

Adequate & Affordable Housing for All

Research, Policy, Practice

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A proposed choice model for the delivery of mass custom homes

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INTRODUCTION

The use of industrialized building systems, which allow a higher in-factory completion of housing components, has the potential to eliminate building site inconveniences such as bad weather, vandalism and theft that affect construction time, quality and cost, and also helps produce homes more efficiently, when compared to site-built counterparts (Hullibarger 2001). In addition, a mass custom design 1 approach to the delivery of quality affordable homes relates closely to today's market demands for housing (Noguchi 2003). However, in reality, homebuilders tend to follow routines in their way of doing business and to be reluctant to apply (or buy) innovative design and construction systems to their housing developments. Their buying behaviour towards the adoption of a new product or service was surveyed by reviewing organizational (or industrial) buying behaviour. The task-related variables reflect both initial and operating costs, while the non task-related variables are those that have no direct bearing on the specific problem to be solved by the buying task—such as buyers' emotional concerns. Furthermore, organizational buyers tend to cut down the information search for non-programmed decisions to determine whether or not to buy an unfamiliar product or service.

In the light of a review of organizational buying behaviour models, the author developed a “choice” model that aims to help homebuilders understand the true value of innovative design and construction systems applicable to their housing development in conjunction with the concept of mass customization. The model was thus termed the “choice model for mass customization” and an outline of it is described in this paper.

ORGANIZATIONAL BUYING BEHAVIOUR

To some extent, housing development involves the purchase of “products” and “services” in order to carry out a housing project. Thus, homebuilders can be considered as the

¹ The *mass custom design* is a new design approach, which is a result of the combination of three basic sets of design elements of housing: the volume, exterior, and interior (Noguchi 2001). It allows a higher level of product standardization that helps reduce production costs and achieves a higher level of design customization to satisfy today's market demands for housing (Noguchi and Friedman 2002).

industrial buying decision-makers who determine whether or not to subcontract out to familiar or unfamiliar sub-contractors (i.e. suppliers) who actually execute the housing projects initiated by the builders. The homebuilder's buying decision-making process is seemingly complex; thus, this section aims to identify the major unclear factors that considerably influence their buying decisions, based on the state-of-the-art reviews of organizational buying behaviour.

Webster and Wind (1972) defined organizational buying behaviour as:

“the decision-making process by which formal organizations establish the need for purchased products and services, and identify, evaluate, and choose among alternative brands and suppliers.”

The term “decision-making” used in this definition includes information acquisition and processing activities, as well as the development of goals and other multiple criteria to be used in choosing among the alternatives.

Moriarty and Galper (1978) emphasize that the organizational buying decisions differ from consumer (or individual) buying decisions. First, the number of people typically involved in the buying decision is greater due to the differing needs and objectives of participants and the operating functions, which they represent. Second, the major technical complexities related to the product or service being purchased. Third, the length of time involved is typically longer than consumer buying decisions due to the technical complexity of industrial buying decisions, which require more information and longer evaluations, as well as involving more uncertainty about product performance. Fourth, such information, proposals and purchase contracts in the organizational buying process add a formal dimension, which is rarely found in consumer buying. Fifth, the personal and organizational risks generated are much greater, because a larger amount of money is often involved. In addition, the organizational members, who participate in the buying function, are neither purely “economic men” nor purely emotional or irrational men; rather, they are human beings, whose buying decisions and behaviour are influenced by both task- and non task-related variables (Webster and Wind 1972).

As stated above, the organizational buying process is complex and decisions are influenced essentially by task- and non task-related variables; thus, the organizational buying behaviour models can be also classified into task- or non task-oriented models. “Task-oriented” models include those that emphasize task-related variables (such as price), while “non task-oriented” models are those that attempt to explain organizational buying behaviour based on a set of variables (such as emotional factors) which have no direct bearing on the specific problem to be solved by the buying task. The following sections aim to identify the task- and non task-oriented models, as well as to examine other models that successfully integrate both types of variables into an organizational buying decision-making process, in order to develop a new ‘choice’ model that homebuilders can practically apply for the selection of design and construction systems.

TASK-ORIENTED MODELS

The task-oriented models may be most useful for investment justification; however, these models may suffer the disadvantages of incompleteness, due to the absence of “non task” variables, which are also considered as important determinants of organizational buying behaviour. The minimum price and lowest total cost models may well exemplify the task-oriented models with regard to monetary considerations, while the constrained choice model stresses the existence of habitual behaviour that many organizations may engage in while making an industrial buying decision.

The minimum price model: A firm is often forced to obtain all factors of production at the lowest possible price and to achieve the most efficient methods of operation since a firm is usually motivated to maximize its profit (Webster and Wind 1972). The minimum price model can be considered the simplest organizational buying behaviour model.

The lowest total cost model: The lowest total cost model is essentially an elaboration that attempts to achieve the minimum of initial costs (like the minimum price model), as well as of additional operating costs, which are recognized as significant. In other words, the model aims to adjust the initial purchase and reflect the additional costs of product-in-use, while considering the “opportunity” costs associated with profit opportunities.

The constrained choice model: The constrained choice model focuses on the fact that the buyer’s decisions often involve choosing from a limited set of potential suppliers. Webster and Wind (1972) indicate that the potential suppliers in this set are regarded as “in”, while all other potential suppliers are “out”. In addition, Moriarty and Galper (1978) emphasize that the buyer usually views the selection of an “in” supplier for its product or service to be purchased as “low risk” since the “routine purchase” reinforces the buyer’s perception. Thus, any member of the buying organization may impose constraints on the list of possible suppliers, in order to reduce the risk perceived by the buyer in the purchasing decision.

NON TASK-ORIENTED MODEL

Non task-oriented models generally concern the emotional factors influencing organizational buying behaviour, thus disregarding the rational (or economic) factors as aforesaid. Accordingly, this section focuses mainly on examining the perceived risk model, which reflects the uncertainty associated with the purchasing process.

The perceived risk model: Perceived risk is defined as “the uncertainty that consumers face when they cannot foresee the consequences of their purchase decisions” (Schiffman and Kanuk 1999). The perceived risk model was originally proposed by Bauer and is regarded as a useful framework within which to consider organizational buying behaviour from the viewpoint of the individual (Webster and Wind 1972). Furthermore, Webster and Wind (1972) explain perceived risk as follows:

“Perceived risk is a function of uncertainty which an individual has about the outcome of a given course of action and the consequences associated with alternative outcomes. The individual may be uncertain either about the goals that are relevant in the

buying situation or about the extent to which a particular course of buying action will meet those goals.”

