

E-Lifestyle Conceptualization: Measurement Model Validation Using Variance Based Structural Equation Modeling (SEM-PLS)

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Received: September 27, 2014

Accepted: October 1, 2014

Online Published: January 28, 2015

doi:10.5539/mas.v9n2p307

URL: <http://dx.doi.org/10.5539/mas.v9n2p307>

Abstract

The purpose of this paper is to examine the epistemic nature of e-lifestyle conceptualization and to assess a proposed second-order formative-formative model for consumer e-lifestyle. Through a two-step approach of formative-formative model using partial least square analysis, the four constructs of consumer e-lifestyle were assessed and validated. The empirical results reveal the absence of multicollinearity while nomological, and discriminant validity were affirmed. This study has confirmed the e-lifestyle model as formative first-order and second-order hierarchical latent construct which was previously operationalized by means of reflective dimensions. This investigation merely represents a starting point in e-lifestyle conceptualization using SEM-PLS. To improve the validity and generalization of the scale proposed in the study, further cross-cultural validation through a greater population is recommended. Beyond validating e-lifestyle model as a second-order construct, this study is able to provide ample opportunity for marketers to know more about the weight and importance of each dimension of e-lifestyle. This research contributes to current consumer behavior literature on what factors affect consumer e-lifestyle that pave a way for marketers to have a better understanding toward their consumer e-lifestyle and hence execute related marketing strategies.

Keywords: consumer e-lifestyle, reflective measurement model, formative measurement model, partial least square analysis, second-order construct, Malaysia

1. Introduction

Recently, remarkable growth is observable in the mobile communication market around the world. Specifically, more people use Internet services on the mobile phones compared to before as it is more convenient and facilitates the communication. Indeed, the trend has considerably influenced and altered the way people live in the current environment. In addition to that, understanding consumer lifestyle has extensively been conceived beneficial in tailoring appropriate product and/or services to particular target segments, that has provided ample opportunity exist to conceptualize an e-lifestyle instrument (Yu, 2011). By doing so, marketing management could be able to build a better strategic planning based on understanding their potential consumer's lifestyle toward using particular product and/or service. Remarkably, many advertisers prefer to profile their brand relying on consumer lifestyle, as different brands within a product and/or service segment are commonly hard to distinguish in terms of product and/or service attributes (Biel, 1992). In the similar sense, Hornik (1989) notes the premise of psychographics is that the more we know about the people's lifestyle, the more we can understand, communicate and respond to them effectively. Consequently, it is obvious that marketing communication is more effective when consumer lifestyles are fully understood. In another word, lifestyle research is of capital interest for managers to visualize their audiences more appropriately (Vyncke, 2002).

Lifestyle studies are prevalently based on extensive surveys using quantitative methods (Vyncke, 2002). Lifestyle was studied using large set of activities, interests, and opinions (AIO) rating statements developed by Wells and Tigert (1971). Plummer (1977) conceptualized the notion of lifestyle term in generic perspective without statistical results. Kucukemiroglu (1999) used AIO statements to measure Turkish consumer's belief toward their activities, interests and opinions. Their analysis extracted eight factors explain 68.55 percent of variance; however, they didn't consider consumer values in lifestyle measurement model. This can be explained by the notion that individual's value preferences are part of their basic worldviews (Struch *et al.*, 2002), and

hence important determinants of lifestyle (Vyncke, 2002). Vyncke (2002) used cluster analysis to conceptualize lifestyle from different lenses including ad hoc AIO surveys and stable terminologies of values, esthetics styles and life visions. However, their study is lacked providing statistical support for the measurement instruments.

More recently, Lee *et al.* (2009) conceptualized consumer lifestyle in terms of four distinct factors incorporating e-shopping preference, Internet involvement, fashion consciousness, and leisure orientation. Reliability value for each constructs was moderate (ranged about 0.75) and all factors considered reflective while they are different in nature. Yu (2011) operationalized e-lifestyle incorporating AIO and VALS rating statements. Yu (2011) deployed reflective measurement model for each construct (e.g., e-activities, e-interests and etc.), while items for each construct carried different contents. In terms of e-activities, 13 items were asked from the respondents reflectively, however, each item is about different type of activity. For example, the ranges of activities start from using Internet to perform job, to participate social event and arrange trips which are completely different in meaning and hence each carries different weight. Therefore, it would be odd to group them as reflective indicators, but rather formative as each carries different weight. Consequently, marketers will be confused about the major activities which are preferred by the consumers.

