PRELIMINARY FRAMEWORK ON APPLICATION OF MEANS-END CHAIN FOR PARTICIPATORY HOUSING PERSONALISATION

Thomas Terna AULE[*1, 2]**, Mahmud Bin Mohd JUSAN**[1]**,
Roshida Binti Abdul MAJID**[1]**, Moses Iorakaa AYOOSU**[1]

[1] Department of Architecture, Faculty of Built Environment and Surveying,
Universiti Teknologi Malaysia, Skudai, Johor Bahru 81310, Malaysia

tutee1000@gmail.com[*], b-mahmud@utm.my, b-roshida@utm.my, arcayoosu@gmail.com
[2]Department of Architectural Technology, Faculty of Environmental Studies,
Federal Polytechnic, Kaura Namoda - Nigeria

ABSTRACT

The Means-End-Chain model, originally developed to elicit customer values through consequential benefits and attributes of a product in marketing research, is becoming increasingly productive in other practical disciplines such as architecture and housing. Although initial applications of the means-end chain in Architecture were mostly in housing choice and preference at individualised level, it is progressively being applied in the personalised design of mass housing schemes and housing and urban upgrade programmes at the community level. Therefore, this scoping review examined the Means-End-Chain theory as a model with high prospects in Architecture and related disciplines and its application for participatory housing personalisation at the community level. The study found that preferences for housing, like any other product-choice behaviour, have value orientation directed towards achieving specific goals, which can be analysed using its physical attributes. An attempt was finally made to develop a preliminary research framework for the application of MEC in indigenous housing personalisation through community participation.

Key Words: Housing attributes, Housing Personalisation, Personal Values, Housing Choice and Preference, community participation

1.0 INTRODUCTION

The theory of Means-End-Chain (MEC), which has become increasingly popular in recent merchandise researches, is also constantly evolving in its versatility in a quest to satisfy the ever-changing needs of humans (Cohen & Warlop, 2015; Zinas & Jusan, 2017). Simply put, MEC is a theory that links consumer values to their choice behaviour by focusing on the complete meaning of a product (Fabbrizzi, Marinelli, Menghini, & Casini, 2017; Zinas & Jusan, 2017).

Although MEC was originally developed for merchandised products in consumer and marketing research, it is becoming widespread in other propitious disciplines such as architecture, advertising, agriculture, computing, education, food science, information technology, leisure & tourism, organisational management, urban design, among others (Ho et al.,

2016; Lin et al., 2018; Richter & Bokelmann, 2018; Zinas & Jusan, 2017).

A product, which could be house, car, shoe, cloth, cream, food, drink, or even toothpaste, is usually filtered through its *Attributes* (A), linked to its utility *Consequences* (C), to satisfy personal *Values* (V) of individual or community (Moghimi, Jusan, & Izadpanahi, 2016; Moghimi, Jusan, Izadpanahi, & Mahdinejad, 2017). Therefore, ensuring A-C-V structure formulates a ladder for means-end chain analysis in product-value exploration (Da Silva & Miron, 2017; Lin et al., 2018).

Historically, Gutman (1982) pioneered the MEC model, focusing on in-depth qualitative analysis for behavioural motives of end-users (Jiang, Scott, & Ding, 2015; C. S. Lin et al., 2018). This was in turn, based on inspirations from research findings by Rokeach (1968) and Yankelovich (1981), showing that values dictate the behaviour of individuals in all facets of living. The theory was further developed and propagated by Reynolds and Gutman (1988) through the practical description of the conduct, analysis and application of MEC interviews, which has since become a useful and dynamic domain of productive enquiry (Kaciak & Cullen, 2006; Veludo-de-Oliveira et al., 2006; Zinas & Jusan, 2017).
MEC is still an influential example of preferential field research that contributes to understanding perceived values by end-users (Da Silva & Miron, 2017; Zinas & Jusan, 2017). It is usually analysed using the Summary implication matrix (SIM) and the hierarchical value map (HVM) (Lin et al., 2018; Skalkos, Tsohou, Karyda, & Kokolakis, 2020).

The application of the means-end chain in housing development is mostly in housing choice and preference (Coolen & Hoekstra, 2001; Zinas & Jusan, 2017). Housing personalisation, on the other hand, can be in the form of an individual or family renovation (Isa, 2016; Jusan, 2010), as well as through participatory personalisation for mass housing

schemes (Jusan & Sulaiman, 2005; Omar, Endut, & Saruwono, 2012). The broader approach of personalisation through participation, which allows end-users more direct, informed, and creative say in their service design and delivery (Leadbeater, 2004b, 2006), otherwise called community participation, also needs to be explored.

Therefore, this review aims to develop a research framework for the application of MEC in housing personalisation through community participation. In other words, it is an attempt to synthesis the main attributes of MEC theory, as well as housing values and expectations of the community, to arrive at possible areas of upgraded personalisation or customisation, especially in a local indigenous setting.

Therefore, the paper hopes to provide a preliminary framework for indigenous housing upgrades to improve the living standard of the poorest and most vulnerable people (Georgeson & Maslin, 2018; United Nations SDGs, 2015), in line with the Sustainable Development Goals.

