EXPECTATION AND PERCEPTION OF HOMEOWNERS ON SERVICE QUALITY OF GREEN HOME PROPERTY DEVELOPERS

J. PATHMA PRIYA A/P JAYASINGHAM

UNIVERSITI SAINS MALAYSIA

2023

EXPECTATION AND PERCEPTION OF HOMEOWNERS ON SERVICE QUALITY OF GREEN HOME PROPERTY DEVELOPERS

by

J. PATHMA PRIYA A/P JAYASINGHAM

Thesis submitted in fulfilment of the requirements
for the degree of
Doctor of Philosophy

June 2023

ACKNOWLEDGEMENT

First and foremost, I am thankful to God for creating this path and for making me who I am today. I would like to convey my heartfelt gratitude to my supervisor, Associate Professor Dr. Mohd. Wira Mohd. Shafiei for his invaluable guidance, support and motivation throughout the completion of this thesis. Apart from that, I would like to thank all the staff from the Housing, Building and Planning (HBP) School and Institute of Postgraduate Studies (IPS) who had rendered their assistance whenever I needed them. Special thanks to my colleagues from IJM Construction Sdn. Bhd., whom never stopped trusting in me and encouraged me in all possible ways.

I am deeply indebted to my parents, sisters, brother in laws, nephews and nieces for their endless prayers and unwavering support. Lastly, I want to express my admiration to my husband and daughter who understood my demanding and hectic lifestyle juggling between work and study and continued to support me patiently. Without all these people, this journey would not be possible.

TABLE OF CONTENTS

ACKNOWLEDGEMENT ii

TABLE OF CONTENTS iii

LIST OF TABLES viii

LIST OF FIGURES x

LIST OF APPENDICES xi

ABSTRAK xii

ABSTRACT xiv

CHAPTER 1 INTRODUCTION 1

1.1 Introduction 1

1.2 Research Background 1

1.3 Research Problem 6

1.4 Research Questions 10

1.5 Research Aims and Objectives 10

1.6 Significance of the Study 11

1.7 Expected Contribution 11

1.8 Research Scope 12

1.9 Thesis Organization 14

CHAPTER 2 LITERATURE REVIEW 16

2.1 Introduction 16

2.2 Service quality 16

  2.2.1 Customer satisfaction 30

    2.2.1(a) Housing Development 32

    2.2.1(b) Logistics 34

    2.2.1(c) Banking 35

2.2.1(d) Education 36

2.2.1(e) Airline 37

2.2.1(f) Hospital 39

2.2.2 Factors influencing customer satisfaction 40

2.3 Green Agenda in Malaysia 40

2.3.1 Green Initiatives in Malaysia 42

2.3.2 Green Building in Malaysia 43

2.3.2(a) Incentives for Green Building 47

2.3.3 Green Marketing 48

2.3.3 Green building benefits 50

2.4 Servqual model and instrument 51

2.4.1 Servqual dimensions 53

2.4.2 Servqual gaps 53

2.4.3 The Servqual Method 55

2.5 Hypothesis Development 58

2.5.1 Tangibles 59

2.5.2 Reliability 60

2.5.3 Responsiveness 61

2.5.4 Assurance 62

2.5.5 Empathy 62

2.6 Summary 63

CHAPTER 3 RESEARCH METHODOLOGY 65

3.1 Introduction 65

3.2 Research Philosophy 65

3.3 Research Design 66

3.4 Research Method 66

3.4.1 Research Objectives Methodology 67

3.5 Data Collection 68

3.5.1 Primary Data 68

3.5.2 Secondary Data 69

3.6 Sampling data 69

3.6.1 Population objective 70

3.6.2 Sampling Frame 70

3.6.3 Sampling Method 71

3.6.4 Sampling Procedure 71

3.6.5 Sampling Size 74

3.7 Research Instrument 76

3.7.1 Questionnaire aspiration 77

3.7.2 Questionnaire design 78

3.7.3 Pilot test 80

3.8 Construct measurement 81

3.8.1 Origin of construct 81

3.8.2 Data scale of measurement 83

3.9 Data Processing 84

3.10 Questionnaire checking 87

3.11 Data Analysis 87

3.11.1 Descriptive Analysis 88

3.11.2 Reliability test 89

3.12 Test for Normality 89

3.13 Summary 90

CHAPTER 4 ANALYSIS AND RESULTS 91

4.1 Introduction 91

4.2 Analysis and assessment method 92

- 4.2.1 Service quality framework 92
- 4.2.2 Data collection based on questionnaires 92
- 4.2.3 Service quality computation and decision 94
- 4.2.4 Presentation and interpretation of results 95

4.3 Statistical Procedure 103

- 4.3.1 Relaibility test 103
- 4.3.2 Test for Normality 105
- 4.3.3 Check for Skewness and Kurtosis 106
- 4.3.4 Transformation of Data to Obtain Normality Using Log 10 107
- 4.3.5 Non-Parametric Test 107
  - 4.3.5(a) Analogue of parametric and non-parametric test 108
  - 4.3.5(b) Wilcoxon's signed rank test 108
  - 4.3.5(c) Kruskal-Wallis test 110
  - 4.3.5(d) Friedman test 113
  - 4.3.5(e) Spearman's correlation coefficient 114

4.4 Summary 116

CHAPTER 5 FINDINGS AND DISCUSSIONS 118

5.1 Introduction 118

5.2 Recapitulation of the Findings 118

- 5.2.1 Service Quality Gap Discussion 124
- 5.2.2 Hypothesis Discussion 130
  - 5.2.2(a) Tangibles 130
  - 5.2.2(b) Reliability 130
  - 5.2.2(c) Responsiveness 131
  - 5.2.2(d) Assurance 131
  - 5.2.2(e) Empathy 132