Previous literature on consumer lifestyle has being plagued with inconsistency with regard its correlation with consumer behavior failed to satisfy marketers' needs (Vyncke, 2002). These empirical pitfalls reveal that more measurement-related empirical studies need to be conducted. In fact, the potential doubt has risen to either consider AIO and VALS rating measurement indicators as reflective or formative indicators for construct of e-lifestyle. In fact, measurement models are commonly misspecified in empirical efforts (Podsakoff *et al.*, 2006). According to Podsakoff *et al.* (2006), measurement model misspecification is conceived as latent variable having formative measure are incorrectly specified as having reflective measurement or vice versa. Consequently, measurement model misspecification can affect the estimates of the measurement and structural model parameters (Jarvis *et al.*, 2003). In respect to these concerns, the study intends to assess the measurement model specification of e-lifestyle using AIO and VALS rating statements with four dimensions, namely, e-activities, e-interests, e-opinions, and e-values. Although, e-lifestyle was validated previously by Yu (2011), this study used different validity assessment tool in the context of Malaysian consumers. In particular, this study implemented a second-order construct for e-lifestyle in order to reduce complexity in the model (Hair *et al.*, 2013). Moreover, previous studies considered e-lifestyle as a reflective measurement model, while there are some dissimilarity among the group of dimensions that need to be formatively defined. Furthermore, previous studies has discussed the lifestyle instrument which established initially in the late 1970s and early 1980s (Lin, 2003). Therefore, the findings might not be appropriately capturing the consumer's lifestyle in today's real world due to boom of technology and various Internet services applications (Chen and He, 2006). This study, hence, contributes to the emerging consumer behavior literature pertinent to consumer lifestyle by focusing on its measurement model assessment.

Based on above argument, the primary goal of the research is to validate first-order and second-order construct of e-lifestyle that could provide marketers beneficial insights of what triggers consumer's e-lifestyle when they use particular services. Accordingly, subsequent section includes review of literature dominantly related to the lifestyle and e-lifestyle. Given the extant literature review, construct of e-lifestyle is developed and tested within the defined sample group. Measurement assessment and two-step approach (i.e., repeated method) were used conducting Partial Least Square (PLS) analysis. Finally the results are discussed and conclusion has been addressed.

2. Conceptual Differences between Reflective and Formative Measurement Model

Generally, the measurement model stipulates the association between the measurement items and the underlying latent variables (Chin, 1998). In particular, the association between the measurement items and the underlying latent variables can be either formative or reflective, or both formative and reflective in nature (Fornell and Larcker, 1981). The decision, whether to choose reflective or formative, have to be based on theoretical considerations (Gotz *et al.*, 2010).

Indeed, the formative and reflective measurement models differ at theoretical and nomological point of views (Petter *et al.*, 2007b). From theoretical standpoint, reflective measurement models are conceived as manifestation of the latent variable, while formative model provides a means of measured variables defining the characteristics of correspondent latent variable (Hair *et al.*, 2013). In the similar sense, when a latent variable (e.g., e-lifestyle in this research paper) is measured by some formative indicators, it is presumed that the observed indicators cause the latent variable. Conversely, when a latent variable is measured by some reflective indicators, it is assumed that the latent variable causes the indicators (Bollen, 1989). Additionally, from nomological standpoint, previous

research compare between formative and reflective measurement models mainly based on four prominent criteria including direction of causality, interchangeability of the measures, correlation among the measures and nomological net (Jarvis *et al.*, 2003).

3. Previous Research on Consumer E-Lifestyle

Traditional segmentation strategies are based on individual socio-demographic, attitudinal, or psychographic characteristics (Penz, 2006). The term psychographic puts together 'psychology and 'demographics' to add richness of both social and behavioural sciences to demographics in order to improve understanding of consumer behaviour (Demby, 1974). The first spectrum of psychographic studies was originally rooted in personality profiles with the most frequently used scale for measuring general aspects of personality traits. However, these researches being plagued with inconsistent correlations with consumer behaviour (Vyncke, 2002). In the second spectrum of psychographic research, concept of personality has been replaced by concept of 'lifestyle' which was introduced by Lazer (1963). To date, the term lifestyle has become prevalent amongst scholar in the field of consumer behaviour, and hence, the term is used in this research.

Lifestyle is commonly referred to patterns in which people live and spend their time and money (Kaynak and Kara, 2001). Lifestyle can also be defined as patterns of action which differentiate people in order to help to understand what people do and why they do it (Chaney, 1996). Accordingly, the term lifestyle has become central, while the personality concept has become marginal to psychographic studies and the latter is currently replaced by lifestyle concept (Vyncke, 2002). The term lifestyle is rather widespread than that of socioeconomic and demographic characteristics (Blackwell *et al.*, 2001). More importantly, individual lifestyles seem to be more effective predictor of consumer behaviour including disposition and use of products and services (Murry *et al.*, 1997). Thereby, decision makers will be able to connect to their consumers strongly by recognizing the lifestyle characteristics of potential consumers (Lee *et al.*, 2009).