2.0 METHODOLOGY

This study is a scoping review, focusing on the means-end chain theory and its application for housing personalisation. The goal is to explore some key concepts, collect results of previous inquiries, and identify some gaps regarding adopting MEC principles for housing improvements.

2.1 Means-End Chain Theory
Means-End Chain, as a research model, seeks to explore three aspects of a product, namely, attributes (A), consequences (C) and Values (V). The resulting A-C-V chain forms the hierarchical sequence for MEC analysis (Jusan, 2007; Zinas, 2013).

a. Products
In the marketing domain, a product may be viewed as whatever thing presented publicly for consideration, purchase, consumption or use, that may gratify a need or even want (Kotler & Armstrong,

2008; Talloo, 2007).

In more concrete terms, a product could either be seen as a tangible article that can be felt by touch, such as building, vehicle, ball, gadget, among others (Brown-Luthango, Reyes, & Gubevu, 2017; Xiaoyu & Beisi, 2015). It could also be viewed as an intangible creation that can merely be observed in principle, as an assurance program, culture, communication, identity, education, consulting, among others (Chew, 2009; Jha, Shalwee, Verma, & Chaudhari, 2016) (Fig. 1).

In means-end chain analysis, products are perceived as the means where consumers gain valued ends to achieve desired satisfaction. Though originally developed for merchandised products in consumer and marketing research, the popularity of MEC is craving into other promising areas such as architecture, urban design, tourism, among others (Ho et al., 2016; Veludo-de-Oliveira et al., 2006; Zinas & Jusan, 2017). Depending on the field of enquiry, a product could be a house, car, shoe, cloth, cream, or even toothpaste, with identifiable attributes (Fabbrizzi et al., 2017; Moghimi et al., 2016, 2017).

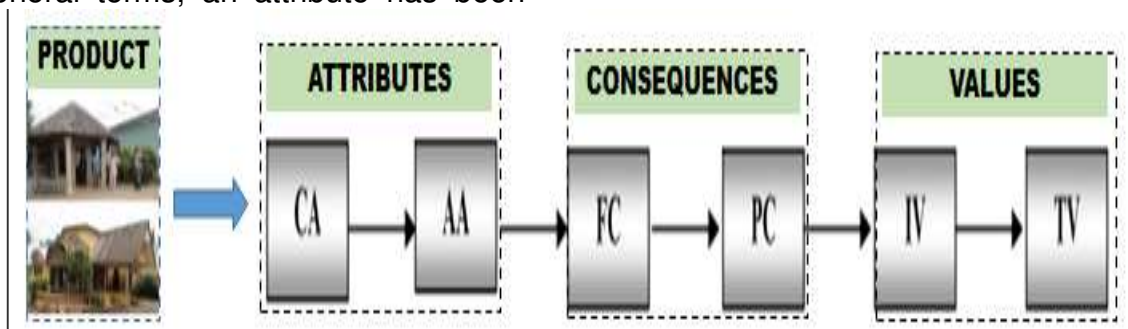**b.   Attributes**
In general terms, an attribute has been described, among others, as qualities, characteristics, features, aspects, behaviours, as well as meanings of goods, persons, amenities, things or performances that are desired or pursued by end-user consumers (Jung & Kang, 2010; Moghimi et al., 2017).

In Specific terms, attributes denote features of a service or product, which may be concrete or non-concrete (see fig. 1), subject to the manner consumers observe the produce (Gutman, 1997; Jiang et al., 2015; Zinas and Jusan, (2012b):-
  i.   Concrete Attributes (CA)
  ii.   Abstract Attributes (AA)
Concrete attributes are the noticeable characteristics of a creation that can be directly perceived. In housing development, Jusan (2007) further classified concrete attributes into elemental units and collective relationships, as shown in Fig 2.

On the other hand, abstract attributes are relatively intangible characteristics (Brito & Formoso, 2014; Zinas & Jusan, 2011). Thus, abstract attributes in housing development may be seen as cultural meanings and other social attachments perceived by end-users, such as identity, simplicity, and history, as shown in Fig 2 (Jusan, 2007; Zinas & Jusan, 2017).

Fig. 1: *Means-end chain Ladders*
Source: *Adapted by the researcher (Gutman, 1982; Leão & Mello, 2007; Zinas & Jusan, 2017).*

c.   Consequences
Consequences, as an intermediate level in the mans-end-chain analysis, can be viewed as the resultant outcome of one's behaviour (Moghimi et al., 2017; Valette-Florence & Rapacchi, 1991) or benefits derived from the consumption of a product (Gutman, 1982; Zinas & Jusan, 2017).

In other terms, consequences are synonymous with consumer feelings due to produce, which could be favourable

benefits or a negative feeling (Lin, 2002; Zinas & Jusan, 2017).

Two categories of consequences can be identified in means-end chain analysis as shown in see fig. 1 namely: -
   i.   Functional Consequences (FC)
   ii.   Psycho-social Consequences (PC)

Functional consequences denote concrete gains and service satisfactions (Zinas & Jusan, 2017), resulting from immediate, direct, tangible effects of utilising a product (Claeys et al., 1990). In other words, they arise from the express association concerning the utilisation of produce and a consumer, relating to the usefulness of the goods in a precise situation of usage.