Furthermore, they also defined the two types of consequences (“goal identification uncertainty” and “goal/purchase matching uncertainty”) regarding them as important determinants of the amount of risk perceived by the organizational buyer in a given buying situation.

In general, the major types of risk that buyers somehow perceive when making a buying decision include performance risk, financial risk, psychosocial risk, and time risk (Webster and Wind 1972). The ‘performance risk’ can be considered as the risk that the product will not perform as expected or the risk to self or others that the product may be harmful. The ‘financial risk’ is the risk that the product will not be worth its cost. The ‘psychosocial risk’ represents the risk that a poor product choice may result in social embarrassment or damage to the consumer’s ego or self-esteem. The ‘time risk’ is the risk that the time spent in product search may be wasted if the product does not perform as expected.

Webster and Wind (1972) indicate that organizational buyers may adopt several strategies for reducing the amount of perceived risk. First, the buyers may simply avoid a decision. Second, they may remain loyal to “in” suppliers to maintain their routine purchase. Third, they may extensively gather and evaluate additional information in the search of new products or services. Fourth, they may do business with well-known, reputable, established suppliers—this also reflects brand loyalty.²

In addition, they also introduced a unique approach to avoiding uncertainty in the course of the organizational buying action—i.e. “split orders”. They said “Another strategy used by organizational buyers to reduce risk is to split orders between two or more vendors, although single sourcing (especially from well-known suppliers) was found to be more common practice...” (Webster and Wind 1972). This approach may help buying organizations venture to apply more innovative products that meet their demand, while they can reduce risk by splitting the orders between two or more suppliers. In this case, buyers may be able to choose “in” and “out” suppliers not only for conventional products, but also for innovative products. The weight given to each of the suppliers for their products or services that will be purchased may vary according to the buying organizations’ needs and demands for them.

The amount of uncertainty surrounding the purchase of a new product may be reduced through a series of “problem-solving” activities.³ However, the type of problem solving adopted depends on the task at hand. It is classified into two buying situations: programmed and non-programmed (Fig. 1.1).

A “programmed” decision reflects a habitual (or routine) purchase, and it may lead almost immediately to a purchase, while a ‘non-programmed’ decision may require more

² *Brand loyalty* is a term used to describe consumers’ consistent preference and/or purchase of the same brand in a specific product or service category (Schiffman and Kanuk 2000).

³ The term “problem solving” used in the field of consumer behaviour implies a general approach to understanding consumer decision making and it focuses on consumers’ cognitive representation of the decision as a problem. Important aspects of the problem representation include consumers’ end goals, sub-goals and relevant knowledge. Consumers construct a decision plan by integrating their knowledge within the constraints of problem representation (Peter and Olson 1996).

time (which can be also considered as a cost relating to the search) for the acquisition and processing of information on a product to be purchased (Blythe 1997). Information search usually comes from an internal search from memory and an external search from outside sources (Blythe 1997). The extent of the external search for information depends on a range of factors that are connected with the buyer's situation, the value and availability of the information, the nature of the decision being contemplated, and the nature of the individual (Fig. 1.2).

Figure 1.1: Classification of problem solving
(After Onkvisit and Shaw 1994)

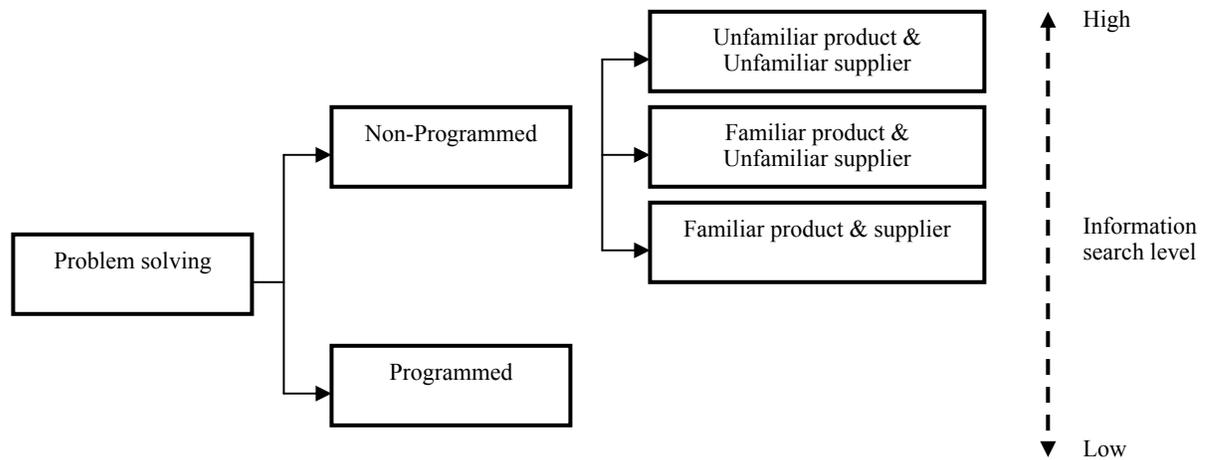
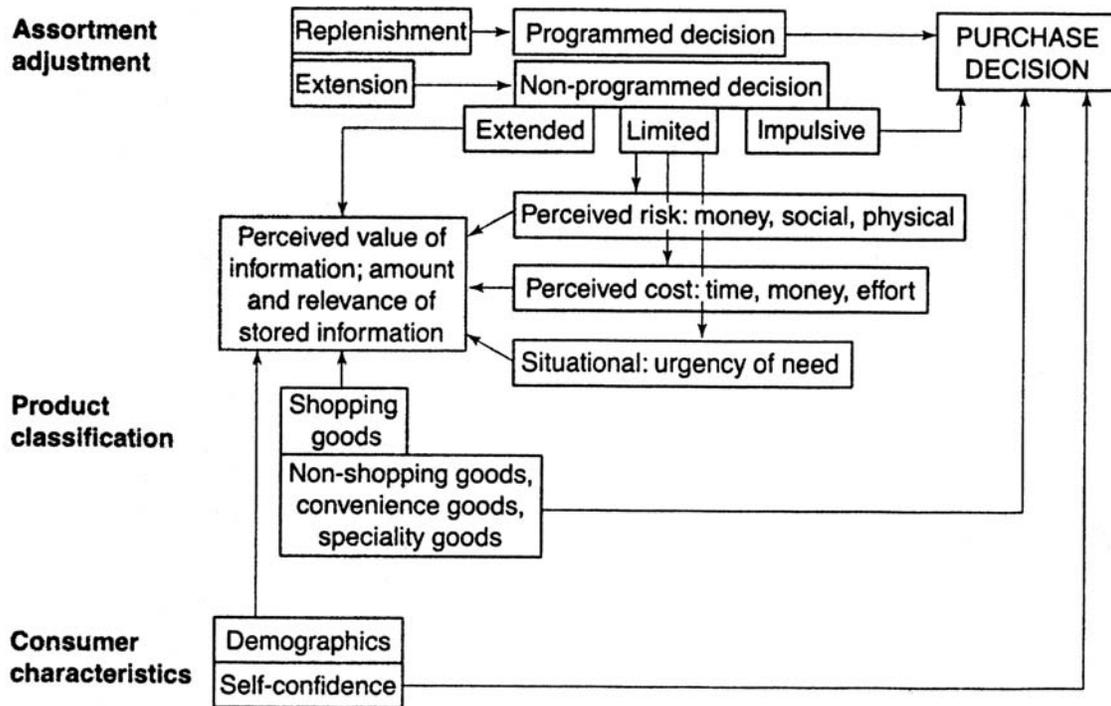