Hyper merging of the Internet and mobile usage, particularly among the youth, has dramatically impacted and shaped the way people live since last decade (Yu, 2011). Therefore, understanding the consumer lifestyles has been reflected useful in bringing suitable products and/or services to particular target segments of information and communication technology and hence, concept of e-lifestyle has been introduced that could help marketers to decide precisely within this target segment (Chen and He, 2006). Furthermore, Yu (2011) develops and validate an e-lifestyle construct that could offer marketers some understandings of what triggers people's e-lifestyles. E-lifestyle, in this research, conceives as patterns in which people live and spend their time and money through Internet and electronic, which this definition is consistent with that of Kaynak and Kara (2001). Lifestyle theories agreed that consumer behaviours can be anticipated toward sociological and psychological variables. Consistently, consumer e-lifestyle is also predictable and assessable by psychological and sociological constructs (Yu, 2011).

Myriad of researches have assessed the lifestyle construct, but among various lifestyle scales, two conceptualizations are popular and broadly used. The first one is lifestyle's construct conceptualizing by three dimensions of activities, interests, and opinions (AIO), originally developed by Wells and Tigert (1971). The second construct includes value, attitude, and lifestyles (VALS) rating scale, which operationalized by seminal work of Mitchell (1983). Wells and Tigert (1971) defined activities as "actual observable behaviours, interests as the continuous paying of attention to certain objects, and opinions as responses to specific events". Since then, lifestyle has been conceptualized based on AIO approach extensively to help marketers tailoring particular service and/or product to various target segments (Bates *et al.*, 2001, Green *et al.*, 2006, Hur *et al.*, 2010).

Mitchell (1983) developed VALS instrument by observing the associations between individual actions, values, lives, and beliefs. He explained that combination of perceived value and personal life can identify the consumer behaviour, while perceived value is a synthesis of individual beliefs, hopes, demands, and attitudes. Therefore, many scholars argue that value is one of the necessary constructs, beside activities, interests, and opinions, to assess consumer lifestyle (Lin, 2003). Interestingly, in parallel with that, Yu (2011) operationalized e-lifestyle employing four reflective dimensions of e-activities, e-opinions, e-interests, and e-values. Furthermore, lifestyle is a set of behaviours mirroring individual psychological concerns (i.e., internal beliefs) as well as sociological consequences (i.e., external stimuli) (Yu, 2011). However, this research raises the confusion on considering the dimension of e-lifestyle as either reflective or formative.

In essence, the dimensions of e-activities, e-interests, e-opinions, and e-values shape the psychographic characteristics of the individual consumers by contributing unique measures of AIO and VALS rating scale. Combing the indicators capture the entire concept of e-lifestyle which defined as the collective pattern of action which differentiate people in order to help to understand what people do and why they do. By inspection, the

four indicators of e-lifestyle reveal the causal priority flows from the indicators to the construct of e-lifestyle, but not the other way round. It is obvious, the way individual consumers do their activities or believe about a particular objects, frame their lifestyle, while the other way round may not be plausible.

With regard to interchangeability of the measures, the definitions of the e-activities, e-interests, e-opinions, and e-values do explain different theme based on each perspective definition and hence do not share common thoughts about the phenomena. Therefore, it is odd to interchange one dimension by another as it may not shed light under umbrella of e-lifestyle. Thereby, dropping one dimension might change the conceptual domain of lifestyle. These features contradict concerning the reflective measurement models. More specifically, these four dimensions might have positive or negative correlation to each other. Therefore, they are not expected to be highly correlated which is a necessary condition for the reflective measurement models. Consequently, changes in one dimension and/or indicator may not be related to changes in other dimension or indicator. Overall, the dimensions of e-activities, e-interests, e-opinions, and e-values are obviously not interchangeably; hence have potential different antecedents and outcomes. Indeed, they would not essentially covary and correlate with each other. As a result, the latent constructs of e-lifestyle can be viewed as formative measurement models. Indeed, lifestyle's dimensions can be specified as a hierarchical latent variable constituted by its four dimensions. Furthermore, each dimension involves certain formative indicators with each indicator includes different, for example, activity or interest. In relation to this, the e-lifestyle conceptualization can be specified as a second-order formative-formative model.

4. Method

4.1 Sample and Data Collection Procedure

A self-administered questionnaire distributed among university students from several regions in Malaysia. The unit of analysis in this study is mobile subscribers (consumers) of the prominent service operators (i.e., Celcom, Digi, Maxis, and Umobile) within some areas in Malaysia that become the sub-region of continuous development, progress, wealth, peace and quality of life according to the five-year IMT-GT Roadmap (ADB, 2008). The covered area in Malaysia includes states of Kedah, Perlis, Perak, Penang, Selangor, Kelantan, Melaka, and Negeri Sembilan. Based on rule of thumb, the minimum number of respondents is five-to-one ratio of the number of latent variables to be tested. Since we were not able to obtain a list of total population in the suggested area, thereby a non-probability purposive sampling approach is employed whereby only mobile subscribers of the four particular mobile providers in Malaysia were chosen and the rest were excluded from the data set. Purposive sampling method was used as the list of populations was not available. About 600 self-administered questionnaires were used for gathering data from the respondents in Malaysia. A total 197 valid questionnaires were received by end of data collection's period (32.8% response rate).