On the other hand, psycho-social consequences are linked to the capacity of merchandise or package to gratify essential intents that are self-oriented or emblematic and create a picture that is consistent with meaningful standards of society (Brito & Formoso, 2014; Overby et al., 2004).

d.   Values
Values can be perceived as personal and communal benefits, set goals or lasting needs, and learned beliefs (Da Silva & Miron, 2017; Jiang et al., 2015; Moghimi et al., 2017; Zinas & Jusan, 2017).

They are part of individual lives that determine, modify and regulate, interactions concerning persons, community groups, government establishments, and human societies at large providing.

They can also be viewed as lasting, relatively stable, intrinsic beliefs, consisting of mental representation of needs, used by subjects as a base for processing decision making and conflict resolution (Jiang et al., 2015; Parks & Guay, 2009).

Values as the highest ladder in means-end chain analysis may be subdivided into Instrumental and Terminal Values (Da Silva & Miron, 2017; Fabbrizzi et al., 2017; Lin et al., 2018; Bako Zachariah Zinas &

Mohd Jusan, 2017) see fig. 1:-
   i.   Instrumental Values (IV)
   ii.   Terminal Values (TV)

In summary, instrumental values are the *means* to an end, while terminal values end themselves (Da Silva & Miron, 2017; Rokeach, 1973). Generally, values regarding behaviour are known as instrumental values, while others relating to end-states are termed terminal values see fig. 2.

Instrumental values are the favourite social conduct and behaviour modes adopted to attain personal objectives (Da Silva & Miron, 2017; C. S. Lin et al., 2018). Moreover, instrumental values have much of a moral or competent nature that might be necessary for achieving prosperity. Examples of Instrumental values include ambition, determination, honesty, among others, as shown in Fig 2 (Veludo-de-Oliveira et al., 2006; Zinas & Jusan, 2012a).

On the other hand, Terminal values are the perceived ultimate preferences for the final state of existence, representing the goals we seek in life (Leão & Mello, 2007; Lin et al., 2018). Examples of terminal values include peace, happiness, and friendship (Da Silva & Miron, 2017; Leão & Mello, 2007; Rokeach, 2009; Zinas & Jusan, 2012b).

e.   Domain of Values

In simplifying value categorisation, Schwartz (1992; 1994) derived ten (10) motivational domains of values attainment namely:-
   i.   **Achievement** (ambition, esteem, success)
   ii.   **Benevolence** (true friendship, charitable, helping)
   iii. **Conformity** (self-discipline, respect, politeness)
   iv.   **Hedonism** (enjoying life, fun, pleasure)
   v.   **Power** (wealth, authority, social power)

vi. **Security** (cleanness, reliability, family security)

vii. **Self-direction** (curiosity, determination, independence)

viii. **Stimulation** (exciting life, confidence, daring)

ix. **Tradition** (devoutness, loyalty, modesty)

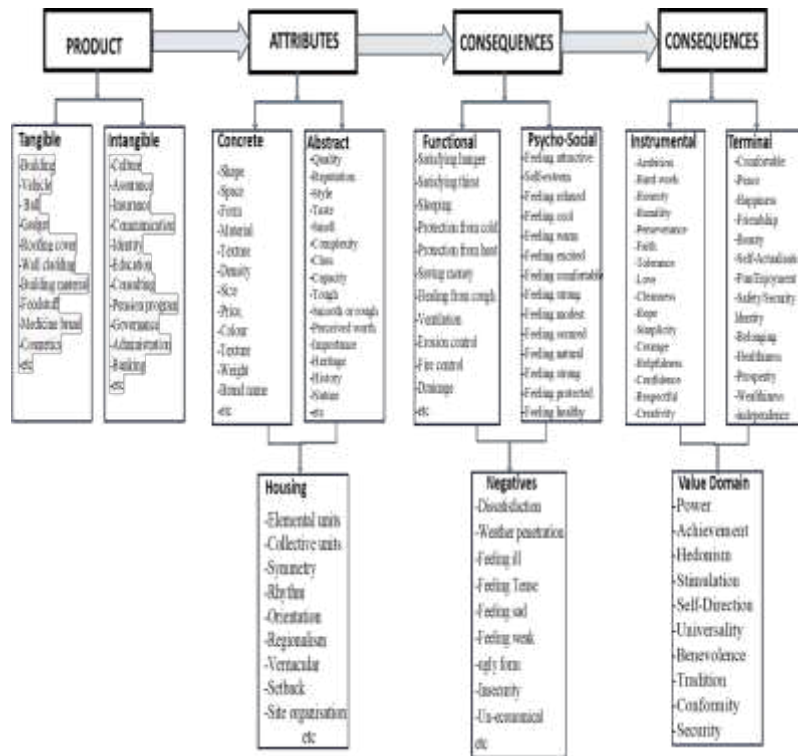x. **Universalism** (unity with nature, conservation, social justice)

Fig. 2: *Means-end chain details*
Source: *Adapted by the researcher from (Brown-Luthango et al., 2017; Lin et al., 2018; Moghimi et al., 2017; Rokeach, 1973; 2009; Schwartz, 1992; 1994; Xiaoyu & Beisi, 2015; Zinas & Jusan, 2017).*

2.2 Means-End Chain in Housing Personalisation

Personalisation simply means user(s) involvement in designing products and services in a way that is most suited to them. According to Carr and Dittrich (2012, 2013), personalisation focuses on individuals' aspirations, preferences, and strengths, usually directed at placing people at the heart of the procedure of recognising their desires and choice-making about how to live their lives.