Figure 1.2: Factors affecting external search
 (Source: Blythe 1997)



THE INTEGRATED MODELS

Webster and Wind (1972) admit that a model of organizational buying behaviour which deals with task and non task variables, generally takes one of two forms: a “stimulus-response” type model or a “stimulus-respondent-response” type model. The former model relates inputs (i.e. market stimuli) to output (i.e. buying response), while the latter model consists of a set of propositions (e.g. advertisement and market trends) about how the buyer responds to marketing stimuli and these propositions may provide some answers about how inputs lead to outputs. In part, these models reflect a model of a classical behavioural learning theory that indicates what goes on inside the buyer’s head is a “black box” in which a given market stimulus will prompt a particular response (Fig. 1.3). However, none of these models helps clarify the way of identifying “what is happening inside the black box” (Blythe 1997).

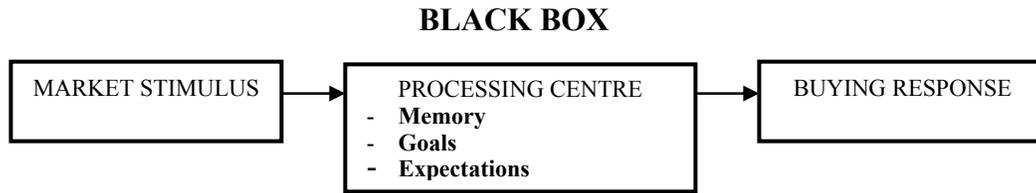


Figure 1.3: A simplified model of buying response
(After Blythe 1997)

In general, the organizational buying decision-making process is considered a complex process that takes a relatively long time to reach the final buying decision and involves several members of the given organization and relationships with other organizations, based on contractual arrangements. Webster (1991) emphasizes that:

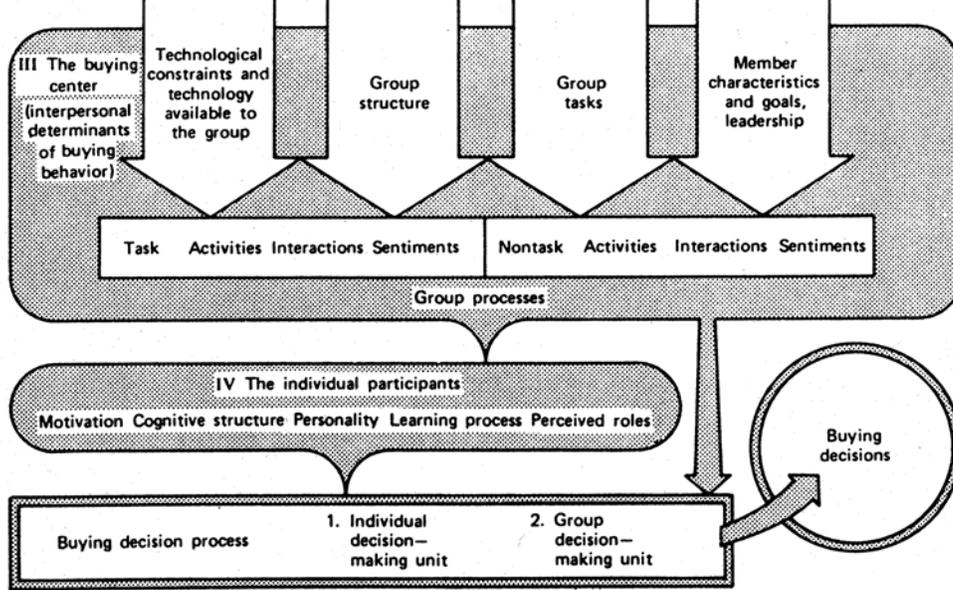
“Buying decisions do not just happen. They represent a complex set of activities engaged in by many members of the buying organization and result in a commitment to purchase goods and services from a vendor. Buying is not an event. It is an organizational decision-making result of which is a contractual obligation.”