5.3 Summary 133

CHAPTER 6 CONCLUSION 135

6.1 Introduction 135

6.2 Main Findings 135

6.3 Limitations of the Study 136

6.4 Recommendations 137

6.5 Study Contribution 138

  6.5.1 Theoretical Contributions 138

  6.5.2 Practical Contributions 141

6.6 Concluding Remarks 144

REFERENCES 146

APPENDICES

LIST OF TABLES

Page

Table 2.1 Table for Summary of Type of Service Quality Tool (Various Researches) 26

Table 2.2 Table for Service Quality in Various Industry (Various Researches) 32

Table 3.1 Table for Objectives relationship to the methodology 67

Table 3.2 Table for Determining Sample Size for a Limited Number of Population 73

Table 3.3 Table Formula for Determining Sample Size for a Finite Population 74

Table 3.4 GBI Projects in Malaysia by State/Territories 75

Table 3.5 Sample Size Measurement from a given Population 76

Table 3.6 Construct Tangibles 81

Table 3.7 Construct Reliability 82

Table 3.8 Construct Responsiveness 82

Table 3.9 Construct Assurance 82

Table 3.10 Construct Empathy 83

Table 3.11 Summary of Likert Scale Used to Measure Variables 84

Table 4.1 Respondents Demographic Profile – Gender 95

Table 4.2 Respondents Demographic Profile - Age 95

Table 4.3 Respondents Demographic Profile - Race 96

Table 4.4 Respondents Demographic Profile - Professional 96

Table 4.5 Calculation of Servqual Scores (Tangibles) 97

Table 4.6 Calculation of Servqual Scores (Reliability) 97

Table 4.7 Calculation of Servqual Scores (Responsiveness) 98

Table 4.8 Calculation of Servqual Scores (Assurance) 99

Table 4.9 Calculation of Servqual Scores (Empathy) 99

Table 4.10 Calculation to obtain unweighted Servqual score 100

Table 4.11 Importance given to each dimension 100

Table 4.12 Servqual weighted score 101

Table 4.13 Comparison between Unweighted and Weighted Servqual score ... 103

Table 4.14 Cronbach Alpha (Expectation q0001_0001 to q0022_0001) 104

Table 4.15 Item-Total Statistics (Expectation q0001_0001 to q0022_0001) 104

Table 4.16 Cronbach Alpha (Perception q0023_0001 to q0044_0001) 104

Table 4.17 Item-Total Statistics (Expectation q0023_0001 to q0044_0001) 105

Table 4.18 Test of Normality 106

Table 4.19 Statistics (Check for Skewness and Kurtosis) 106

Table 4.20 Statistics (Transformation of Data to Obtain Normality Using Log10 107

Table 4.21 Analogue of parametric and non-parametric tests (Ali Z, Bhaskar SB, 2016) 108

Table 4.22 Wilcoxon’s Signed Rank Test (Descriptive Statistics) 109

Table 4.23 Wilcoxon’s Signed Rank Test (Ranks) 109

Table 4.24 Wilcoxon’s Signed Rank Test (Test Statistics) 110

Table 4.25 Kruskal-Wallis Test (Independent-Samples) 111

Table 4.26 Kruskal-Wallis Test (Hypothesis Test Summary) 111

Table 4.27 Friedman’s Test (Test Statistics) 114

Table 4.28 Spearman’s Correlation 116

LIST OF FIGURES

Page

Figure 2.1 Customer Window Quadrant (González, M., E. et al., 2004) 19

Figure 2.2 Customer's response in case of satisfaction and disatisfaction (Leiks and Heki, 2005 p.86) 33

Figure 2.3 Flow Chart of Housing Development Progress (The Housing Delivery System in Malaysia "Opportunities & Challenges" Michael KCY, 2014) 49

Figure 2.4 Determinants of Service Quality (Parasuraman et al., 1988) 55

Figure 2.5 Conceptual Framework used in this Research 59

LIST OF APPENDICES

Appendix A Questionnaire

Appendix B Pilot Study _ Reliability Test

Appendix C Pilot Study – Testing for Normality

Appendix D Pilot Study – Check for Skewness and Kurtosis
Pilot Study – Transformation of Data to Obtain Normality Using

Appendix E Log10

Appendix F Pilot Study – Frequencies Check after Log10 Transformation

Appendix G Pilot Study – Non-Parametric Tests

Appendix H Actual Study – Reliability Test

Appendix I Actual Study – Test for Normality

Appendix J Actual Study – Check for Skewness and Kurtosis
Actual Study – Transformation of Data to Obtain Normality using