4.2 Measures

The e-lifestyle instrument which was originally developed by Wells and Tigert (1971), and Mitchell (1983) under theme of lifestyle and adapted by seminal work of Yu (2011), was adapted in this study. The questionnaire comprised of 28 items to measure the dimension of e-activities (8 items), e-interests (7 items), e-opinions (6 items), and e-values (7 items). The questionnaire with a five-point Likert scale, ranging from 1 (strongly disagree), to 5 (strongly agree) was used to collect the data.

The instrument was hence adapted based on Malaysian-response context. The questionnaire consists of two major sections. First section included four sub-constructs underlying consumer e-lifestyle. Construct of e-lifestyle is considered as second-order construct. Four first-order constructs are defined for the e-lifestyle construct which were adapted from previous research (Wells and Tigert, 1971, Yu, 2011, Mitchell, 1983). Previous studies employed all indicators as reflective indicators, however its flawed because some indicators carried different weight. Therefore, they need to be served as formative items. Last section gathers demographic information of the respondents such as gender, age, race, and education level. Table 1 provides the items for each sub-construct underlying construct of e-lifestyle.

Table 1. Dimension of e-lifestyle and its item description

Dimension	Item	Description
E-activities		I frequently use Internet on my mobile to
	EA1	play games or listen to online music
	EA2	shop for products/services.
	EA3	share my opinions within network communities (e.g., Facebook, Twitter, etc.)

	EA4	chat with my friends or colleagues/classmates.
	EA5	arrange trips by booking flight/bus tickets, accommodation and etc.
	EA6	participate in social events.
	EA7	read news or get data.
	EA8	download or watch movie online.
E-interests		I use Internet services on my mobile because
	EI1	I am very interested in discovering new things online.
	EI2	I would like to stay updated with the latest electronic development.
	EI3	I feel happy to use the newest technology.
	EI4	I like gaining knowledge through online.
	EI5	I like to participate in the network of social communities.
	EI6	I like browsing and searching on the web.
	EI7	I enjoy online shopping.
E-opinions		Continued development of Internet service on mobile is
	EO1	positive for our society.
	EO2	positive for our culture.
	EO3	positive for our education system.
	EO4	positive for our economy.
	EO5	bringing more happiness to our daily life.
	EO6	very important to know about the vulnerable people and situations.
E-values		I believe that using Internet on phone
	EV1	enhances the convenience in my life.
	EV2	improves my job efficiency.
	EV3	expands my circle of friend.
	EV4	enhances interaction among people.
	EV5	decreases face-to-face emotional interaction among people.
	EV6	provides the learning environment that I have benefited from the impact.
	EV7	provides more new knowledge.

4.3 Data Analysis Technique

Higher-order construct is a general concept that is either formed or reflected by its dimensions as a lower-order constructs (Becker *et al.*, 2012). Generally, the nature of relationship between the second-order and first-order construct is categorized in four types of second-order latent variables (Jarvis *et al.*, 2003, Hair *et al.*, 2013). First, the reflective-reflective type I model with the lower-order constructs are reflectively measured constructs. Second, the reflective-formative type II model with higher-order construct is a common concept of several formative lower-order constructs. Third, the formative-reflective type III model with the higher-order construct is common concept of several particular formative lower-order constructs. Finally, the formative-formative type IV model with the lower-order constructs are formatively measured constructs that form a general concept of higher-order construct. For the purpose of this research, formative-formative type IV model as illustrated in Figure 1, has been conducted (refer to the argument in section 3) in order to validate the measurement instrument for the latent variable construct of e-lifestyle. SmartPLS 2.0 software (Ringle *et al.*, 2005) was used to validate the e-lifestyle instruments by conducting partial least squares (PLS) analysis. PLS was preferred as the methodological choice due to several reasons.