In 1965, Webster published an article entitled “Modeling the Industrial Buying Process.” In his article, he confined his model strictly to the process of industrial buying and outlined the following four stages:

1. Problem recognition
2. Assignment of buying authority and responsibility
3. Search process for identifying product offerings and for establishing selection criteria
4. Choice process for evaluating and selecting among alternatives

Moriarty and Galper (1978) recognized that this four-phase model was “a major breakthrough in understanding and documenting the process of buying.” Furthermore, in 1967, Robinson, Faris, and Wind expanded this four-phase model into an eight-phase model:

1. Need recognition
2. Definition of the characteristics and quantity of items needed
3. Development of the specifications to guide the procurement process
4. Search for and qualification of potential sources
5. Acquisition and analysis of proposals
6. Evaluation of proposals and selection of suppliers
7. Selection of an order routine
8. Performance feedback and evaluation



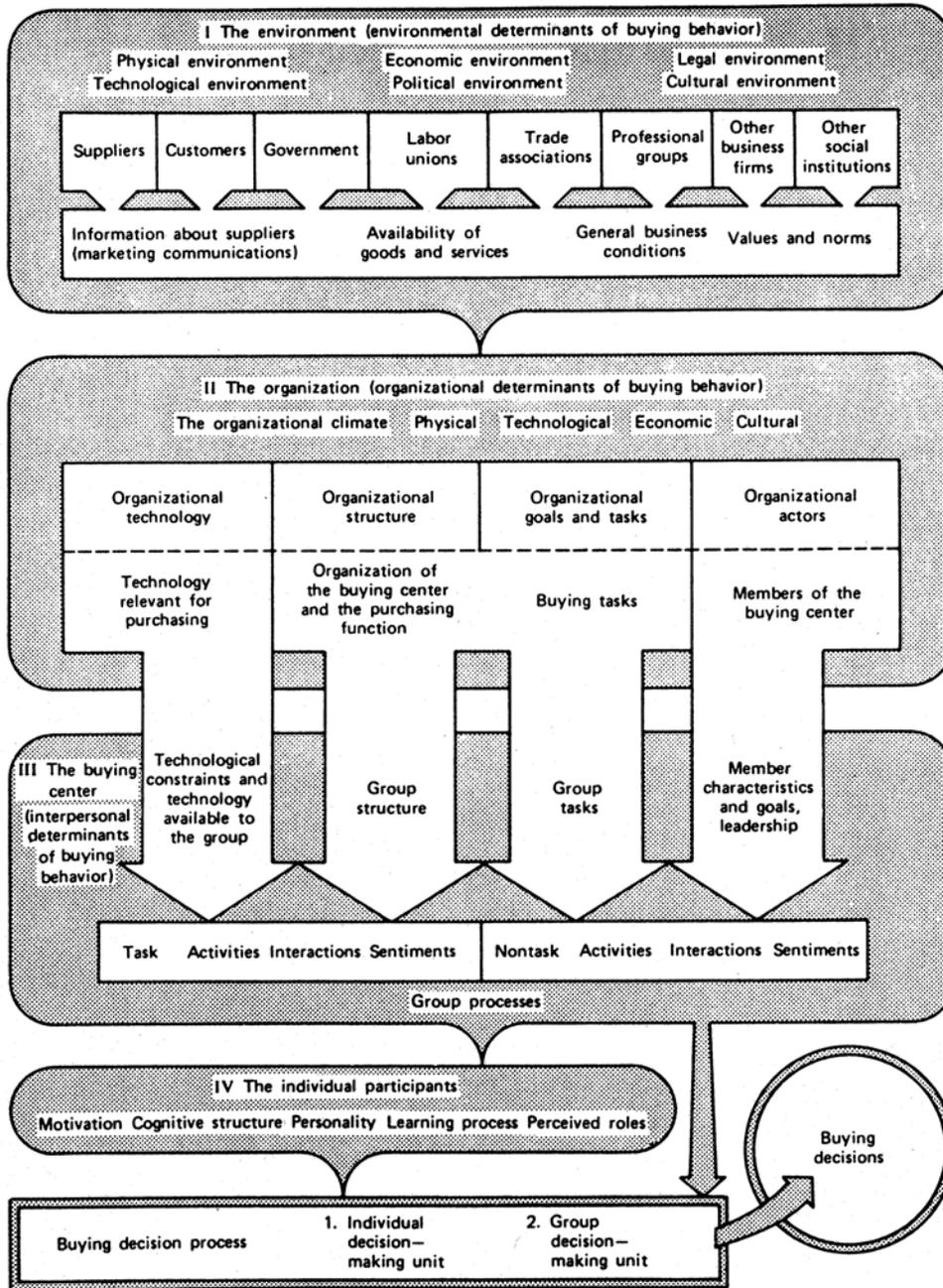


Figure 1.4: A general model of organizational buying behaviour (Source: Webster 1991)

In 1972, Webster and Wind integrated these multiple influences on the buying decision into a conceptual model as follows:

$$B = f(I, G, O, E)$$

In this model, “B” denotes the buying behaviour itself, which is a function of individual characteristics: (I), group factors (G), organizational factors (O) and environmental factors (E). Furthermore, in order to distinguish between the task and non task elements of the

individual, group, organizational, and environmental variables that affect the buying decisions, they expanded the model as follows:

$$B = f(IT, INT, GT, GNT, OT, ONT, ET, ENT)$$

In this model, “T” stands for task variables, while NT stands for non task variables. Task variables are those that directly relate to the organizational “buying problem”, which is defined by the organization’s objectives. Non task variables are those that do not directly relate to the buying problem.

Environmental factors: Task-related environmental influences are not limited. However, the complex nature of environmental influences may reflect the interrelation of physical, technological, economical, political, and legal factors, while the non task-related environmental factors include both the influences of other organizations (e.g. the government, banks, transportation companies) and the social and cultural environment (Fig. 1.5). The values of any given society exert significant influence on the organizational buying process.

In addition, as part of the environmental factors, a growing awareness of the impact of economic activity on the physical environment (i.e. sustainable development) also needs to be taken into consideration. Webster and Wind (1972) emphasized that “This new concern for the physical environment will undoubtedly change the constraints within which organizational buying decisions must be made.”