Appendix K Log10

Appendix L Actual Study – Frequencies check after Log10 Transformation

Appendix M Actual Study – Non-Parametric Test

JANGKAAN DAN PERSEPSI PEMILIK RUMAH TERHADAP KUALITI PERKHIDMATAN PEMAJU HARTANAH RUMAH HIJAU

ABSTRAK

Matlamat Pembangunan Mampan (SDG) telah menjadi keutamaan dalam pembangunan Malaysia dan selaras dengan Agenda 2030 untuk Pembangunan Mampan. Adalah jelas bahawa 29.4% pelepasan gas rumah hijau (GHG) telah dikurangkan pada akhir tahun 2016 berbanding dengan intensiti pelepasan pada tahun 2005. Kualiti perkhidmatan pemaju hartanah rumah hijau (tidak ketara) disokong oleh andaian penting terhadap persepsi dengan jangkaan mereka. Sepanjang pembangunan dan jangka hayat rumah hijau diketahui menggunakan air, tenaga dan bahan binaan dengan cekap. Pemaju hartanah yang membina dan mengurus rumah hijau sehingga tamat tempoh liabiliti kecacatan perlu memahami jangkaan dan persepsi pelanggan mereka dari aspek kualiti perkhidmatan. Aspek perkhidmatan pelanggan harus diperiksa dengan teliti, dengan instrumen Servqual kerana ia boleh membantu dalam menentukan sama ada terdapat sebarang jurang dalam perkhidmatan yang disediakan. Dalam penyelidikan ini, analisis kualiti perkhidmatan telah dijalankan ke atas pemilik rumah yang tinggal di rumah hijau yang dibina oleh pemaju hartanah rumah hijau di Pulau Pinang. Bagi menilai kualiti perkhidmatan, satu metodologi yang telah dibangunkan oleh Parasuraman, Zeithaml & Berry pada tahun 1985 telah diguna pakai yang dikenali sebagai Servqual. Rangka kerja Servqual telah digunakan dalam pelbagai industri untuk mengukur jurang antara jangkaan dan persepsi pelanggan. Kaedah yang ditetapkan mempunyai 22 pernyataan yang termasuk dalam 5 dimensi (RATER). Pembolehubah yang digunakan dalam kajian ini ialah ketara, kebolehpercayaan, responsif, jaminan, dan empati. Responden diminta menjawab setiap pernyataan dari dua aspek kualiti perkhidmatan iaitu jangkaan dan persepsi. Secara amnya, Servqual membolehkan syarikat menilai kepuasan pelanggannya terhadap perkhidmatan yang disediakan dan untuk menangani jurang jika ada. Berdasarkan kajian ini, ternyata jangkaan pelanggan adalah lebih tinggi daripada persepsi mereka terhadap pemaju hartanah rumah hijau. Ia juga terbukti bahawa jurang perkhidmatan yang positif menunjukkan kurang kepuasan pelanggan dalam kualiti perkhidmatan oleh pemaju hartanah rumah hijau. Untuk menjadi lebih daya saing, pemaju hartanah rumah hijau mesti melihat melangkaui membina rumah berkualiti dan berusaha untuk menyediakan perkhidmatan pelanggan yang terbaik dan terus menambah baik untuk terus kekal dalam pasaran yang kompetitif.

EXPECTATION AND PERCEPTION OF HOMEOWNERS ON SERVICE QUALITY OF GREEN HOME PROPERTY DEVELOPERS

ABSTRACT

Sustainable Development Goals (SDGs) has become Malaysia's development standing and in line with the 2030 Agenda for Sustainable Development. It is evident that 29.4% greenhouse gas (GHG) emission was reduced at the end of 2016 in comparison with emission intensity in 2005. A green home property developer's service quality (non-tangible) is supported by the essential assumption of measurement by comparing their perceptions with their expectations. Green homes are known to utilise water, energy and construction materials efficiently throughout its development and lifespan. Property developers who build and manage green homes until the end of defect liability period face need to understand their customer's expectations and perceptions from service quality aspect. Customer service aspect should be thoroughly examined, with the Servqual instrument as it can assist in determining if there are any gaps in the service provided. In this research, service quality analysis was conducted on homeowners who lived in green homes which was built by a green home property developer in Penang. In order to evaluate the service quality, a methodology that was developed by Parasuraman, Zeithaml & Berry in 1985 was adopted which is known as Servqual. The Servqual framework has been used in various industry to measure the gap between customer's expectations and perceptions. The method established has 22 statements which was falls into the 5 dimensions (RATER). The variables used in this study were tangible, reliability, responsiveness, assurance, and empathy. Respondents were asked to answer each statement in terms of two aspects of the service quality which are expectation and perception. In general, Servqual enables a company to assess its customers' satisfaction in regard to the service provided and to address the gap if any. Based on the research findings, it is evident that customer’s expectation was higher than their perception towards the green home property developer. It was also proven that the positive service gap implies lack in customer satisfaction in service quality by the green home property developer. In order to gain a competitive edge, a green home property developer must look beyond quality homes and strive to provide the best customer service and continuously improve in order to sustain in the competitive market.

CHAPTER 1

INTRODUCTION

1.1 Introduction

Research background, research problems, research questions, aims and objectives, and significance of the study are the main elements that are discussed in this chapter. Besides, expected contributions, scope of the study and an overview of the study are also presented.

1.2 Research Background

Customer satisfaction is becoming increasingly important in order to better manage customer relationships, but it appears to be a significant challenge in practise. Customer loyalty maintains a company’s financial status and viability. Customer loyalty is defined as sincerity in buying likeable products or services repeatedly, even when there are conditional determinants and commercialism that might lead buyers to change their minds (Kotler and Keller, 2012). The first step to establishing customer loyalty is customer satisfaction. In this case, customers are seen as an important part of any businesses and satisfaction refers to the motivation to purchase products and services on a regular basis (Kim et al., 2008). Enhancing and, more importantly, maintaining the loyalty of loyal customers is critical to a company's competitiveness (Deng et al,. 2010). It is evident that customer satisfaction leads to the increase in customer loyalty (Liao and Wu, 2009). By maintaining customer’s satisfaction, it influences greatly on the home purchase, which means word of mouth will bring more purchasers to the property developer (NAHB, 2000). Apart from delivering a quality home, efficient service during the 2 years defect liability period, it is also vital that the first impression given by the salesperson from the property developer's firm is impactful.

Property development industry had to wade difficulties, especially in getting customer's confidence during ecomony slow-down as purchaser's market is categorised by increased number of houses, lack in customer's trust in property developer and customer's financial problems. Business strategy had to be changed as the demand from home buyers increases, especially with their knowledge in property development become better (Kerber, 2000). Home owners must be provided with comfort, safety, security, privacy and health among other services as highlighted by The Ministry of Housing and Local Government in Malaysia (MHLG) (Manuel Jose and Pedro Simoes, 2003). Many research have been carried out pertaining customer satisfaction in housing project around the globe including Malysia (Jaafar, Hasan, Mohamad, and Ramayah, 2005); Australia (Forsythe, 2007); Tanzania (Nguluma, 2003) and China (Yang and Zhu, 2006).

There are many ways customer can assess a property developer, it ranges from service rendered the day they enter the property developer's office to make a house purchase, all the way up to the day their defect liability period ends and continues to management of their property. In addition, many types of customer satisfaction had been carried out to assess a customer's satisfaction towards a property developer, such as Customer Satisfaction Survey, Customer Satisfaction Score (CSAT), Net Promoter Score (NPS), Customer Effort Score (CES), Social Media Monitoring and Things Gone Wrong. Nevertheless, one of the most systematic and strategized method explored was Servqual. Though this method was usually adopted in service industry such as hospital, bank, education instituition and airline, property development was seen as an industry that not only sell product but it comes with before, during and after sales service. Assessing the product (house) quality can be done in many ways which covers the quality of house built by the property developer.