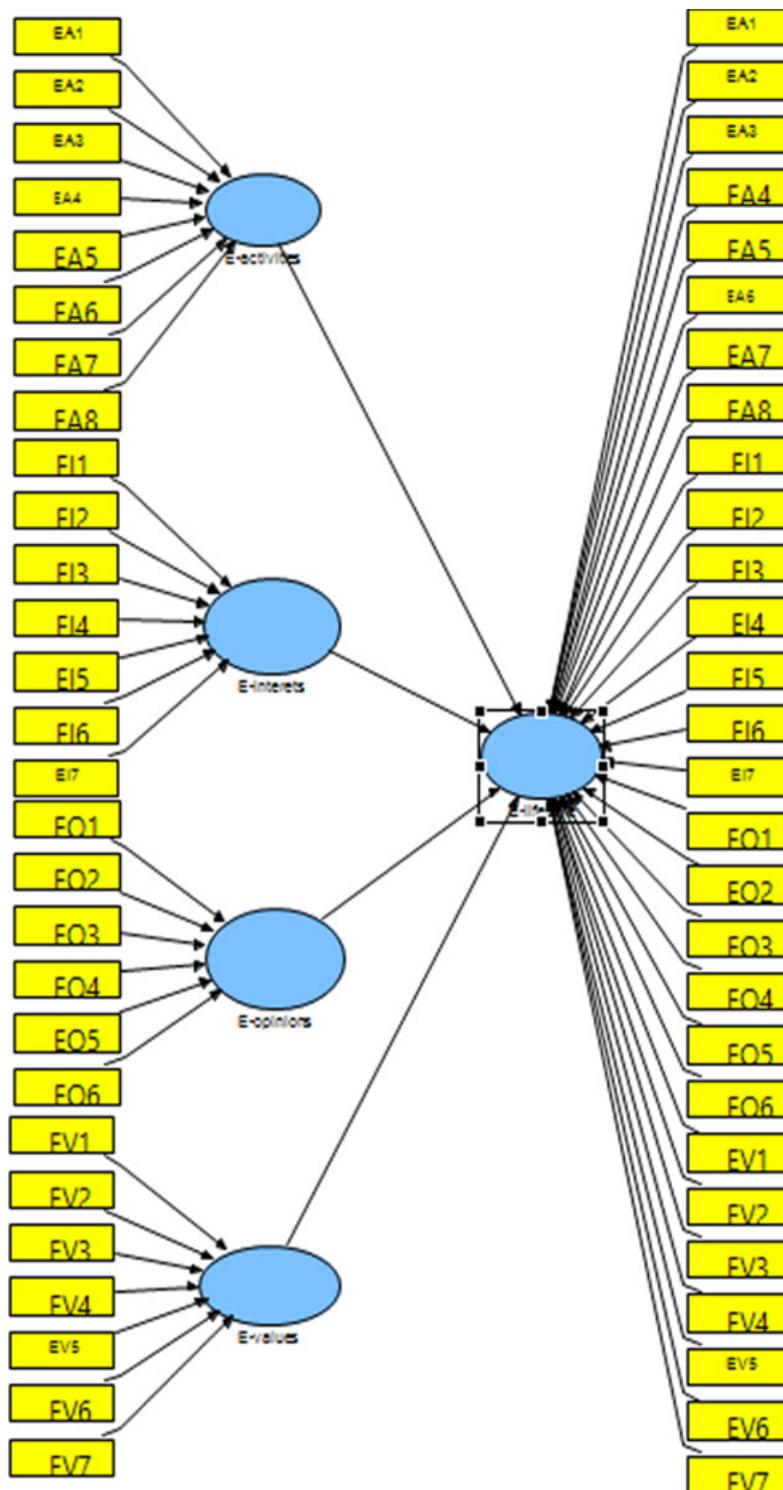


Figure 1. Illustration of repeated indicator approach

First, as a variance-based approach, it places minimal requirements on residual distributions and sample size to achieve a satisfactory numerical power (Hair *et al.*, 2012). Second, it is advance the choice to analysis constructs' association comparing to other technique (Acedo and Jones, 2007). Third, it allows us to simultaneously evaluate both measurement and structural model (Chin, 1998), while it eliminates concerns about the multicollinearity issues (Inkpen and Birkenshaw, 1994). Fourth, it allows to analysis data during the early stage of theory development (Tsang, 2002).

In line with the purpose of this research, the dimensions of e-activities, e-interests, e-opinions, and e-values are manifested by its respective item measures (see Table 1). Additionally, these four dimensions do not share a common theme capture the conceptual domain of consumer lifestyle, and their respective item measures capture also different theme with respect to type of activity, interest, opinion and values. Therefore, the relationships between e-lifestyle and its four dimensions concur with the nature of relationship higher- and lower-order construct as illustrated in Figure 1, represents a second-order formative-formative type IV model. As such, e-lifestyle is then characterized as hierarchical latent construct in the form of second-order formative-formative type IV model in this study. The repeated indicator approach was implemented to assess the second-order formative-formative type IV model due to its advantage to estimate all variables and indicators simultaneously in order to avoid interpretational confusion (Becker *et al.*, 2012). In particular, four dimensions of e-activities, e-interests, e-opinions, and e-values are termed as first-order constructs. According to Figure 1, repeated indicator approach is depicted when the second-order construct, namely, e-lifestyle was directly assessed by the corresponding first-order constructs and in turn these four first-order constructs were directly estimated by its underlying formative measures.