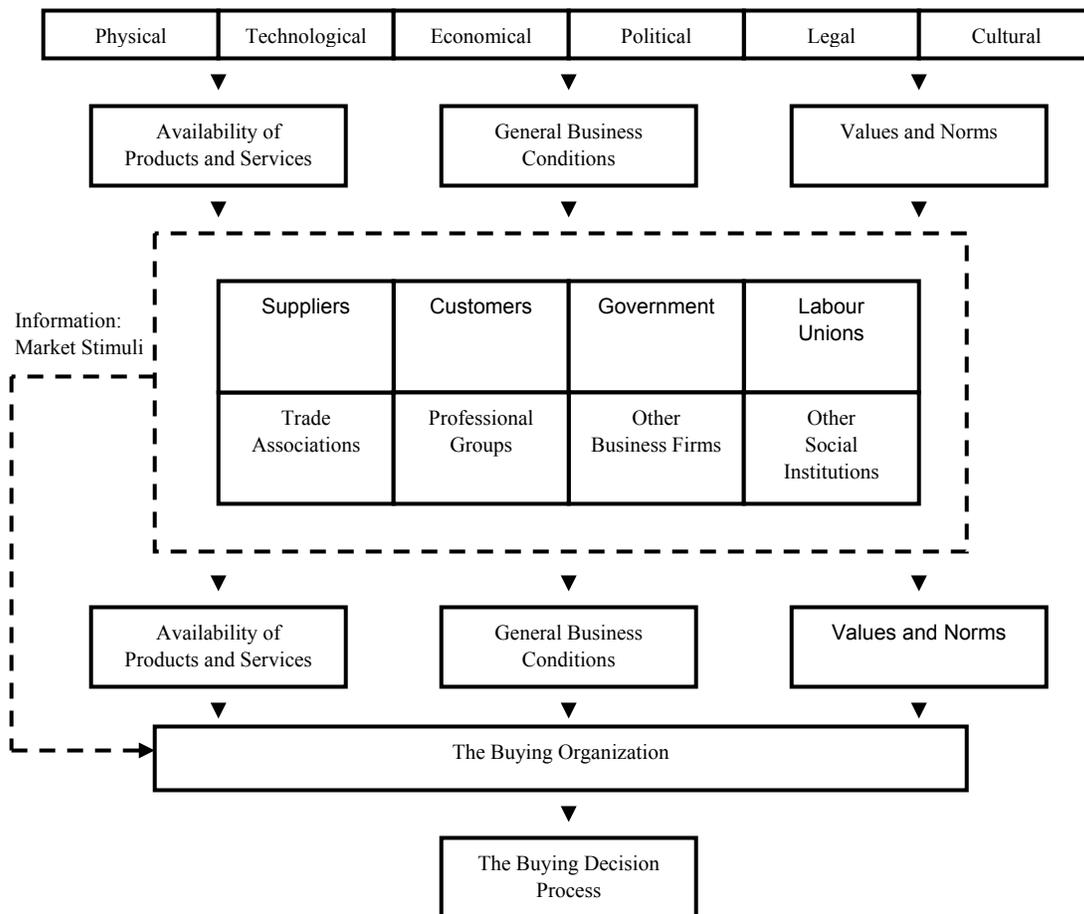


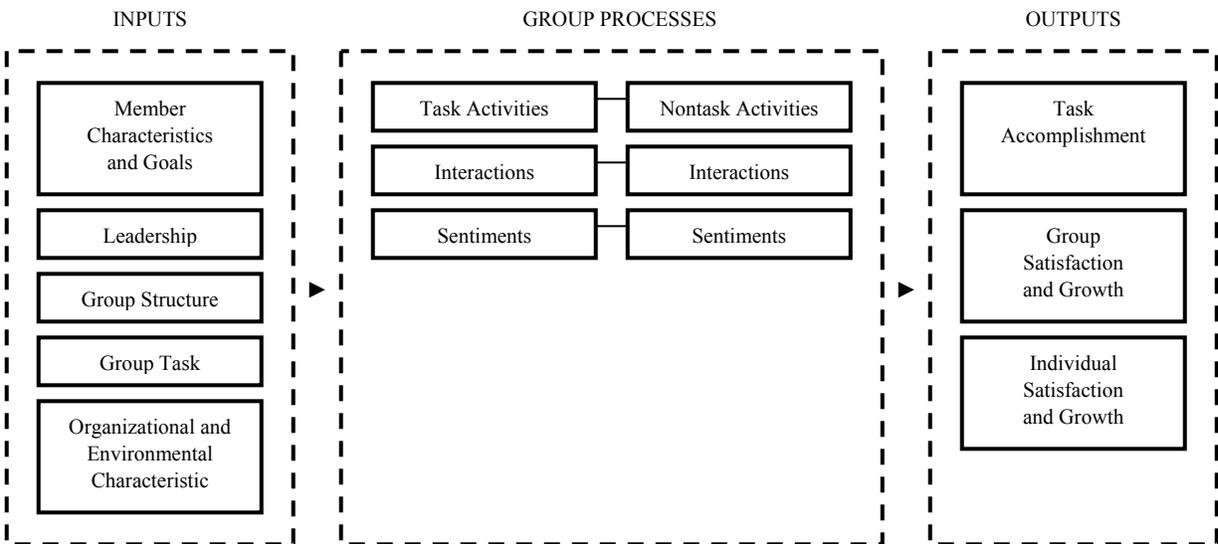
Figure 1.5: A model of environmental effects on the organizational buying process (After Webster and Wind 1972)

Organizational factors: The task-related organizational factors mainly include the organization’s policies which provide the criteria as to the kind of materials to be purchased, as well as product quality specifications (Webster and Wind 1972). On the other hand, organizational policies, which relate to buying activities, can be also formulated based on non task factors, such as the favouring of local businesses and preferences for dealing with “in” suppliers.

Interpersonal (group) factors: Interpersonal influence is defined simply as the influence of one person on another. Such interaction between individuals yields a shared set of objectives, values (norms) and expectations (Webster and Wind 1972). Furthermore, Webster and Wind (1972) summarize a number of key factors related to interpersonal behaviour: ”(1) the multiplicity of and interdependency among the factors affecting group processes and outcomes; (2) the fact that the essence of a group process can be described as the mutual relationships among activities, interactions and sentiments; (3) the relevance of both task and non task activities, interactions and sentiments; and (4) the nature of the output (consequences) of the group process, which includes not only the accomplishment

of the task but also the satisfaction and growth of both the group and the individual” (Fig. 1.6).

Figure 1.6: A simplified model of interpersonal determinants of buying behaviour (After Webster and Wind 1972)



Individual factors: Only the person can think, feel and act, even though each aspect of individual behaviour may be affected by the people, tasks, structure and technology of the organization which the individual belongs to. Webster and Wind (1972) point out that “individual behaviour is a function of three factors: (1) the person’s personality, motivation, cognitive structure, and learning (habit and attitude formation) process; (2) his interaction with the environment situation; and (3) his preference structure and decision model.” Furthermore, they also indicate that individual factors in organizational buying include the person’s age, income, education and professional experience. In reality, some of these factors may generate non task variables that affect buying decisions.