A product is categorized as a tangible item that is available for purchase, while a service is categorized as an intangible item, whereby it is an output provided by one or more individuals (2015 to 2021 CFI Education Inc.). Eventhough it seems like both product and service are differentiated by tangibility, but it is also important to remember that in most cases services are intangible, but products are not always tangible. Products and services are closely aligned as majority of products in the market carries an element of service. An example of this would be, when a consumer buys a car, the product comes with a lot of other service responsibilities, such as tune-up and maintenance. Nonetheless, there is a clear difference between the two concepts, and it's imperative for one to understand their working definitions.

It is rather simple to assess the quality of a tangible product because it is visible and touchable. A good example would be when a customer wants to purchase a home, he/she will inspect the home at every corner to see if it is built properly. While on the other hand if the purchaser is getting a service from the salesman who is selling a home, he/she can't feel or try out before buying the house. Giant construction or property development companies typically has a sales team that represent them in selling their product/house. They usually become the first point of contact to the customer. The salesperson or sales team needs to understand and appreciate the house that they are selling in order to satisfy the customer before a large purchase can get through. It is regrettable that most companies do not recognize and support the motion of gettting a salesperson that truly understands and appreciate the home that they sell (NAHB, 2003).

Increased environmental pollution, energy crisis, and climate change have all gotten a lot of attention from around the world (EPA, 2008). Sustainable development has been explained in many terms and meanings and it has also appeared in different scenarios and circumstances (Hill, 2003).Greenhouse gas emission namely CO2 and methane are largely emitted by human industrial practices. As a result, climate change takes place such as thunderstorm, draught and increase heat (He, Q, Siliman, 2019). It is estimated that temperature could rise up to 10 °C due to human activities. Globalwarming effects are heavy downpour, draught, water levels to rise and floods in many countries. Natural resources are depleting due to heavy usage especially in densely populated countries (Goldewiik, Beusen, Janssen, 2010).

Increased population and rapid use of natural resources are relatable and due to its effect on climate change, nations are moving towards a sustainable culture (UN, 2020). Some of the methods of sustainable development are as follows:

1. Eradicating poverty
2. Same living standards
3. Basic need satisfaction

~~4.~~ Sustainable poitical practices

While the above is in place, damage to the nature must be avoided in the future for short-term gain by combining development projects. According to McGraw-Hill (2008), billions of transactions encompassing a workforce of 120 million people who work in the industry which generates $4.6 trillion construction annual output and eventually contributing 8-10% of the world's GDP (Gross Domestic Product). Construction companies on the other hand, comprise of 13.4% of the $13.2 trillion US GDP in the United States, whereby 6.1% GDP is contributed during which commercial and residential buildings are constructed (AHKS, 2011). General building and special trade works are the two main elements of a construction industry in Malaysia. The first part which is the general building is divided into residential building, non-residential building and civil works. Activities of metal works, electrical works, and others of that nature are classified under part two (AHKS, 2011).

In cities, green buildings can be constructed as these are the areas which require sustainability and environmental control. Green buildings are known not only to increase occupants' health but also reduce harmful impacts on their lives. Green buildings focus on five integral elements which are site planning that is sustainable, efficient water usage, efficient energy usage, reuse of materials/resources and finally indoor air quality upgrade as well as health improvement. Green building design and construction practices address; sustainable site planning, safeguarding water and water efficiency, energy efficiency, conservation of materials and resources, and indoor environmental quality. Green buildings in Malaysia are rated through the Green Building Index (GBI) – the nation's first comprehensive rating system for evaluating the environmental design and performance of buildings, towns and factories. GBI Rating ranges from Platinum (86-100), Gold (76-85), Silver (66-75) and Certified (50-65) (https://www.greenbuildingindex.org).

Despite the academic focus on green issues, the market value of various types of green products has not increased to the expected level over the last ten years

(Brécard et al., 2009; Peattie and Crane, 2005; Rex and Baumann, 2007; Sheth et al., 2011). The reason for the poor performance of green products is that customer expectations were not met, resulting in a gap between realisation and anticipation (D'Souza et al., 2006 and Horie et al., 2005). First of all it is important to recognize the research gap to understand why past research had not looked into the reasons as to why suppliers did not meet customer's expectations, what is bothering the customers and finally how to bridge the gap. By knowing the differences between anticipation and realization of green product customers, the initial move is attained as this is deemed as significant in advancing the green products.

Even though there are numerous elements that green products offer, many buyers are unwilling to sacrifice product quality in exchange for green attributes (Lin et al., 2013; Peattie, 2001 and Rex & Baumann, 2007). In fact, green attributes that the customers demand do not sync with the real buying attitude (Lin et al., 2013; Prakash, 2002). In order to fulfill the customer's needs, one must first know which feature a customer requires, what are the anticipation and realization of the customer and how the product owners can bridge the gap Using Servqual to assess the degree of contrast between anticipation and realisation is very convenient because it provides a very good quality gauge (Jiang et al., 2000). In short, Servqual tool has been adopted in order to establish a tool to assess green products and measure the difference in buyer's anticipation and realization of the green homes.

