customization in De Cans Cans Services Sdn Bhd

Through the research in De Cans Cans Services Sdn Bhd, the researcher has affirmed that the criteria for mass customization play a vital role in a manufacturing company. De Cans Cans Services insists on providing high-quality products by providing eco-friendly packaging solutions to their customer. Thus, the first research objective is to identify the criteria for paper straw mass customization.

Based on the discussion of qualitative findings in the previous chapter, chapter 4 can conclude that all the respondents agree that Product Variety in mass customization is involved when providing the mass customization straw at De Cans Cans Services Sdn Bhd. This is because the company needs to fit customers' needs for the design. Besides that, QA 3 mentioned that the company had the application certification with the Department of Islamic Development Malaysia (JAKIM); this application is to get and receive the certification of Halal Certifications.

Based on the discussion of qualitative findings in the preceding chapter, mass customization has been utilized at De Cans Cans Services Sdn Bhd. From the researcher's perspective, De Cans Cans Services Sdn Bhd offer product variety due to consumers wanting more variety than ever before. Product variety is crucial for customer satisfaction and competitive advantage in the straw manufacturing industry. Product variety is defined by the number of products a company offers consumers (Brun & Pero, 2012). To summarize the respondents, product variety aided the De Cans Cans Services Sdn. Bhd. in meeting customers with various interests and tastes and reducing costs when producing or storing inventory by enabling customers to customize the straw.

Referring to the discussion on modular design, modular design inevitably plays a role in mass customization. It allows manufacturers to use the same materials and designs to the same standards as the products. Bask et al. (2011) state that modular

product design can lead to unlimited varied and individualized products. To recap the key points made by the respondents, modular design, in which each module is combined to create the finished product, leads to saving time.

Product innovation can improve the firm's competitiveness, increase resource utilization efficiency, increase investment and sales profits, develop the latest market, and improve the firm image (Dangelico et al., 2010). Based on the research, De Cans Cans Services Sdn Bhd allows mass customization that offers many types of straws, enabling customers to customize products tailored to their tastes. The company also follows lean production principles to minimize waste. Based on Kaneku-Orbegozo et al. (2019), lean manufacturing techniques are the most successful improvement concepts that many companies can apply to eliminate waste and non-value-added activities related to manufacturing.

Customer responsiveness includes value-adding activities such as solving customers' problems (Matthyssens & Vandembemt, 2008), building relationships with customers (Storbacka & Nenonen, 2009), and customizing the offering (Schlegelmilch & Ambos, 2004). Based on the research, it measures how well a company can respond to and meet the needs of its customers. When customers receive what they need, it is valuable to be appropriate. De Cans Cans Services Sdn Bhd needs to fulfill their needs, knowing what they like and what drives them. To support with an example, De Cans Cans Services Sdn Bhd had created a booth for the Interpack event in Dusseldorf to create, promote, and sell their product or service to the public and existing customers to build relationships with customers.

As Pine et al. (1995) mentioned, a customized product cannot be delivered to the customer at the time of purchase. Since the customer initiates the design process, the customer must invest time in "designing" the product. Based on the research, the company would offer a discount to customers whose deliveries were late to show the company's value and waive the export fee to compensate the customer. To summarize the respondents' main point, De Cans Cans Services Sdn Bhd is a customer-driven

service industry based on paying great attention to finding out what customers want and helping them to solve it.

Besides, based on the discussion on leadership support, the researcher believed it could be provided to build effective relationships with employees and provide relevant resources to help them succeed. Cheung and Wong (2011) determine that supervisors who encourage and maintain cooperative interpersonal relationships can influence employees' engagement in the creative process by enhancing their self-efficacy. To support with an example, De Cans Cans Services Sdn Bhd encourages teamwork between all the staff and the department. The company enables collaboration among staff to increase performance as it has reduced feelings of being alone and increases staff involvement with jobs.

The current business opportunity for De Cans Cans Services Sdn Bhd is exporting paper straws globally. The company is poised for international growth and invites distributors, retailers, and partners to collaborate on expanding the paper straw to reach globally. Focusing on quality and sustainability, the company's products have gained recognition in the local market. Now, they seek partners to help them establish a presence in new regions. This opportunity is ideal for businesses with a strong distribution network and a commitment to sustainable practices.

In brief, the first research objective was achieved as the criteria for paper straw mass customization in De Cans Cans Services Sdn Bhd includes product variety, modular design, customer involvement in assembly, innovation ideas, responsiveness to customer needs, readiness for change, and leadership support.