In short, industrial buying decisions are influenced by task and non task variables. Task-oriented models focus solely on the “economic” choice, while non task-oriented models generally concern the “emotional” factors—thus, this study examined a perceived risk model. Both sets of factors must be taken into consideration when organizational buying decisions are in question. Accordingly, this study also examined an integrated model of organizational buying behaviour developed by Webster and Wind in 1972. Their model is valuable for identifying a number of task- and non task-related “buying determinants” at the environmental, organizational, interpersonal, and individual levels.

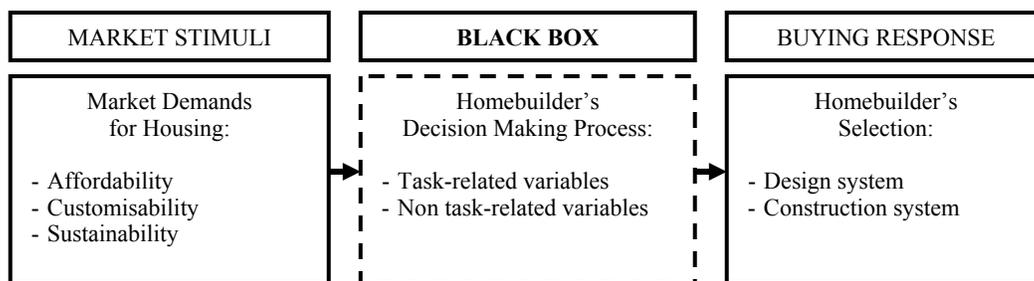
The industrial buying behaviour models reviewed are useful in organising a decision-making process for the selection of design and construction systems with consideration of the presence of multiple evaluation criteria that are coupled with the risk

and uncertainties associated with estimating future outcomes. However, the organizational buying behaviour models do not explain any analytical evaluation techniques for the selection of alternatives. Thus, “value analysis” techniques, which take account of both task and non task variables in order to help decision-makers find the most optimal alternative, merit being integrated into the choice model that will be outlined in the following section.

STRUCTURING A CHOICE MODEL FOR MASS CUSTOMIZATION

As reviewed in the preceding sections, an organizational buying response is assumed to be the result of a market stimulus. In fact, homebuilders (seen as formal organizational buyers) need to take the responsibility for the selection (or purchase) of sub-contractors (or suppliers) who actually carry out the housing projects that the builders initiate. In other words, homebuilders make some buying decisions for the ‘design’ and ‘construction’ systems to be applied, in order to design and build homes that must meet the market demands for housing (Fig. 1.7).

Figure 1.7: A model of the homebuilder’s buying response



However, it is questionable whether homebuilders respond simply to the market demands for housing when selecting the design and construction systems for their housing development.

In today’s housing market, quality affordable homes are still in great demand. Housing affordability reflects the selling price, which is affected by direct and indirect costs. The former represent material and labour costs that to some extent relate to construction time, while the latter include the external costs, such as financing, tax, land cost, overheads and profit. The notion of housing quality may concern a wide range of ‘design’ and ‘product’ features. Thus, the ‘product quality’ of housing represents the physical quality that the expected work of a house being purchased must perform, while the ‘design quality’ of housing reflects, to some extent, the homebuyer’s individual needs, desire and expectations in design—i.e. customisability. In addition to these aspects, sustainability is also a matter of concern in today’s homebuilding industry. Except for product quality (i.e. insulating properties and air-tightness), the housing type (i.e. attached, semidetached or detached housing) can be considered as one of the most influential factors in producing energy-efficient homes.

In order to produce quality affordable homes, homebuilders may wish to apply industrialized building systems as the industrialization of housing has the potential to eliminate building site inconveniences, such as bad weather, vandalism and theft, all of which generally affect construction time, quality and cost. In addition, the computer-cut of building materials may also help reduce the amount of wastage and contributes to sustainable development. In reality, builders rarely use innovative building technologies and tend to build homes in a conventional way, in which the productivity is somewhat considered to be inefficient and the construction cost is greatly affected by economic fluctuations—i.e. inflation. In general, inflation contributes towards increasing labour and material costs that, in turn, increase to some degree the selling price of housing.

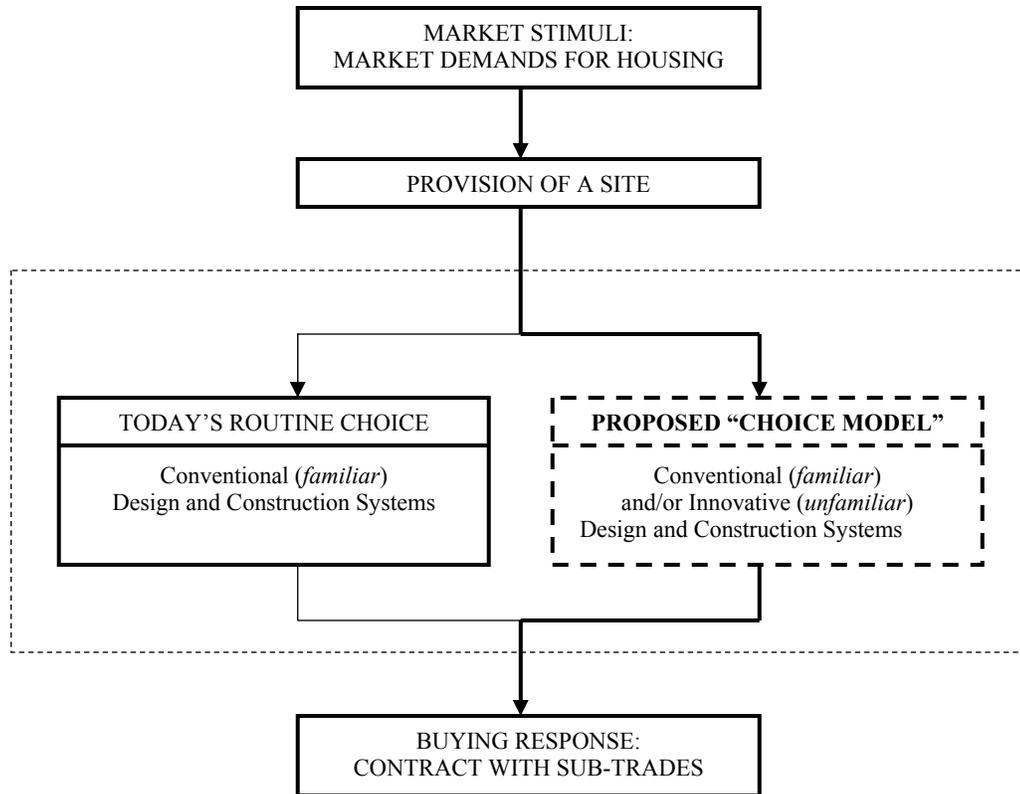
Accordingly, in order to produce quality affordable homes that reflect today's housing market demands, industrialized building systems should ideally be incorporated with the builder's mass housing development that yields economies of large-volume work. However, this is impossible if homebuilders, who generate and supervise the project, do not fully appreciate the advantage (or value) of innovative construction technologies over that of traditional site-built construction.