In relation to this, the relationship between of e-activities, e-interests, e-opinions, and e-values and its receptive formative measures was determined at first-order construct level. Thereafter, the relationship between the consumer e-lifestyle and the four first-order constructs was examined at second-order level. This study used PLS analysis to estimate the parameters in both first-order formative model and second-order formative model with a path weight scheme (Johnson *et al.*, 2012). Additionally, the study applied bootstrapping with resampling 5000 replications to achieve the standard error of the estimates (Efron and Tibshirani, 1994). Following the Hair *et al.* (2013) guideline, the analysis was conducted on two levels of the first-order constructs and second-order constructs level.

5. Results

We followed the guidelines of Hair *et al.* (2013) to report the PLS-SEM approach. Since PLS-SEM is nonparametric approach, therefore it does not require the data to be normally distributed. However, it is important to verify data are not far from normal distribution. Subsequently, skewness and kurtosis were used prior to data analysis to evaluate the extent to which a variables' distribution is symmetrical (Hair *et al.*, 2013). The skewness and kurtosis values of most items ranged between -1 and +1, which are well below the levels suggested for transformation of variables (Ghisseli *et al.*, 1981). Thereby, non-normality of data is not an issue for the research. The following discusses about the results of the study.

5.1 Common Method Variance

Furthermore, common method bias was assessed by conducting Harman's single factor (Podsakoff *et al.*, 2003). Accordingly, single factor accounted for the majority of variance explained (19.149% only). This suggests that common method bias is not a major issue in this study.

5.2 Demographic Profiles of Respondents

Table 2 depicts the demographic profile of 197 respondents in Malaysia. The demographic profile includes the respondent's gender, age, race, highest education level, monthly salary, monthly mobile subscription and their most recent subscription.

Accordingly to Table 2, the respondents who are female are more than double that of the number of male respondents with rate of 68.7% female versus 31.3% male. Age of respondents in this category varies differently. In fact, about 70% of respondents aged between 18 and 22 years old, while only 30% of respondents aged between 22 and 37 years old. Therefore, the results show that the majority of respondents are in the range of generation Y (i.e., birth date years between 1980s and 2000s). More than half of respondents are Chinese based (58.2%), while 28.6 are Malay and only 1.5% of respondents are Indians. Majority of respondents are educated having bachelor degree (65.8%), master (15.8%) and PhD (6.6%). 77% of respondents have monthly salary of less than RM1000, which show majority were students at the university level, while the rest of respondents with salary above that amount.

Table 2. Demographic profile of respondents (n=197)

Variable	Categories	Frequency	Percentage
Gender	Male	61	31.3
	Female	134	68.7

Age	18-22	128	69.9
	23-27	25	13.6
	28-32	19	10.3
	33-37	11	5.8
Race	Malay	56	28.6
	Chinese	114	58.2
	Indian	3	1.5
	Others	23	11.7
Highest educational level	High school (SPM)	1	0.5
	Diploma/Matriculation/STP	22	11.2
	Degree	129	65.8
	Master	31	15.8
	PhD	13	6.6
Monthly salary	Less than RM1000	131	77.5
	RM1000-2000	15	8.9
	RM2001-3000	9	5.3
	RM3001-4000	6	3.6
	Rm4001-5000	5	3.0
	More than RM5000	3	1.8
Monthly subscription	Less than RM50	78	40.8
	RM50-100	75	39.3
	RM101-150	29	15.2
	RM151-200	6	3.1
	More than RM200	3	1.6
Current subscription to mobile operator	Celcom	51	21.1
	Digi	63	27.4
	Maxis	57	24.2
	Umobile	16	2.6
	Others	14	1.6

40.8% of mobile users as respondents spend less than RM50 monthly on mobile subscription. Similarly, about the equal numbers of respondents spend monthly between RM50 and RM100 on subscription, while only 1.6% spends over RM200 on mobile subscription. In general, mobile users in Malaysia closely use different mobile network operators. It shows high competition on telecommunication sector. For example, Digi is number one in terms of subscription among the respondents by 27.4%. Maxis come to the second after Digi with 24.2%, and Celcom (21.1%) respectively. Umobile is newly introduced brand to the market and has yet to be recognized among the mobile users.

5.3 Assessment of First-Order Constructs Model

In order to assess the validity for formative constructs at first-order construct level, several steps need to be done sequentially. First, scholars need to assess multicollinearity issue for the formative indicators (Peng and Lai, 2012). High correlations between two formative indicators can have an effect on the results as it boosts the standard error and reduce the ability to demonstrate that the estimated weights are different from zero (Hair *et al.*, 2013). Variance inflation factor is a used means to assess the multicollinearity issue (Petter *et al.*, 2007a). In context of PLS-SEM, a VIF value of 5 and higher indicates a potential collinearity problem (Hair *et al.*, 2011). However, the common acceptable threshold for VIF is below 3.3 (Diamantopoulos and Sigauw, 2006). Second, scholars should assess each formative indicator's contribution to the formative construct score which is created by aggregating the formative indicators of a construct using the item's weight (Götz *et al.*, 2010). Item's weight should be significant, the sign of item weight should be consistent with the underlying theory and the magnitude of the item weight should be greater than 0.10 (Andreev *et al.*, 2009).