5.3 The customers' and suppliers' influence on the paper straw mass customization in De Can Cans Services Sdn Bhd

This study's second research objective is to examine the customers' and suppliers' influence on paper straw mass customization in straw production. In that case, the effective mass customization of paper straws involves cooperation between suppliers and customers in De Cans Cans Services Sdn Bhd. The key components integrated with customers and suppliers include recognizing and adapting to customer preferences while closely collaborating with suppliers to ensure the availability of high-quality materials.

Based on the discussion of the qualitative findings in the previous chapter, the researcher can conclude that De Cans Cans Services Sdn Bhd building a customer relationship can drive iterative improvements and adjustments in the customization process. This may include addressing durability, texture, or other factors. As Koufteros et al. (2005) proposed, customer integration aims to assess customer needs and tailor internal activities to meet those needs. Referring to the discussion, customer integration in mass customization is important since it may help understand their needs to meet those needs effectively in a straw company that quickly adapts to changing customer needs and market trends. In the case of De Cans Cans Services Sdn Bhd is a customer-centric company that focuses on customers and has been truly listening to them to provide them with what they want.

As proposed by Petersen et al. (2005), supplier integration can be defined as the extent to which suppliers participate in activities and processes the firm had formerly done through customer relationships. In short, the researcher believed that collaboration between a company and its suppliers is essential to produce straw products to ensure a reliable supply of quality raw materials, enhance cost efficiency, and contribute to the overall resilience and sustainability of the supply chain. In the case study, De Cans Cans Services Sdn Bhd involving communication and follow-up to create a long-term relationship. This action can help De Cans Cans Services Sdn

Bhd to navigate the complexities of the straw product industry and meet the evolving needs of customers and the market.

Jitpaiboon et al. (2009) proposed that cooperative relationships are how a firm coordinates activity with suppliers and customers. Cooperative relationships result when a firm coordinates activity with suppliers and customers. De Cans Cans Services Sdn Bhd collaborates with a select few thrust suppliers rather than many. It aims to build solid and long-term relationships, ensure product quality and consistency, and achieve cost efficiencies. This positioning the company for success in a competitive market environment. To recap the key points made by respondents, the company aims to cultivate enduring partnerships, ensuring both customers and suppliers achieve shared expectations and contribute to a mutually beneficial and sustainable business relationship.

In brief, the second research objective has been achieved as the customers' and suppliers' influence on the paper straw mass customization in De Cans Cans Services Sdn Bhd are customer integration, supplier integration, and cooperative relationships (CRs).



5.4 Contribution of Study

This research discussed the criteria of mass customization and the customers' and suppliers' influence on the paper straw mass customization in De Cans Cans Services Sdn Bhd. The findings in the preceding chapters help the researcher gain insights into each criteria of mass customization and understand the customers' and suppliers' influence on paper straw mass customization. Therefore, this research benefits the researcher and the local straw industry by enabling them to deliver customized goods and services to the market to satisfy a specific customer's needs. This research study uses the seven criteria of mass customization as the basis. Below are the criteria of mass customization that the researcher studied before the interview session with De Cans Cans Services Sdn Bhd:

