

**STRATEGIES TO IMPROVE CUSTOMER SATISFACTION WITH
INDUSTRIALISED BUILDING SYSTEM (IBS) HOUSES AND IBS
ADOPTION USING QUALITY FUNCTION DEPLOYMENT (QFD)
APPLICATION: A MALAYSIA BASED STUDY**

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ABSTRACT

The Malaysian government has brought the Industrialised Building System (IBS) to the attention of all professionals in this industry. Due to certain barriers, the actual projection of the IBS adoption could not be achieved. One of the factors identified is the lack of customer satisfaction with IBS houses. This research aims to determine the factors pertaining to customer satisfaction of IBS houses, the strategies to improve customer satisfaction, to determine IBS adoption factors and the strategies to improve IBS adoption in the Malaysian construction industry. This research methodology uses a mixed method approach. The research process was conducted in four (4) phases. Relevant respondents were divided into two groups, namely, the IBS house occupiers and the construction industry stakeholders. The quantitative study is based on a self-administered questionnaire survey. Purposive sampling was carried out to determine the sample from three types of IBS houses. Data were obtained from 391 IBS house occupiers to determine customer satisfaction in the first part of the first phase. In addition, data from 105 valid respondents of construction stakeholders were obtained to determine IBS adoption factors in the second part of the first phase. Then, the researcher continued the study using a structured focus group discussion, qualitatively, in the second and third phase. Respondents who are IBS house occupiers, construction stakeholders and academicians took part in the discussion. The QFD matrixes were developed from the Quality matrix and Function matrix, which led to the compilation of the QF matrix. The researcher also developed a list of strategies on how to improve customer satisfaction on IBS house development and strategies on how to improve the IBS adoption in the Malaysian construction industry. The researcher used descriptive and gap analysis for the quantitative study. A statistical analysis was conducted to confirm the reliability of the instruments used. The qualitative study of the structured focus group discussion is continued further by using QFD application. Lastly, the researcher applied semi structured interviews to achieve its validity in phase four (4). Respondents for the validation process consisted of ten (10) experts – academicians, and construction stakeholders. The study discovered nine (9) customer satisfaction factors related to IBS house construction. The nine (9) factors were identified as critical factors in IBS adoption. Five (5) strategies were identified from the QFD application on how to improve customer satisfaction in IBS house construction and five (5) strategies were identified from the QFD application on how to improve IBS adoption. Several major recommendations to improve customer satisfaction and to enhance IBS adoption were made. This research will contribute to four (4) kinds of new knowledge. First, it will provide strategies to address the issue concerning the lack of customer satisfaction in IBS housing projects. Second, it will provide strategies to improve and enhance IBS adoption. Third, it highlights the major roles of related organizations to enhance the IBS adoption industry. Finally, yet importantly, it provides new knowledge and a new dimension to QFD application in the IBS planning and management system.