In the sphere of Physical development, Jusan (2007) and Zinas (2013) noted that the acceptability and utilisation of the MEC research approach in housing personalisation are still at their growing state. The meaning is that written works in the subject area are yet to be copiously published.

Studies have found that housing is a multifaceted and diverse creation complex (Timmermans, Molin, & van Noordwijk, 1994; Zinas & Jusan, 2011).

Based on the dimension of choice as well as stated perceptions of housing preferences, it has been established that:-

i. Its attributes could describe a house or built environment.

ii. Person(s) gain some part-worth consequential utility from respective attribute levels.

iii. Individuals could aggregate their part-worth usage to attain a general valued choice or preference in order of some common good.

Values of users should therefore be integrated into their housing as a product. The values also explain why users find some homes unsatisfactory for their comfortable living and prefer to personalise them at some private family level.
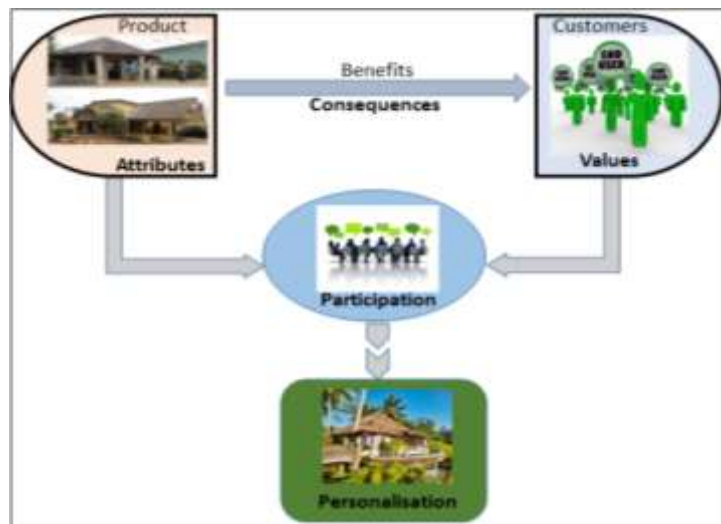

Fig. 3: *Elements of Housing Personalisation*
Source: *Conceptualised by Researcher (Mahmud Bin Mohd Jusan, 2007; Leadbeater, 2004a; 2004b; Tames, 2004).*

3.0 RESULT AND DISCUSSION

Since it has been established that its attributes can succinctly describe housing as a tangible product in its entirety of parts, users' choices can therefore be attained to satisfy their valuable preferences.

3.1 FRAMEWORK FOR PARTICIPATORY PERSONALISATION

Personalisation generally involves two major elements: product and consumer(s) (Fanfarillo, Bellefonds, Ratajczak, & Abraham, 2018). The product possesses definite attributes to meet the specific needs of consumers. On the other hand, consumers have some personal values they expect to gain satisfaction (Nichifor & Olariu, 2008; Pileliene & Liesionis, 2016) see fig. 3.

In the built environment, end-users also strive to enjoy some level of personal and sometimes collective fulfilments (Isa, 2016; Zavei & Jusan, 2011). Other times,

they try to attain some unique identity and meaning from their housing products (Jusan, 2010; Omar et al., 2012). Hence the need to participate in housing developments that are meant for them just as consumers participate through feedback to customise some product (Fanfarillo et al., 2018; Gandhi, Magar, & Roberts, 2014; Lee & Chang, 2011).

Housing end-users also seek to maximise comfort and value satisfaction through personalisation in the form of addition, reduction or even colourful delineations (Isa, 2016; Jusan, 2010; Omar et al., 2012)

Generally, as summarised by Bailie & Watson (2018), Hes (2017), and Noori (2017), a whole community ought to participate in project developments to ensure value preservation in housing design, as well as attainment of social and cultural sustainability in their built environments.
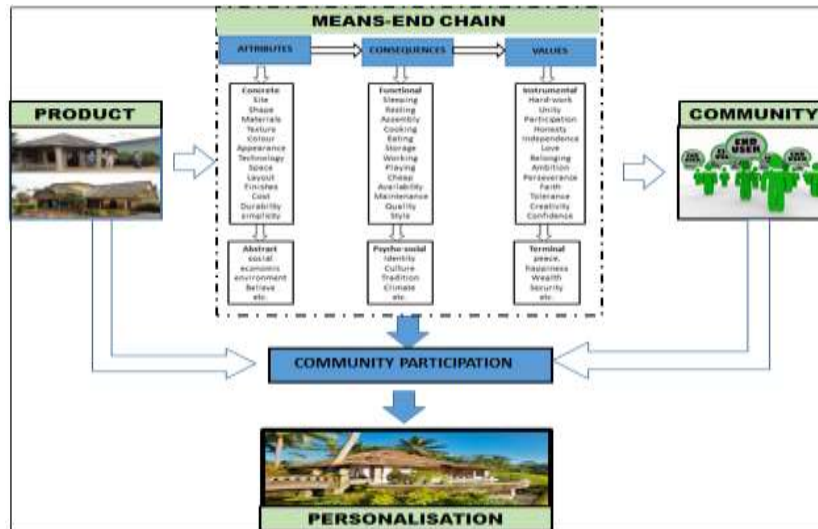
Fig.4: *Framework for Housing Personalisation through Participation*
Source: *Conceptualised by Researcher*

4.0 CONCLUSION

The Means-end chain (MEC) theory, which was first developed for marketing merchandise, is also gaining productivity in other multidisciplinary fields such as architecture, housing, and urban development. MEC could be seen as a gainful tool for eliciting personal values through attributes of a product to personalise and customise (Hassan & Hamdan, 2012; Wong & Jusan, 2017).