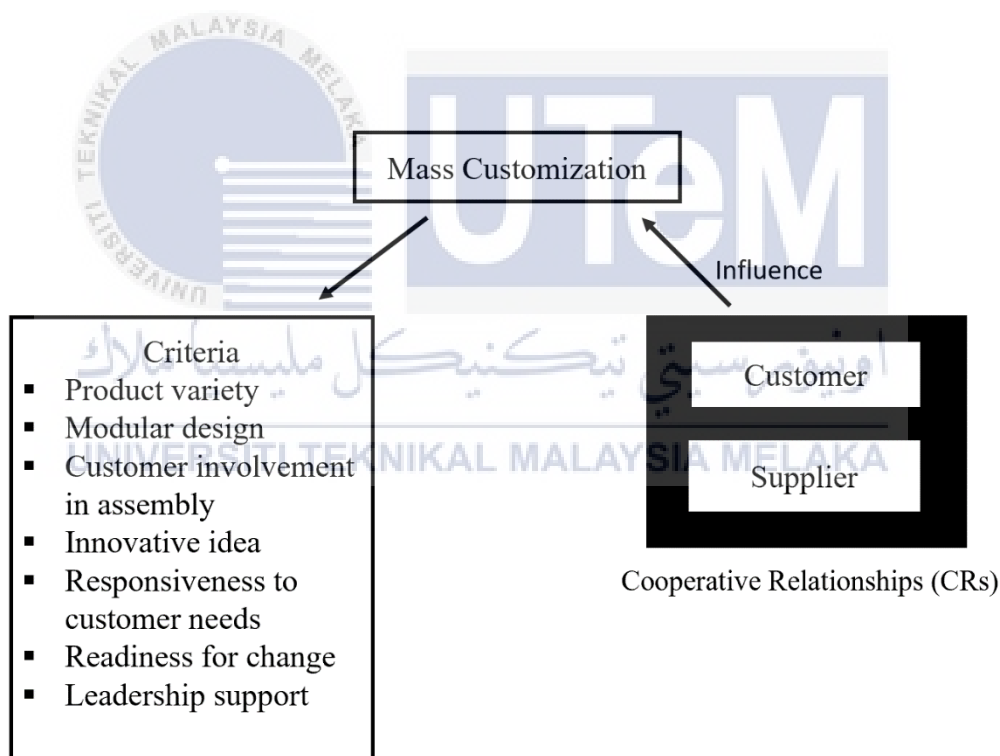


Figure 10: Criteria of mass customization and customers' and suppliers' influence on the paper straw mass customization

Source: Adel, H.M. et al (2019) and Jitpaiboon, T. et al (2013)

5.5 Future Recommendation

Last but not least, the researcher would like to propose recommendations for future research into this study since the researcher interviewed De Cans Cans Services Sdn Bhd's top management and staff. Researchers observe that cooperation and teamwork are essential to make the mass customization outcome successful. The mass customization trend is constantly changing, and the researcher needs to keep up by transforming the business into a movement as a case study.

Future researchers can compare review practices and mass customization based on this research. A successful paper straw product is because of the achievement of a business or an organization. Effective communication and collaboration among each department in straw production are essential to ensure a streamlined and efficient production workflow.

Lastly, this research may be implemented or extended to a related industry. For instance, the future researcher may conduct a comparative study in another sector of the sustainable product business, such as plastic spoons and forks. In addition, the researcher might examine the case study of identical products or services to evaluate mass customization.

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Appendix 3: Questionnaires

INTRODUCTION OF THE INTERVIEW

<< READ OUT TO RESPONDENT >>

Thank you for taking part in this interview.

This research aims to identify the criteria for paper straw mass customization and examine the customers' and suppliers' influence on paper straw mass customization in De Cans Cans Services Sdn Bhd.

By conducting the interview, I could discover more insights on mass customization and further generate proper findings for this research. All respondents will be asked questions based on the research topic and objectives during this interview.

I will jot down all your responses, and I request your permission to voice record the whole interview session to ensure the precision of your responses. I promise that everything recorded will be kept private, confidential, and solely for academic and research purposes.

Please feel free to express your answers and perspective throughout the interview. Should you have any questions or if you do not understand the questions, please do not hesitate to ask me. Likewise, please let me know if you feel uncomfortable or do not want to answer a specific question.

Lastly, the interview session will last approximately 30 minutes. Shall we begin our interview session now?

QUESTIONNAIRE:

1. Which are the most critical criteria in paper straw mass customization?
2. What are the most important criteria for mass customization?
3. Why this criteria is important?
4. How do you determine the paper straw mass customization criteria?
5. What is the purpose of the company identifying the criteria?
6. Which business mostly orders paper straws?
7. Why did customers choose your paper straw?
8. How does the company safeguard the straw in the warehouse?
9. What will influence the company's paper straw mass customization production?
10. Why does the company produce mass customization?
11. How does the company manage customer mass customization?
12. How can a company improve mass customization?
13. How do you maintain the machine to keep the process effective?
14. Why can customers influence the paper straw mass customization?
15. Why create customer value?
16. How can customer behaviour influence paper straw mass customization?
17. How do you integrate customers?
18. How far is customer integration interactive value-adding in mass customization?
19. Why is it important to have a good relationship with suppliers?
20. How do you effectively integrate suppliers?
21. How does a company link a firm with your customer or supplier to increase your relationship?
22. Who will coordinate the activity with the supplier and customer?