ABSTRAK

Kerajaan Malaysia telah membawa kaedah sistem binaan berindustri (IBS) kepada perhatian setiap profesional di dalam industri. Disebabkan oleh beberapa kekangan, sasaran sebenar pengaplikasian sistem ini tidak dapat dicapai. Salah satu faktor penyebab ialah kurangnya kepuasan pelanggan terhadap perumahan jenis IBS. Penyelidikan ini bertujuan untuk mengenalpasti faktor-faktor kepuasan pelanggan terhadap rumah jenis IBS, strategi untuk meningkatkan kepuasan pelanggan, mengenalpasti faktor-faktor pengaplikasian IBS dan strategi untuk meningkatkan pengaplikasian IBS dalam industri pembinaan di Malaysia. Metodologi kajian ini menggunakan pendekatan kaedah bercampur. Proses penyelidikannya telah dijalankan di dalam empat (4) fasa. Responden yang berkaitan dibahagikan kepada dua kumpulan iaitu; penghuni kediaman IBS dan pihak industri pembinaan. Pendekatan kuantitatif dalam kajian ini berdasarkan kepada tinjauan soal-selidik. Sampel tujuan khas dilakukan untuk menentukan sampel daripada tiga jenis perumahan IBS. Data diperolehi daripada 391 penghuni kediaman IBS bagi menentukan kepuasan pelanggan di bahagian pertama di dalam fasa pertama. Manakala data dari 105 responden yang sah dari pihak-pihak berkepentingan di dalam industri pembinaan diperolehi bagi menentukan faktor-faktor pengaplikasian IBS di bahagian kedua di dalam fasa pertama. Seterusnya, penyelidik meneruskan kajian dengan menggunakan kaedah perbincangan berkumpulan berstruktur sebagai pendekatan kualitatif di dalam fasa kedua dan ketiga. Responden terdiri daripada pihak penghuni rumah, industri binaan dan juga pegawai akademik mengambil bahagian dalam perbincangan. Matriks QFD dihasilkan daripada matrik Kualiti dan matrik Fungsi yang seterusnya menghasilkan matrik QF. Penyelidik juga menghasilkan senarai strategi untuk menambah baik kepuasan pelanggan terhadap pembangunan rumah IBS dan juga strategi untuk menambah baik pengaplikasian IBS di industri binaan Malaysia. Bagi kajian kuantitatif, penyelidik menggunakan analisis deskriptif dan analisis perbezaan. Analisis statistik dilakukan untuk mengesahkan kebolehpercayaan dan kesahihan instrumen. Kajian kualitatif bagi perbincangan kumpulan fokus berstruktur dilakukan dengan menggunakan aplikasi QFD. Penyelidik telah melaksanakan wawancara berstruktur untuk mencapai kesahihannya di dalam fasa keempat. Responden untuk proses validasi terdiri daripada sepuluh (10) orang pakar daripada para ahli akademik dan pihak berkepentingan industri pembinaan. Kajian ini mendapati sembilan (9) faktor kepuasan pelanggan yang berkaitan dengan pembinaan rumah IBS. Sembilan (9) faktor telah dikenalpasti sebagai faktor penting dalam pengaplikasian sistem IBS. Lima (5) strategi dikenalpasti dari aplikasi QFD untuk meningkatkan kepuasan pelanggan dalam pembangunan rumah IBS dan lima (5) strategi dikenalpasti dari aplikasi QFD untuk meningkatkan pengaplikasian IBS. Beberapa cadangan utama untuk meningkatkan kepuasan para pelanggan dan untuk meningkatkan pengaplikasian IBS telah diadakan. Penyelidikan ini telah memberikan empat (4) jenis sumbangan ke atas pengetahuan baru. Pertama, ia menyediakan strategi untuk mengatasi masalah kurangnya kepuasan pelanggan dalam pembangunan perumahan IBS. Kedua, ia menyediakan strategi untuk memperbaiki dan meningkatkan pengaplikasian IBS. Ketiga, ia dapat mengenalpasti peranan utama atau cadangan untuk meningkatkan kepuasan pelanggan dan untuk meningkatkan pengaplikasian IBS dalam industri pembinaan di Malaysia. Akhirnya, ia memberikan pengetahuan baru bagi aplikasi sistem QFD dalam perancangan dan pengurusan IBS.

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LIST OF ABBREVIATIONS

IBS	Industrialised Building System
QFD	Quality Function Deployment
CIDB	Construction Industry Development Board
R&D	Research and Development
9MP	9th Malaysia Plan
GDP	Gross Domestic Product
CREAM	Construction Research Institute of Malaysia
QA	Quality Assurance
QC	Quality Control
TQM	Total Quality Management
CAs	Customer Attributes
MHLG	Ministry of Housing and Local Government
PKNS	Perbadanan Kemajuan Negeri Selangor
LRT	Lightweight Railway Train
HDB	Housing and Development Board
PCA	Portland Cement Association
OBS	Open Building System
MC	Modular Coordination
UBBL	Uniform Building by Law
CAPEX	Capital Expenditure
MBAM	Master Builders Association Malaysia
JPN	Jabatan Perumahan Negara
RO	Research Objective
RQ	Research Question
RMK9	National Vision Number 9
RMK10	National Vision Number 10
RMK11	National Vision Number 11
PAM	Pertubuhan Arkitek Malaysia
ISM	Institute of Surveyors Malaysia
IEM	Institute of Engineers Malaysia
BEM	Board of Engineers Malaysia