While at a micro-level, an individual or family may decide to personalise their home to satisfy their socio-cultural values, personalisation at the community level requires the participation of the entire people in project planning, design, and implementation to reflect their value orientations. Regarding community participation, laddering interviews, a hallmark of MEC, could also serve as a viable step for value elicitation and other qualitative approaches.

In housing development where concrete attributes such as shape, colour, materials, among others, can be easily identified, the MEC laddering interview could be utilised to elicit abstract meanings, psycho-social consequences as well as instrumental and terminal values of the people.

The MEC research model should also be explored to improve the lives of the poorest and most vulnerable in a blighted settlement among other indigenous settings.

REFERENCES

Akpoyomare, O. Ben, Adeosun, L. P. K., & Ganiyu, R. A. (2013). The influence of product attributes on consumer purchase decision in the Nigerian food and beverages industry: A study of Lagos metropolis. *American Journal of Business and Management*, *2*(1), 196–201. https://doi.org/10.11634/216796061706211

Allanwood, G., & Beare, P. (2014). *User experience design: Creating designs users really love*. London: Bloomsbury.

Anitsal, M. M., & Cadotte, E. R. (2014). The application of means-end theory to understanding the value of simulation-based learning. *Developments in Business Simulation and Experiential Learning*, 1–12.

Anıtsal, M. M. (2007). *An Application of the Means-End Theory: Measurement of Delivery and Consumption of an Educational Service*. University of Tennessee.

Bailie, C., & Watson, L. (2018). *Community involvement strategy 2018-2023: Inspiring communities & shaping our services*. https://doi.org/10.4324/9781351298209-6

Balla, E., & Deari, H. (2015). How do product's attributes affect consumer behavior: An empirical evidence of the brand choice. *International Journal of Economics, Commerce and Management*, III(8), 38–46.

Botschen, G., Thelen, E., & Pieters, R. (1997). Using Means-End Structures for Benefit Segmentation in a Service Industry. *Advances in Services Marketing*, *33*(1/2), 38–58. https://doi.org/10.1007/978-3-322-91507-8_10

Brito, J. N. de S., & Formoso, C. T. (2014). Using the Means-End approach to understand perceived value by users of social housing. *Value in Construction*, *22*, 331–341.

Brown-Luthango, M., Reyes, E., & Gubevu, M. (2017). Informal settlement upgrading and safety: experiences from Cape Town, South Africa. *Journal of Housing and the Built Environment*, *32*(3), 471–493. https://doi.org/10.1007/s10901-016-9523-4

Carr, S., & Dittrich, R. (2012). *Personalisation: A rough guide*.

Carr, S., & Dittrich, R. (2013). *Personalisation: A rough guide (Revised Edition)*.

Ceptureanu, S. I., Ceptureanu, E. G., Luchian, C. E., & Luchian, I. (2018). Community based programs sustainability: A multidimensional analysis of sustainability factors. *Sustainability (Switzerland)*, *10*(3), 1–15. https://doi.org/10.3390/su10030870

Changing Lives Service Development Group. (2009). *Personalisation: A shared understanding* (R. R. Donnelley, Ed.). Edinburgh.

Chew, M. M. (2009). Cultural sustainability and heritage tourism development: Problems in developing Bun festival tourism in Hong Kong. *Journal of Sustainable Development*, *2*(3), 34–42. https://doi.org/10.5539/jsd.v2n3p34

Claeys, C., Swinnen, A., & Abeele, V. P. (1990). Consumers' means-end chains for " think " and " feel " products. *Onderzoeksrapport Nr 9018*, *2376*(23), 1–44.

Cohen, J. B., & Warlop, L. (2015). *A motivational perspective on means-end chains*.

Coolen, H., Boelhouwer, P., & Van Driel, K. (2002). Values and goals as determinants of intended tenure choice. *Journal of Housing and the Built Environment*, *17*(3), 215–236. https://doi.org/10.1023/A:1020212400551

Coolen, H., & Hoekstra, J. (2001). Values as determinants of preferences for housing attributes. *Journal Of Housing and the Built Environment*, *16*, 285–306. https://doi.org/10.1023/A

Costa, A. I. A., Dekker, M., & Jongen, W. M. F. (2004). An overview of means-end theory: Potential application in consumer-oriented food product design. *Trends in Food Science and Technology*, *15*(7–8), 403–415. https://doi.org/10.1016/j.tifs.2004.02.005

Da Silva, M. N., & Miron, L. I. G. (2017). Hierarchy of value perceived by groups of users about their neighbourhood. In K. Walsh, R. Sacks, & I. Brilakis (Eds.), *International Group for Lean Construction* (pp. 193–200). https://doi.org/10.24928/2017/0186