1.3 Research Problem

Growth rate of 6.2% per annum was recorded from the year 1971 till 2015 in the Malaysian economy, but in the year 2016 to 2020, it has gone down to 2.7%. Nevertheless, the growth was considered acceptable in comparison with other countries as it has upgraded living standards and reduced the gap of inequality (Twelfth Malaysia Plan, 2021-2025). Sustainable Development Goals (SDGs) has become Malaysia's development importance and in line with the 2030 Agenda for Sustainable Development. More than 1.16 million units of low-cost houses were built from 1999 to 2020 as an effort in upgrading the living standards of low-income groups in Malaysia. It is also evident that 29.4% greenhouse gas (GHG) emission was reduced at the end of 2016 in comparison with emission intensity in 2005. The Ministry of Environment and Water and Ministry of Finance have produced a ratio of 20.7% within the year 2016 to 2019 on selected green products and services based on average proportion of government green procurement (GGP) to total government procurement, which exceeds the target of 20%. These initiatives portray on Malaysia's effort in building more green homes.

Green buildings are designed and required to contribute to positive impact to the environment and users. Studies shows that almost of half of the CO_2 emissions are contributed by buildings, especially in urban development it goes up to 70% of the human population by 2050. Green buildings are known to utilise water, energy and construction materials efficiently throughout its development and lifespan. Green rating strategy was established to compute socio-environmental impact. Green Building Index (GBI) was one of the systems that recognise and accomplish material usage of a building. GBI is owned and managed in Malaysia and used to give green rating for building in order to encourage sustainable development prompt green future for Malaysia.

Designs that are eco-friendly and construction methods that promote sustainability give positive impact to the environment and residents. Enhanced air and water quality, reduced water and energy usage as well as less use of natural resources are some of the green building effects. Return on value for green certified building are reduced energy and maintenance cost in long term. Some of the projects that gone through the green certifications are University of Technology Sarawak (Platinum Award), Nucleus Tower, Sunway City Iskandar Putri, IKEA Distribution Centre Malaysia, Tropicana Gardens Mall and the Energy Commission Diamond Building in Putrajaya.

Property developers, who are constantly under pressure to prove they are consumer centric, deliver regular improvements in quality achievement. Despite monetary and manpower constraints, variations in quality status must be managed by understanding and measuring customer expectations. This information then assists a reputable property developer who constructs green homes and manages it in recognizing profitable methods, determining differences in service quality and giving importance according to priorities. In order to excel and be competitive, focus must be given to customer satisfaction whereby it will increase profit and strengthen the market share. This is evident in Real Estate or Property Development industry as a company's progress very much depends on customer satisfaction and word of mouth (Narayanan & Vinoth, 2022).

Property developers who build and manage green homes until the end of defect liability period face challenges in meeting their customer's expectations. The customer service aspect should be thoroughly examined, with the Servqual instrument assisting in determining if there are any actual or perceived gaps in the service provided. Plenty of research have been carried out on green evolution and commerce aspect of green since customers are aware of the ecology and global environmental governance. The reason for this is because many green products are unable to convince the customers due to the mismatch between expectation and perception.

In the absence of objective measures for assessing service quality, Berry, Zeithaml, and Parasuraman developed a multiple-item scale instrument (SERVQUAL) for measuring customer perception of service quality. SERVQUAL is considered robust in different environments (Johnston and Barnes, 2008). The purpose of SERVQUAL is to measure current service quality with diagnostic abilities. It is not predictive. This assessment model was used in this study with some modifications to reflect the housing industry domain. It is worth to mention here that this satisfaction gap has been given less attention in previous studies, especially pertaining to green home property developer's service.

As an outcome, this research mimics a service quality model to address the gap between customer expectation and perception. Servqual tool is the service quality model that has been adopted in this research. It has been modified to suit to the green home property developer's environment while focusing on service quality delivered by the property developer to their customers. Fundamental characteristics of product superiority and acknowledgement by relevant bodies related to green building are taken into consideration in developing this mimic model. By using this proposed instrument, it is hoped that the gap between customer expectation and satisfaction pertaining to green home property developer will be addressed.

1.4 Research Questions

There are three prime objectives identified in this research. These objectives are essential to answer the research questions. The objectives of this research are as follows:

1. What is homeowners' perception towards green home developers in Malaysia?
2. What is homeowners' expectation towards green home developers in Malaysia?
3. What is the gap that exists between homeowners' perception and expectation towards green home developers in Malaysia?

This research was developed with customer satisfaction towards green home property developer as the main focus. In order to identify the gap between customer's expectation and perception towards green home property developers in Malaysia, questionnaires developed using the Servqual framework was distributed to all the green home owners in Penang particularly.

1.5 Research Aims and Objectives

1. To ascertain homeowners' perception towards green home developers in Malaysia.
2. To ascertain homeowners' expectation towards green home developers in Malaysia.
3. To ascertain the gaps between homeowners' perception and expectation of green home developers in Malaysia.

The aim of this study is to adopt the Servqual model by using the five attributes which are Reliability, Assurance, Tangible, Empathy and Responsiveness to assess the gaps between homeowners' expectations and their perceptions towards green home developers. The questionnaire has adopted the essence of the attributes but tailored to meet the property development industry specifically in green homes.

1.6 Significance of the Study

Measuring customer satisfaction among homeowners will help green home property developers in promoting their homes and eventually ease their marketing strategy in selling their homes and support government initiative in going green. By assessing customer's level of fulfilment in a product or home, property developer is able to gauge the level of customer satisfaction that the company give importance and eventually work on continuous improvement.The research will not only gather information on the expectation and perception of green home buyers but also bridge the gaps that exists.

1.7 Expected Contribution

This study is important in providing valuable information to green home property developers in improving their services in delivering green homes. It will also provide an insight on actual customer's perception versus expectation of green homes. Property developers will be able to gain customers' trust and, as a result, increase customer satisfaction and future sales of their green homes by improving on elements that cause poor customer ratings. It is important for property developer to provide good customer satisfaction to homeowners as service to customers who are ready to enrich one another as a measure to stay relevant in a green and sustainable market condition.

This study is anticipated to make three main contributions to the literature within the realm of customer satisfaction of green homes. In any businesses, satisfying customers needs is a vital aspect of marketing; it not only help a firm to measure customer loyalty and maintaing them as repeating customers, but it also facilitates the detection of disatisfied customers, curtail customer deprivation and lessen the spread of destructive rumours which in return help a company to boost sales and gain profit. The first expected significant contribution from this research is recognition of the homeowners expecation towards the green home property developer. Second, it looks into the homeowners perspective on green home property developer. Lastly it identifies the gap. The contribution also continues to support government initiatives in building more green homes and sustainability effort in saving the human mankid and the world.