The major barriers that hinder today's homebuilders from adopting and implementing new design and construction approaches to their homebuilding activities can be enumerated as follows:

1. The small size of a homebuilding firm keeps staff extremely busy—pressures of multi-tasking and time-constraints
2. Homebuilders tend to follow a routine that maintains great efficiency for their activities
3. Homebuilders are not risk-takers; rather, the way of doing business is incentive-oriented, based on an economic choice

Homebuilders tend to be reluctant to adopt new construction technologies to their mass housing development, because a departure from their routine activities may impact considerably on their administrative burdens. The homebuilding industry, like other industries, remains unwilling to pay for information, even though it is considered “the integrator of the resource system” (Charney et al. 1971). Thus, builders may cut down the information search for ‘non-programmed’ decisions on the purchase of unfamiliar design or building systems simply because searching for information takes too much time, money, and effort. In order to help homebuilders understand the true value of other possible alternatives applicable to mass housing development, their buying decision-making process needs to be well ‘programmed’. Furthermore, two types of the non-programme decision's consequences (i.e. “goal identification uncertainty” and “goal/purchase matching uncertainty”) which generate the greatest amount of risk perceived by organizational buyers must be eliminated.

Accordingly, the main purpose of the choice model to be proposed is to systematize a decision-making process for the selection of alternatives that helps mass customising an end product, such as a housing unit or development. In this context, the term “buyer” represents a “homebuilder” who needs to make or buy certain products and services (i.e. design and construction systems) in order to carry out a housing project (Fig. 1.8).



Builder's decision-making process

Figure 1.8: A model of the homebuilder's decision-making process for the selection of design and construction systems

However, the choice model will also be designed to help a "homebuyer" select certain alternatives (i.e. the standardized housing components) in order to mass customize homes. In addition, the major objectives of the choice model are to form some alternatives that help mass customize an end product, according to the market stimuli, as well as to evaluate the value of the given alternatives. The model attempts to help buyers select optimal alternatives in accordance with the objectives and specifications established during the decision-making process within the choice model that accommodates their task- and non task-related choices. Hereafter, it will be termed the "choice model for mass customization" that will focus mainly on:

1. Identifying the need for buying or making actions
2. Formulating the objectives and specifications for making optimal choices
3. Generating the alternatives for mass customising an end product

4. Evaluating the given alternatives
5. Selecting the preferred alternatives

In order to mass-customize an end product, these five stages within the choice model may need to be followed cyclically. As well, the specific nature, importance of, and interrelationships among these stages may vary slightly across users of the model. However, the choice model may provide a ‘general’ starting point for integrating the homebuilder’s non-programmed decision-making process when choosing the design and construction systems for mass housing development.

Identification of need: Homebuilders build homes that need to meet the market demands for housing. These external demands function as market stimuli that prompt them to generate housing projects. Thus, there is no clear-cut distinction between the two—i.e. producers’ need and buyers’ demand. In reality, market demands for housing (which can be considered to be the homebuilders’ need to produce marketable homes) must be identified when the project is initiated. In addition, housing development involves a wide variety of products and services; thus, homebuilders make a decision whether or not to produce the product and service internally or purchase them from outside suppliers. Homebuilders perceive a problem that can be solved via the buying or making actions. Thus, this stage aims to identify the ‘local’ market demands for housing which, in turn, help homebuilders understand mainly why and what they ‘need’ to buy or make (e.g. certain products and services) in order to carry out their housing project that must meet the external demands. In other words, this stage is to eliminate the “goal identification uncertainty.”

Formulation of objectives and specifications: The need for the buy-or-make decisions is defined with sufficient clarity to permit the drawing up of specifications for the buying or making actions. Specifications grow directly out of the definitions of the need, which help identify certain objectives that the buy-or-make decisions must meet. In other words, this stage is to identify the homebuilder’s task- and non task-related concerns that will be taken into consideration for their future buying or making actions. As well, it serves to establish the multiple evaluation criteria including both concerns for the value analysis of the given alternatives, in order to eliminate the ”goal/purchase matching uncertainty.”

Generation of alternatives: After the multiple evaluation criteria are established, a set of alternatives, which contribute towards mass customising an end product that corresponds to market stimuli, will be generated. In the context of the choice model for mass customization, alternatives are the products (and services) readily available on today’s market or those that homebuilders can obtain information relating to the evaluation criteria developed in the preceding stage. According to the concept of mass customization, a new combination of existing or standardized elements helps make the end product mass-customized, based on the buyer’s direct “choices” that correspond with their objectives and specifications for the buying or making actions.