Den Uijl, L. C., Kremer, S., Jager, G., Van der Stelt, A. J., De Graaf, C., Gibson, P., … Lawlor, J. Ben. (2015). That's why I take my ONS. Means-end chain as a novel approach to elucidate the personally relevant factors driving ONS consumption in nutritionally frail elderly users. *Appetite*, *89*, 33–40. https://doi.org/10.1016/j.appet.2015.01.016

Dibley, A., & Baker, S. (2001). Uncovering the links between brand choice and personal values among young British and Spanish girls. *Journal of Consumer Behaviour*, *1*(1), 77–93. https://doi.org/10.1002/cb.55

Erman, O. K. (2004). *The analysis of symbolic performance in mass housing settlements*. *39*, 449–457. https://doi.org/10.1016/j.buildenv.2003.09.006

Fabbrizzi, S., Marinelli, N., Menghini, S., & Casini, L. (2017). Why do you drink? A means-end approach to the motivations of young alcohol consumers. *British Food Journal*, *119*(8), 1854–1869. https://doi.org/10.1108/BFJ-12-2016-0599

Fanfarillo, B. S., Bellefonds, N. De, Ratajczak, D., & Abraham, M. (2018). *The building blocks of personalization*. Boston.

Forbes, S. L. (2008). *The influence of individual characteristics, product attributes and usage situations on consumer behaviour: An exploratory study of the New Zealand, Australian, UK and US wine markets* (Lincoln University).

Franke, N., Keinz, P., & Steger, C. J. (2009). Testing the value of customization: When do customers really prefer products tailored to their preferences? *Journal of Marketing*, *73*(5), 103–121. https://doi.org/10.1509/jmkg.73.5.103

Gandhi, A., Magar, C., & Roberts, R. (2014). How technology can drive the next wave of mass customization. *MC Kinsey & Company's Business Technology Jurnal*, *32*(Winter 2013), 1–8. https://doi.org/10.1016/j.techfore.2015.02.015

Gengler, C. E., & Reynolds, T. J. (1995). Consumer understanding and translation of analysis and strategic advertising strategy: Laddering data. *Journal of Advertising Research*, (August), 19–33.

Georgeson, L., & Maslin, M. (2018). Putting the United Nations Sustainable Development Goals into practice: A review of implementation, monitoring, and finance. *Geo: Geography and Environment*, *5*(1), 1–25. https://doi.org/10.1002/geo2.49

Grandgirard, J., Poinsot, D., Krespi, L., Nénon, J. P., & Cortesero, A. M. (2002). Costs of secondary parasitism in the facultative hyperparasitoid Pachycrepoideus dubius: Does host size matter? *Entomologia Experimentalis et Applicata*, *103*(3), 239–248. https://doi.org/10.1023/A

Gutman, J. (1982). A means-end chain model based on consumer categorization processes. *Journal of Marketing*, *46*(2), 60. https://doi.org/10.2307/3203341

Gutman, J. (1997). Means-end chains as goal hierarchies. *Psychology & Marketing*, *14*(6), 545–560.

Hassan, S., & Hamdan, H. (2012). Means-End Chain Approach to Study Muslim Consumers' Values and Preference towards Genetically Modified (GM) Food in Malaysia. *International Journal of Arts and Commerce*, *1*(4), 319–327.

Hes, Dominique, & Plessis, C. du. (2015). *Designing for Hope: Pathways to regenerative sustainability*. https://doi.org/10.4324/9781315755373

Hes, Dominque. (2017). *Next Generation Engagement project: Impact of community engagement on sustainability outcomes*. Melbourne.

Ho, C.-I., Huang, S.-C., & Lin, P. (2016). An investigation of working holiday experiences: A means-end analysis approach. *Travel and Tourism Research Association: Advancing Tourism Research Globally*, *11*, 1–12.

Hofstede, F. Ter, Audenaert, A., Steenkamp, J. B. E. M., & Wedel, M. (1998). An investigation into the association pattern technique as a quantitative approach to measuring means-end chains. *International Journal of Research in Marketing*, *15*(1), 37–50. https://doi.org/10.1016/S0167-8116(97)00029-3

Isa, A. A. (2016). *End-users' personalization potentials and factors towards effective housing occupancy*. PhD Thesis, Universiti Teknologi Malaysia.

Jha, B., Shalwee, A., Verma, S., & Chaudhari, P. R. (2016). Green Buildings Concept towards Sustainable Urban Development and Panacea for Global Warming. *International Journal of Latest Research in Engineering and Technology*, *2*(1), 35–41.

Jiang, S., Scott, N., & Ding, P. (2015). Using means-end chain theory to explore travel motivation: An examination of Chinese outbound tourists. *Journal of Vacation Marketing*, *21*(1), 87–100. https://doi.org/10.1177/1356766714535599

Jung, Y., & Kang, H. (2010). User goals in social virtual worlds: A means-end chain approach. *Computers in Human Behavior*, *26*(2), 218–225. https://doi.org/10.1016/j.chb.2009.10.002

Jusan, M. B. M., & Sulaiman, A. B. (2005). Personalization as a sustainable approach to mass housing: The fundamental theory. *Conference Proceeding on Sustainable Building South-Esat Asia, Malaysia*, *11–13*(April), 502–514.