Four formative constructs (e-activities, e-interests, e-opinions, and e-values) in the research were assessed for validity using VIF and outer weighting significance results. Table 3 depicts that VIF value is lower than 3.3 for all four constructs. Hence, collinearity issues are not at critical level for the first-order constructs in this study. Therefore, first assessment's step of for the formative constructs are met, and hence item weight in formative measurement models should be analysed for their significance and relevance as the second step for formative measurement assessment (Hair *et al.*, 2013). Bootstrapping procedure generating 5000 subsamples was used to

test whether the outer weights in formative measurement models are significantly different from zero.

Table 3. Collinearity statistics

E-activities		E-interests		E-opinions		E-values	
Indicators	VIF	Indicators	VIF	Indicators	VIF	Indicators	VIF
EA1	1.143	EI1	1.480	EO1	1.521	EV1	1.395
EA2	1.403	EI2	1.855	EO2	1.415	EV2	1.582
EA3	1.672	EI3	2.088	EO3	1.682	EV3	1.821
EA4	1.220	EI4	1.748	EO4	1.405	EV4	1.738
EA5	1.350	EI5	1.447	EO5	1.454	EV5	1.053
EA6	1.605	EI6	1.523	EO6	1.383	EV6	1.776
EA7	1.270	EI7	1.128			EV7	1.964
EA8	1.138						
EA9	1.134						

Furthermore, Table 4 illustrates the assessment of formative constructs using the items weight's significance. E-activities have total nine formative items. The weights for three items are not significant (i.e., EA3, and EA6). Additionally, their outer loadings are less than value of 0.50. Therefore, they were removed from data sample set. Seven indicators of e-interest are significant at 99, 95 and 90% confidence level (refer to last column of Table 4). All seven formative indicators of e-interest have item's weight value above 0.10 and statistically significant. For construct of e-opinion, out of six formative indicators, four of them have item weight value above 0.10, while EO2 and EO5 are not significant. However, since their item loading are above value of 0.50 (i.e., 0.624, and 0.567 respectively), they have to remain in the model of the study. Five indicators of e-values have item weight above value of 0.10 and significant at 99, 90, and 95% confidence level. EV4 is not significant; however, it remained in the model as its representative item loading is above 0.50 with value of 0.645. Moreover, EV5 have to be removed from the model, which were not either significant nor has item loading above value of 0.50.

Table 4. Validity results for formative first-order constructs

Formative constructs	Formative indicators	Measure	Item weight (Item loading)	T.stat
E-Activities	EA1	Formative	0.163 (0.254)	1.704**
	EA2		0.319 (0.341)	2.976***
	EA3		0.029 (0.283)	0.504 ^{NS}
	EA4		0.322 (0.558)	2.840***
	EA5		0.113 (0.395)	1.235 ^{NS}
	EA6		0.021 (0.422)	0.383 ^{NS}
	EA7		0.223 (0.537)	2.043**
	EA8		0.660 (0.732)	6.501***
E-interests	EI1	Formative	0.315 (0.712)	2.783***
	EI2		-0.142 (0.433)	1.393*
	EI3		0.151 (0.618)	1.451*
	EI4		0.355 (0.809)	3.211***
	EI5		0.385 (0.764)	3.472***
	EI6		0.152 (0.663)	1.561*
	EI7		0.159 (0.386)	1.747**
E-Opinions	EO1	Formative	0.255 (0.739)	3.177***
	EO2		0.086 (0.624)	1.176 ^{NS}
	EO3		0.625 (0.926)	7.599***
	EO4		0.047 (0.576)	1.432*
	EO5		0.088 (0.567)	0.809 ^{NS}
	EO6		0.186 (0.553)	2.276**
E-Values	EV1	Formative	0.161 (0.646)	1.577*
	EV2		0.147 (0.709)	1.632*
	EV3		0.354 (0.796)	3.029***
	EV4		0.032 (0.645)	0.412 ^{NS}

EV5	0.025 (0.198)	0.467 ^{NS}
EV6	0.258 (0.784)	2.258**
EV7	0.333 (0.839)	2.759***

Note: NS = not significant. *p < 0.10, ** p < 0.05, *** p < 0.01.

According to Table 4, the validity for formative measurement models first-order-constructs are assessed. The next section deals with the assessment of the second-order construct model including the four indicators of e-activities, e-interests, e-opinions, and e-values as first-order constructs for the latent variable construct of e-lifestyle as second-order construct.