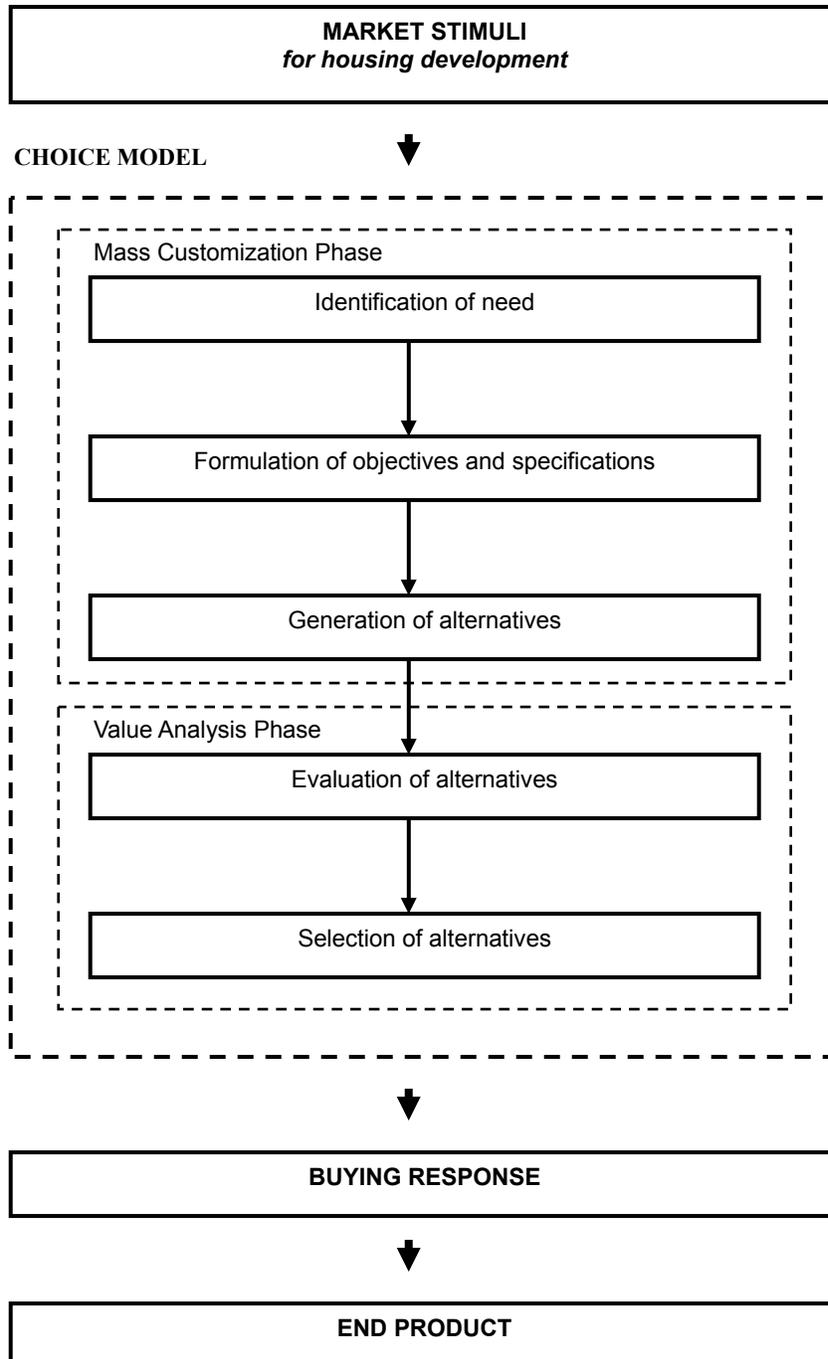
Evaluation of alternatives: The value of the alternatives formed in the preceding stage will be analysed in terms of the task and non task variables that influence the buyer’s decision making. Task variables basically reflect the characteristics of the given

alternatives with regard to the cost, quality, and time factors that correspond to the specifications formulated in the second stage, while the buyer's objectives include the non task variables. It is important to note that the choice model for mass customization focuses on analysing the value that represents not only the cost of the products or services in question, but also the buyer's needs, desires and expectations.

Selection of alternatives: The main purpose of this stage is to help the buyer understand the value of the given alternatives by visualising it in a simple form. The 'value visualization' of the given alternatives may, to a considerable extent, facilitate the buyer's final decision for the selection of the preferred alternatives, in response to market stimuli.

Furthermore, based on the specific tasks assigned to each of these five stages in the choice model for mass customization, these can be classified widely into two phases: mass customization and value analysis (Fig. 1.9). The 'mass customization' phase includes the first three stages of the proposed choice model—i.e. identification of need, formulation of objectives and specifications, and development of alternatives. In the broad sense, this first phase plays an important role in developing a set of alternatives that contribute towards mass customising an end product. On the other hand, the 'value analysis' phase covers the last two stages—i.e. evaluation and selection of alternatives. Thus, this phase actually helps evaluate the value of the given alternatives, visualising the value in order to facilitate a buyer's final decision for the selection of the preferred alternatives.

Figure 1.9: The outline of the choice model for mass customization



SUMMARY AND CONCLUSIONS

Housing development involves the purchasing actions for products and services. Thus, a homebuilder, who can be regarded as a formal organization consisting of a number of employees, needs to make buying decisions. Accordingly, the models of organizational buying behaviour, which relate to an industrial buying decision-making process, were reviewed. These indicated that task- and non task-related factors have a significant influence on the buying decision-making process. The task-oriented models reviewed reflect an organization's "economic" choices, while the non task-oriented model of perceived risk indicates that the large amount of risk and uncertainties associated with the purchase of a new product or service often functions as a hindrance that discourages an organization from adopting it. In order to reduce the amount of risk perceived by buying organizations due to the non-programmed decisions, the industrial buying decision-making process needs to be well programmed.

In fact, today's homebuilders rarely adopt (or buy) new construction approaches which to some degree interrupt their production-consumption cycle, which can be defined as routine, even though innovative building technologies have the potential to produce quality affordable homes that correspond to today's market demands for housing. With consideration of organizational buying behaviour, homebuilders seem to be unwilling to pay for information and to restrict their information search to the programmed decisions, since the search for information needed for the 'non-programmed' decisions of whether or not to purchase unfamiliar design and construction systems takes too much time, money and effort. Thus, the homebuilders' buying decision-making process needs to be well 'programmed' in order to bridge the communication (or marketing) gap extant in today's homebuilding industry.

In this paper, the conceptual framework (or decision-making process) of a choice model was developed based on the organizational buying behaviour models reviewed. The choice model attempts to help homebuilders understand the true value of possible alternatives (i.e. innovative design and/or construction systems) that contribute towards mass customization of the end product (i.e. a housing unit or development), in response to today's market demands for housing. Thus, it was termed the "choice model for mass customization" consisting of five consecutive stages: identification of need, formulation of objectives and specifications, generation of alternatives, evaluation of alternatives and selection of alternatives. Furthermore, according to the tasks assigned to each stage, these steps can be classified broadly into two phases: mass customization and value analysis. The former emphasizes the process that helps develop possible alternatives that help to mass customize an end product, while the latter serves to evaluate and visualize the value of each of the given alternatives, in order to facilitate the buyer's choices.

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