Jusan, M.B.M. (2010). *Renovation for personalization: A development arm for sustainable housing* (1st, Ed.). Penerbit: UTM Press.

Jusan, Mahmud Bin Mohd. (2007). *Personalization as a means of achieving person-environment congruence in Malaysian housing*. Universiti Teknologi Malaysia.

Kaciak, E., & Cullen, C. W. (2006). Analysis of means-end chain data in marketing research. *Journal of Targeting, Measurement and Analysis for Marketing*, *15*(1), 12–20. https://doi.org/10.1057/palgrave.jt.5750028

Kotler, P., & Armstrong, G. (2008). *Principles of marketing* (12th ed.; J. Shelstad & D. Parker, Eds.). London: Pearson Education Inc.

Leadbeater, C. (2004a). *A summary of personalisation through participation: A new script for public services*. https://doi.org/5 GBP

Leadbeater, C. (2004b). *Personalisation through participation: A new script for public services*. London: Demos.

Leadbeater, C. (2006). The future of public services: personalised learning. In Demos (Ed.), *Personalisation through participation: A new script for public services* (2nd ed., pp. 101–114). London: Demos.

Leão, A. L. M. de S., & Mello, S. C. B. de. (2007). The means-end approach to understanding customer values of an on-line newspaper. *Brazilian Administration Review*, *4*(1), 1–20. https://doi.org/www.anpad.org.br/bar

Lee, H. H., & Chang, E. (2011). Consumer attitudes toward online mass customization: an application of extended technology acceptance model. *Journal of Computer-Mediated Communication*, *16*(2), 171–200. https://doi.org/10.1111/j.1083-6101.2010.01530.x

Lin, C.-F. (2002). Attribute-consequence-value linkages: A new technique for understanding customers' product knowledge. *Journal of Targeting, Measurement and Analysis for Marketing*, *10*(4), 339–352. https://doi.org/10.1057/palgrave.jt.5740058

Lin, C. S., Jeng, M. Y., & Yeh, T. M. (2018). The elderly perceived meanings and values of virtual reality leisure activities: A means-end chain approach. *International Journal of Environmental Research and Public Health*, *15*(4). https://doi.org/10.3390/ijerph15040663

Mahdavinejad, M., & Abedi, M. (2011). Community-oriented landscape design for sustainability in architecture and planning. *Procedia Engineering*, *21*, 337–344. https://doi.org/10.1016/j.proeng.2011.11.2024

Moghimi, V., Jusan, M. B. M., & Izadpanahi, P. (2016). Iranian household values and perception with respect to housing attributes. *Habitat International*, *56*, 74–83. https://doi.org/10.1016/j.habitatint.2016.04.008

Moghimi, V., Jusan, M. B. M., Izadpanahi, P., & Mahdinejad, J. (2017). Incorporating user values into housing design through indirect user participation using MEC-QFD model. *Journal of Building Engineering*, *9*(November 2016), 76–83. https://doi.org/10.1016/j.jobe.2016.11.012

Mugge, R., Schoormans, J. P. L., & De Lange, A. (2007). Consumers' appreciation of product personalization. In G. Fitzsimons & V. Morwitz (Eds.), *Advances in Consumer Research* (Vol. 34, pp. 339–341).

Nichifor, B., & Olariu, I. (2008). Consumers products and services value perception. *Studies and Scientific Researches*, (13), 61. https://doi.org/10.29358/sceco.v0i13.19

Noori, H. (2017). Community participation in sustainability of development projects: A case study of national solidarity program. *Journal of Culture, Society and Development*, *30*, 27–34.

Omar, E. O., Endut, E., & Saruwono, M. (2012). Personalisation of the Home. *Procedia - Social and Behavioral Sciences*, *49*(Cooper 1975), 328–340. https://doi.org/10.1016/j.sbspro.2012.07.031

Orzechowski, M. A. (2004). *Measuring housing preferences using virtual reality and Bayesian belief networks* (Eindhoven University of Technology). https://doi.org/10.6100/IR582392

Overby, J. W., Gardial, S. F., & Woodruff, R. B. (2004). French versus American consumers' attachment of value to a product in a common consumption context: A cross-national comparison. *Journal of the Academy of Marketing Science*, *32*(4), 437–460. https://doi.org/10.1177/0092070304265697

Pai, P., & Arnott, D. C. (2013). User adoption of social networking sites: Eliciting uses and gratifications through a means–end approach. *Computers in Human Behavior*, *29*(3), 1039–1053. https://doi.org/10.1016/j.chb.2012.06.025

Parks, L., & Guay, R. P. (2009). Personality, values, and motivation. *Personality and Individual Differences*, *47*(7), 675–684. https://doi.org/10.1016/j.paid.2009.06.002

Pileliene, L., & Liesionis, V. (2016). Influence of product attributes on milk consumer's choice in Lithuania. *Research for Rural Development*, *2*(January 2007), 223–228.

Reynolds, J., & Gutman, T. J. (1988). Laddering theory, method, analysis and interpretation. *Journal of Advertising Research*, *28*(1), 11–31. https://doi.org/10.1017/CBO9781107415324.004

Reynolds, T. J., & Gutman, J. (1984). Advertising is image management. *Journal of Advertising Research*, *24*(1), 27–36.