Appendix 4: Proof Interview Session with Respondents



Appendix 4.1: Photo with Respondent

Source: Proposed by Lee Xin Row

اونيورسيتي تيكنيكل مليسيا ملاك

UNIVERSITI TEKNIKAL MALAYSIA MELAKA



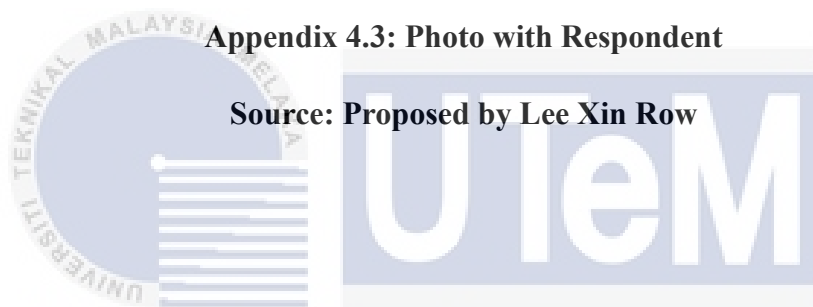
Appendix 4.2: Photo with Respondent

Source: Proposed by Lee Xin Row



Appendix 4.3: Photo with Respondent

Source: Proposed by Lee Xin Row



Appendix 4.4: Photo with Respondent

Source: Proposed by Lee Xin Row



Appendix 4.5: Photo with Respondent

Source: Proposed by Lee Xin Row



Appendix 4.6: Photo with Respondent

Source: Proposed by Lee Xin Row

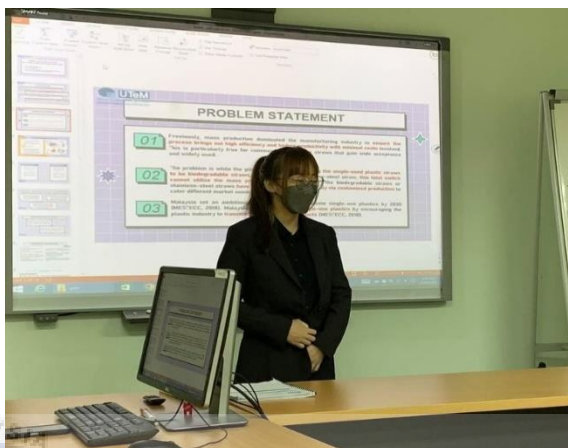


Appendix 4.7: Photo with Respondent

Source: Proposed by Lee Xin Row



APPENDIX 5: VIVA PSM 1 and PSM 2



Appendix 5.1: Photo VIVA PSM 1

Source: Proposed by Lee Xin Row



Appendix 5.2: Photo VIVA PSM 2

Source: Proposed by Lee Xin Row

Appendix 6: Request Letter to Collection Data



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Rujukan Tuan (Your Ref):
Tarikh (Date): 10 Julai 2023 /21 Zulhijjah 1444H

KEPADA PIHAK YANG BERKENAAN

السلام عليكم ورحمة الله وبركاته

Dan Salam Sejahtera,

Tuan/Puan,

MEMOHON MENDAPATKAN MAKLUMAT DAN KAJIAN KES UNTUK MENYIAPKAN TUGASAN PROJEK

Dengan segala hormatnya perkara di atas adalah dirujuk.


2. Adalah dimaklumkan bahawa pelajar berikut adalah merupakan pelajar Program Ijazah Sarjana Muda Fakulti Pengurusan Teknologi dan Teknousahawanan (FPTT), Universiti Teknikal Malaysia Melaka (UTeM):

No	Nama	No. Matrik	Kursus
1	LEE XIN ROW	B062010087	Ijazah Sarjana Muda Pengurusan Teknologi Dengan Keujian (Inovasi Teknologi) - BTMI

3. Pelajar tersebut perlu menyiapkan satu tugas bagi Projek Sarjana Muda (PSM II)-BTMU 4084 untuk tahun akhir pengajian. Sehubungan dengan ini pihak kami amat berbesar hati sekiranya pihak tuan dapat memberi peluang kepada pelajar berikut untuk menyempurnakan tugas tersebut di organisasi tuan.

"MALAYSIA MADANI"
"BERKHIDMAT UNTUK NEGARA"
"KOMPETENSI TERAS KEGEMILANGAN"

Saya yang menjalankan amanah,


RAFIDAH BINTI MD. DUSA
Timbalan Pendaftar Kanan
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SEBUAH UNIVERSITI TEKNIKAL AWAM