It is expected that this study will enable the green homes property developers to understand the level of customer satisfaction towards the service that they provide. Besides that, they are going to be ready to realize customer's perceptions about their firm. In the end, this study will enable rewarding process of a company moving to a higher level of customer service, appreciating consumer feedback, and maintaining a good quality practise. In summary, this research provides results in the gap that exists within expectation and perception of the homeowners which is ready to assist green home property developer to research and improve their service.

1.8 Research Scope

The research focus was to assess the green home property developer's service from homeowner's perspective. Green home mentioned during this study refers to the construction of houses designed to be environmentally sustainable. Property developer in this research means a company that develops green homes in Malaysia. This research will cover the following aspects:

a) Data collection from green homeowners who have lived, purchased or rented a green home on their perceptions towards the property developer's performance in Penang.

b) Data collection from green homeowners who have lived, purchased or rented a green home on their expectations towards the property developer's performance in Penang.

c) Analyse the data collected from green homeowners with the focus to obtain the gap that exists between the perception and expectation towards the property developer in Penang.

It is worth mentioning here that the green homeowners identified in this research are people that purchased the green homes in Penang from a particular property developer that has 4 certified green homes as of 15th December 2014. Questionnaires were designed using Servqual method as a basis considering the 5 main attributes and modified to suit the green home property development industry. Green home property developer identified in this research is Jelutong Development Sdn Bhd, a subsidiary of IJM Land Bhd, who have achieved four GBI certifications for their projects which are The Light Point, The Light Linear, The Light Collection1 and The Light Collection 2.

Constraints for upcoming research must be taken seriously although the current study could make a compelling development in this prevailing research. Due to Personal Data Protection Act (PDPA), it is against the Research Ethics to urge details of the buyers which hampered the data analysis and discussion chapter of this study.

Demographic data of the customers were obtained in numbers and not accessed directly from the customers as shown clearly in the questionnaire. Property developers' unwillingness to open-up over the quality of their green homes has also limited the access to obtain thorough insights from various developers, with only one developer identified as as they built 5 out of 9 GBI certified green homes in Penang from 15th December 2013 to 15th December 2014 (Refer to Table 3.3). A total of 75 green certified homes were built up to 15th December 2014 and Penang constitutes 12% of the green homes in Malaysia. Penang was chosen as the sole region due to the developer's nature of business and geographical positioning, as Penang represents 12% and the developer built 55.56% of the green homes in Penang and it provided a good representation of the developer and Malaysia's green home as a whole.

1.9 Thesis Organization

The current study is divided into five chapters. The introduction on the foundation of the study is presented in Chapter 1. It provides details about the history of the research, research inquiries to be answered, research objectives to be achieved and scope of study. Chapter two provides the review of the literature on customer satisfaction generally, globalization, green homes and products as well as the application of Servqual instrument in other industries. Besides, the concepts that are used throughout this study are also defined in this second chapter. The third chapter delves into the specifics of the data collection methods used, as well as how the relevant instruments were designed and implemented in the industry. It also goes into detail about the analysis of quantitative data, but only because of the method used to analyse non-parametric data. The results of the investigation and examination obtained from the hypothetical model are presented in Chapter 4. Chapter 5 provides thorough discussion on the consequences of the contextual investigation. The thesis ends with Chapter six which summarises and concludes key findings and recommendations for the future studies.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

Past literatures regarding green home have not probed into the gap between customer’s perceptions and expectations. Thus, it is essential to present types of service quality, evolution of green building in Malaysia and instrument which are related to the evaluation of green home owners' satisfaction. Previous studies using the Servqual method in various industries are reviewed in this chapter, as well as their significant contributions to understanding customer satisfaction.

2.2 Service quality

For the past 20 years, the evolution of quality excellence and its assessment has attracted the attention of researchers. Two main ideas to assess service quality have been established by the American and the European during this period (Kang & James, 2004). It was purported that experts usually embrace one from the two main ideas in their primary endeavour (Brady & Cronin, 2001). Many different definitions of service quality have been proposed by researchers, and one of them is that service quality is defined by conformance to specifications (Ahmad, Siti, Norazman, Hishamudin & Ahmad, 2004). There are two views to quality, tangible (product and its physical characteristics) and subjective (values that the customer labels to the product) according to Shewhart (Evans and Lindsay, 2008. A critical shortcoming of this approach is that it ignores the possibility of a mismatch between house specifications and customer needs.

The assessment of customer satisfaction usually has adopted Customer Satisfaction Index (CSI) models. CSI is an evaluation system based on customer, and it measures the quality of service or product according to customer consumption experience. Therefore, CSI has been used to assess the performance of industries. Additionally, American Customer Satisfaction Index (ACSI) has provided a basic framework for many other index models created elsewhere in the world (Bruhn & Grund, 2000; Eklöf & Westlund, 2002; Martensen, Gronholdt, & Kristensen, 2000).