Richter, B., & Bokelmann, W. (2018). The significance of avoiding household food waste – A means-end-chain approach. *Waste Management*, *74*, 34–42. https://doi.org/10.1016/j.wasman.2017.12.012

Rokeach, M. J. (1968). *Beliefs, attitudes, and values*. San Francisco: Jossey Bass.

Rokeach, M. J. (1973). *The nature of human values*. New York: Free Press.

Rokeach, M. J. (2009). Applying the means-end chain theory and the laddering technique to the study of host attitudes to tourism. *Journal of Sustainable Tourism*, *17*(3), 337–355. https://doi.org/10.1080/09669580802159735

Rugg, G., Eva, M., Mahmood, A., Rehman, N., Andrews, S., & Davies, S. (2002). Eliciting information about organizational culture via laddering. *Information Systems Journal*, *12*(4), 215–229. https://doi.org/10.1046/j.1365-2575.2002.00124.x

Scholderer, J., & Grunert, K. G. (2004). *The validity of the means-end chain model of consumer behaviour*. Aarhus.

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology*, *25*, 1–65. https://doi.org/10.1016/S0065-2601(08)60281-6

Schwartz, S. H. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues*, *50*(4), 19–45. https://doi.org/10.1111/j.1540-4560.1994.tb01196.x

Shamsher, R. (2014). The importance of product attributes influencing purchase decision: A comparative study between FMCG laundry soaps. *D.U. Journal of Marketing*, *15*(15), 231–244.

Skalkos, A., Tsohou, A., Karyda, M., & Kokolakis, S. (2020). Identifying the values associated with users' behavior towards anonymity tools through means-end analysis. *Computers in Human Behavior Reports*, *2*(April), 100034. https://doi.org/10.1016/j.chbr.2020.100034

Talloo, T. J. (2007). *Business organisation and management*. Delhi: Tata McGraw Hill.

Tames, E. (2004). Use, appropriate and personalization of space in Mexican housing projects and informal settlements. *Traditional Dwellings and Settlements Review*, *15*(2), 33–48.

Timmermans, H., Molin, E., & van Noortwijk, L. (1994). Housing choice processes: Stated versus revealed modelling approaches. *Netherlands Journal of Housing and the Built Environment*, *9*(3), 215–227. https://doi.org/10.1007/BF02496997

United Nations SDGs. (2015). Transforming our world: The 2030 agenda for sustainable development. In *United Nations Department of Economic and Social Affairs*.

Valette-Florence, P., & Rapacchi, B. (1991). Improvements in Means-end Chain Analysis: Using Graph Theory and Correspondence Analysis. *Journal of Advertising Research*, *31*(1), 30–45.

Veludo-de-Oliveira, T. M., Ikeda, A. A., & Campomar, M. C. (2006). Discussing laddering application by the means-end chain theory. *The Qualitative Report*, *11*(4), 626–642.

Wong, C. S., & Jusan, M. B. M. (2017). Application of means-end chain research model to explore attributes of architecture studio. *International Journal of Applied Engineering Research*, *12*(4), 498–508.

Woodruff, R. B. (1997). Customer value: the next source for competitive advantage. *Journal of the Academy of Marketing Science*, *25*(2), 139-153.

Xiaoyu, L., & Beisi, J. (2015). The intangible sustainability on tangible flexibility: A case study of vernacular architecture in Shangjiayang Village, Taishun, China (1814 - 1949). *Procedia - Social and Behavioral Sciences*, *179*, 141–153. https://doi.org/10.1016/j.sbspro.2015.02.417

Zanoli, R., & Naspetti, S. (2002). Consumer motivations in the purchase of organic food: A means-end approach. *British Food Journal*, *104*(8), 643–653. https://doi.org/10.1108/00070700210425930

Zavei, S. J. A., & Jusan, M. B. M. (2011). Users' motivations and housing attributes: A theoretical framework. *OS Number: 03*, *3*(January), 1–5.

Zinas, Z. B., & Jusan, M. B. M. (2011). Methodological and conceptual framework of means-end chain model for housing environment research. *ATBU Journal of Environmental Technology*, *4*(1), 79–93.

Zinas, Z. B., & Jusan, M. B. M. (2017). Choice behaviour of housing attributes: Theory and measurement. *Asian Journal of Environment-Behaviour Studies*, *2*(2), 23. https://doi.org/10.21834/aje-bs.v2i2.175

Zinas, Z. B., & Jusan, M. B. M. (2012). Housing Choice and Preference: Theory and Measurement. *Procedia - Social and Behavioral Sciences*, *49*, 282–292. https://doi.org/10.1016/j.sbspro.2012.07.026

Zinas, Z. B., & Jusan, M. B. M. (2012). Means-end chain model framework for measuring housing environment choice behavior. *Journal of Civil Engineering and Architecture*, *5*(6), 535–547. https://doi.org/10.17265/1934-7359/2011.06.007

Zinas, Z. B., & Jusan, M. B. M. (2014). Perceptual orientation of housing floor finishes choice and preference. *Global Journal of Sociology*, *4*(1), 5–9.

Zinas, Z. B. (2013). Laddering as a research technique for measuring housing choice and preference. *Journal of Environmental Sciences and Resources Management*, *5*(2), 92.