5.4 Assessment of Second-Order Construct Model

In order to assess the formative second-order construct, the collinearity issue needs to be addressed among the four constructs. The procedure and evaluation process for collinearity issues follow the same guideline as for the first-order construct model (refer to previous section). Likewise, the assessment for the formative indicators for the second-order construct model also follows the guideline from the seminal work of Hair et al. (2013).

According to Table 5, VIF for all four indicators of construct of e-lifestyle are less than value of 3.3, therefore, there is no issue of multicollinearity problem across the indicators. Furthermore, Table 5 depicts that four indicators are highly significant at 99% confidence level. Additionally, their items weights are above value of 0.1, hence they are accepted to be significant formative indicators for their latent variable construct (i.e., e-lifestyle).

Table 5. Validity results for formative second-order construct

Second-order construct	First-order constructs	Measure	Item weights	T.stat	VIF
E-lifestyle	E-activities	Formative	0.214	9.849***	1.720
	E-interests		0.342	15.336***	2.019
	E-opinions		0.335	13.762***	2.413
	E-values		0.301	10.918***	2.070

Note: NS = not significant. *p < 0.10, ** p < 0.05, *** p < 0.01

More specifically, the construct of e-interests carries the highest weight among the indicators with value of 0.342, follows with e-opinions with value of 0.335. The lowest value belongs to e-activities with 0.214. The result confirmed considering the four dimensions of e-lifestyle as formative constructs, thereby affirming nomological validity. Moreover, the model also showed sufficient predictive relevance with Q^2 of above zero value (0.297). The following section involves the discussion about the achieved results and conclusion for the study.

6. Discussion and Conclusion

The inconsistent psychometric findings of the assessment of measurement model underlying consumer e-lifestyle provoked this research to further examine the epistemic nature of e-lifestyle in formative measures. Surprisingly, the four major dimensions of e-lifestyle to be found concurred with the key features of formative measurement models. Furthermore, this study has estimated a second-order formative-formative model of consumer e-lifestyle using the repeated indicator approach suggested by previous scholars (Becker *et al.*, 2012, Hair *et al.*, 2013). Indeed, the outcome of this research has provided a more rigorous psychometric result compared to the previous research which commonly measure e-lifestyle reflectively (e.g., Yu, 2011). The psychometric results can be explored through the practical evidence of measurement parameter estimates such as item weight value, the absence of multicollinearity, nomological validity in the format of second-order formative-formative model.

In particular, new insights were obtained from the result for the first-order constructs, which can add to the body of knowledge. For example, with regard to e-activities, consumers seem not do their banking transaction and/or arrange trips via online, while other activities shows high validity. Likewise, indicating the item weight for each indicator can depict significantly the importance of each from the consumer point of view. The result reveals the target group are interested to certain issues while they may not be interested to do other things throughout Internet. For example, consumers are interested to discover new things or participate in the social communities rather to enjoy online shopping. The result can help marketers to understand to what extent certain interests are important for the consumers, while other interests and hobbies may not be of interest to them.

Furthermore, the results reveals that the consumers think that using Internet is positive for their education system, while other opinions such as society, culture and etc. have become to less attention among the target group. This

can lead to understanding that when business promote Internet services, they may introduce though of education in order to attract their potential consumer to purchase their services. Additionally, e-value included certain beliefs that bring different weights based on the results. Indeed, the sample group give priority to used Internet in order to expand their circle of friend or perceive using Internet to gain more new knowledge. This perception can help marketers to have a better understanding with regard to their potential consumer's belief about using Internet.

Overall, the results provide ample opportunity to prioritize different dimensions of e-lifestyle and compare them together. Previous literature combine and use the dimensions reflectively, hence the prioritization was difficult to recognize. Therefore, the study contributes to the lifestyle literature by revealing the importance of each dimension of e-lifestyle in the context of Malaysian consumers. Probably, marketers can increase their focus on dimensions with the higher weight (e.g., e-interest). Moreover, this study has advanced a second-order formative-formative model of lifestyle using PLS which would provide new insights for variance based SEM.

Notwithstanding, several limitations exist and hence worth to be addressed in this study. First, this study has been conducted in Malaysian context. Probably it would be noble to extend the population of the study to a wider group across Southeast Asian countries as emerging economies located. Cross-cultural analysis can be done amongst four dimensions of lifestyle. Second, the study is limited to students as the major respondents and major Internet users among the generations. The formative measurement model needs to be cross-validated in different setting. Indeed, potential opportunity exists for further studies to include different type of individual consumers in terms of their generation.

Acknowledgments

The authors would like to thank Universiti Sains Malaysia for funding this research under the Research University grant no. **1001/PMGT/816203**.

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