Customer satisfaction is characterized by the differential model as a result of the comparison of individual expectations experienced during use of the product. On the contrary, Huefner et al. (2000) described model of possible customer reactions is labelled as the Hirschman model. This model assumes that customer response not necessarily comes from every positive or negative customer experience. The customer has the opportunity to respond in an active or a passive way. Other model of five contributory factors of unsuccessful customer service - GAP Model of Service Quality analyses which causes result in the difference between customer expectations and perceived differences. The range in customer requirements according to their relevance to the satisfaction are basically defined in two dimensions. One is the degree of fulfilment of customer requirements and the other is degree of customer satisfaction adopting Kano model. The analysis is primarily focused on finding variables that customer considered mandatory and attractive for the product (Loučanová et al., 2014). In addition to customer satisfaction, companies must track the importance of individual parameters. Later, these parameters will be applied into the Customer Window Quadrant (Figure 2.1) and represent a complete picture of customer requirements and satisfaction in four quadrants as:

- Motivators (the customer wants it and does get it)
- Declarative characters (the customer wants it and does not get it)
- Saving opportunities (the customer does not want it and I does not get it)
- Reinvested characters (the customer does not want it and gets it anyway)

If some of the satisfaction features shows at the upper left quadrant several times, it means a call for immediate improvement. However, if any of the features is located at the lower right quadrant of the "customer does not want it and gets it anyway", responsible workers should ask themselves whether it might be advisable to reduce the cost of providing such features and functions that the customer doesn´t want (Šalgovičová, 2006). Identification of customer satisfaction is an essential way to satisfy the customer needs, without which we would not know what the customer really wants. This concept defines the role of companies and describes how to understand customer. Eventually, companies seek to develop and introduce new products that meet customer needs at a higher level than the competition, thus offering competitive products in the market (Tokarczyk, Hansen, 2006).

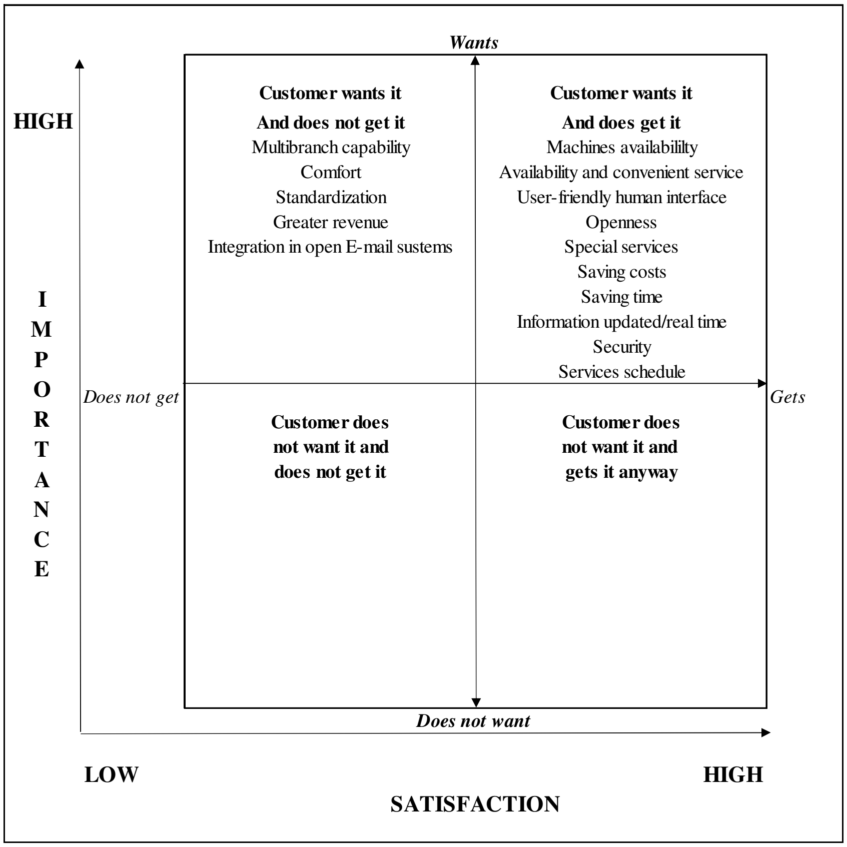
Wants
HIGH
IMPORTANCE
Customer wants it
And does not get it
Multibranch capability
Comfort
Standardization
Greater revenue
Integration in open E-mail sustems
Customer wants it
And does get it
Machines availabililty
Availability and convenient service
User-friendly human interface
Openness
Special services
Saving costs
Saving time
Information updated/real time
Security
Services schedule
Does not get
Gets
Customer does not want it and does not get it
Customer does not want it and gets it anyway
Does not want
LOW
HIGH
SATISFACTION

Figure 2.1: Customer Window Quardrant (González, M., E. et al., 2004)

Several approaches have been proposed to model customer satisfaction in different domains (Dawes et al., 2020; Hill & Brierley, 2017; Koklic et al., 2017; Zeinalizadeh et al., 2015). Yet ironically, machine learning based customer satisfaction modelling is not a straightforward process. This is due to the challenge in acquiring sufficient customer satisfaction data as the ground truth. In market research practices, collecting survey data are prohibitively expensive and nearly impossible to obtain from all current customers. More importantly, the response rates from customer satisfaction surveys are very low (Mellahi & Harris, 2016). A biased result in statistical analysis will appear if the salient features of non-respondents are completely ignored (Valle, 2016). Despite the availability of various forms of survey guidelines on sample size and follow-up procedures on non-respondents, the modelling consequences of non-respondents can be significant. By considering only respondents' data during the customer satisfaction, the model represents attitudes, opinions and other information of respondent while non-respondent customers are a huge portion of the firm's ecosystem. Such bias has a huge impact on both the reliability and validity of survey study findings.

For example, if there is a 25% response rate, there is a 75% potential bias result introduced by non-respondents. The inevitable relationship between response rate and the quality of the modelling is based on the assumption that the higher the response rate is, the greater the probability of the customers represent the entire population. Due to the desire to capture broader cross-sectional attributes and demographic base in most surveys, nonrespondents rate is not limited to the absolute count of records. In other words, several cross-sectional or demographic segments may have to meet some threshold for partial responses to qualify as respondent data in statistical modelling. A tremendous amount of work in literature focuses on estimating the magnitude of non-respondent's bias (Groves & Peytcheva, 2008; Hellevik, 2016; Peytcheva & Groves, 2009) and several studies in different domains propose alternatives to reduce bias in data by considering non-respondents and help adjusting the analysis (Fowler Jr et al., 2002; Sax et al., 2003).

Customer satisfaction and its determinants have been studied extensively in the marketing field. Dawes et al. (2020) study the stability of customer satisfaction over time whereby they send out surveys to same group of customers in two different time periods. They show that survey results were different for each user, even though the time interval between the two surveys was short. This study confirms the fact that the satisfaction of customers changes over time and satisfaction time modelling is of paramount importance. In Zeinalizadeh et al. (2015), the authors use artificial neural networks to predict bank customer satisfaction and rank the factors influencing the customer satisfaction. They extract nine attributes and use them as the input variables for the neural network. The model achieves 73% higher accuracy compared to linear regression in customer satisfaction prediction. In Yau and Tang (2018) research, they investigate the factors influencing customer satisfaction in self-service technology. They used prototypical constraint-based algorithm (PC-algorithm) for learning Bayesian networks to discover the relationship among factors. The factors were then used by regression tree and neural network to estimate the customer satisfaction level. They show that the customer satisfaction has a strong correlation with personal service attributes and temporal commitment. The authors in Ferreira et al. (2018) studied the patients satisfaction using Multicriteria Satisfaction Analysis (MUSA) method and Kano's model to classify the factors. The input data was based on several surveys taken by patients assessing their satisfaction. The model indicates the waiting time as one of the most important factors related to patient's satisfaction.

In Koklic et al. (2017), the research was conducted a study on connections among airline tangibles, quality of personnel, satisfaction with the airline, the intention to repurchase and intention to recommend the airline are examined. They show that tangibles and personnel quality have a positive impact on customer satisfaction while satisfaction affect intentions of repurchase and recommendations. Sánchez-Franco et al. (2019) used supervised machine learning algorithms to empirically identify relevant features and then classify customer satisfaction based on the reviews presented in Yelp for Las Vegas hotels. They show that the results of supervised learning classifiers are more reliable than existing statistical approaches.

Farhadloo et al. (2016) designed a novel framework to draw a connection between the semantic classification method and aspect identification for customer satisfaction prediction. They focussed on analysing unstructured data to build the predictive model. The proposed Bayesian model predicts ratings and identifies the relative importance of each aspect. They show that the method works efficiently on large datasets. The authors in Bi et al. (2019) proposed a customer satisfaction model based on online reviews. The model used sentiment analysis, ensemble learning, neural network and Kano model. To understand customer satisfaction, they first extract customer satisfaction dimensions from the reviews, then using sentiment analysis, they identified the sentiment orientations. They propose a data-driven model that does not need any prior assumption on the customer satisfaction distribution.

In Van Doorn et al. (2013), the authors conduct a comparative study on the performance of customer satisfaction factors and Net Promoter Score (NPS) on predicting the company growth rate. They show that NPS is neither superior nor inferior to other customer metrics. Despite the effectiveness of the aforementioned methods in customer satisfaction modelling, they all work based on only respondent data and do not consider the nonrespondent data in their modelling. Furthermore, the proposed models focussed only on predicting the satisfaction and the time of the satisfaction is unexplored. Understanding and predicting customer satisfaction can increase efficiency and improve a firm’s profitability in the long-term.

In Bekiros et al. (2018), the authors study the problem of predicting customer satisfaction in a shipping industry. They use artificial intelligence methods such as rough sets, neural networks, advanced classification algorithms and multi-criteria analysis. They also apply different processing and evaluation philosophies during the training and prediction steps. The authors in Pansari and Kumar (2017) designed frameworks for customer engagement (CE). They showed that customer satisfaction is in a positive relationship with customer's direct contribution, thus creating customer engagement. They presented a new aspect of the theory of engagement and argued that the engagement level of a customer has a strong relationship with satisfaction and emotional bonding between customers and firms. Bockhorst et al. (2017) proposed a data driven framework to predict customer satisfaction in a corporate call centre. They combined all the customer related signals such as speech-to text, call metadata and policy information. Then, a convolutional fitting function is trained to predict the customer satisfaction score. They showed that the proposed framework is more effective than classic machine learning algorithms such as regression and classification techniques. In Zhao (2019), the author proposed a text-mining classification model to predict overall attitude of reviewers regarding the hotels they stayed in to better understand customers. The paper showed that text mining techniques can help to extract meaningful customer intelligence for decision making.

In Ding et al. (2014), the authors propose an evaluation framework for cloud service trustworthiness. The framework combines the Quality of Service (QoS) prediction and customer satisfaction estimation by considering perception ratings on qualitative attributes. The proposed framework is validated through simulations and shown an effective performance in predicting assessment data. In Ding et al. (2017), the authors propose a new ranking prediction model for personalized cloud service selection by estimating customer satisfaction. The authors design a customer satisfaction function based on two main factors:

(1) they consider a utility attribute based on the fact that a high-quality service is preferable over a low-quality service.

(2) the lower the utility value, lower the customer satisfaction will be.

However, the slight increment in satisfaction will happen when the utility value exceeds a threshold. Customer satisfaction is also used for demand prediction (Cao et al., 2016). They argue that in industries like service-oriented manufacturing, the interactions between customer and the service provider are frequent and therefore customer satisfaction plays an important role in demand prediction. The authors quantitatively model the relationships between customer satisfaction index and the key factors and then use least square support vector method to predict the demand. Miranda et al. (2018) investigates the relationship between customer satisfaction and perceived service quality in railway industry. Different combinations of service quality dimension are considered in this study and their effect on customer satisfaction is investigate using an extension of Servqual.

Important shortcoming pertaining Servqual framework has been argued by both researchers which triggered them to come up with the Servperf idea. Their perceived superiority framework hypothesized that consumer's perception on specification is a reaction of its achievement. Servperf tool was assumed to be more specific and provides options to choose from compared to Servqual framework as the 22 items lead to sufficiently addressing service quality as the main element (Cronin and Taylor, 1992). The heavier adaptation considers the influence of high-quality characteristics as a rationale for perceived quality. Researchers can use the gap theory methodology for measuring service quality performance if precautions are taken to reduce the problems just discussed. If Servqual is used, the instrument should be