DISENTANGLING UTILITARIAN AND HEDONIC CONSUMPTION BEHAVIOR IN ONLINE SHOPPING: AN EXPECTATION DISCONFIRMATION PERSPECTIVE

Abstract

Increasingly, researchers have come to acknowledge that consumption activities involve both utilitarian and hedonic components. Whereas utilitarian consumption accentuates the achievement of predetermined outcomes typical of cognitive customer behavior, its hedonic counterpart relates to affective customer behavior in dealing with the emotive and multi-sensory aspects of the consumption experience. Therefore, while utilitarian consumption activities appeal to the rationality of customers in inducing their intellectual buy-in of the consumption experience, corresponding customers' emotional buy-in can only be attained through the presence of hedonic consumption activities. The same can be said for online shopping. Because the online shopping environment is characterized by the existence of an IT-enabled web interface that acts as the focal point of contact between customers and vendors, its design should embed utilitarian and hedonic elements in order to create a holistic consumption experience. Drawing on the Expectation Disconfirmation Theory (EDT), this study advances a model that not only delineates between utilitarian and hedonic customer expectations for online shopping but also highlights how these expectations can be best served through transactional and aesthetic performance respectively. The model is then empirically verified via an online survey questionnaire administered on a sample of 303 respondents. Theoretical contributions and pragmatic implications to be gleaned from our proposed model and its subsequent empirical validation are discussed.

Keywords: Expectation disconfirmation theory, utilitarian expectations, hedonic expectations, transactional functionalities, aesthetic properties

1. INTRODUCTION

Consumption activities entail both utilitarian and hedonic elements [1,2]. Utilitarian consumption appeals to the rationality of customers by accentuating the attainment of desired outcomes from shopping activities [3] whereas hedonic consumption is tied to the entertainment value of shopping and relates more to the emotive and multi-sensory aspects of the shopping experience [4]. Studies focusing exclusively on utilitarian consumption have been criticized by scholars for not adequately reflecting the totality of shopping experiences [5,6]: they fail to take into consideration the emotional costs and benefits associated with consumption activities [7].

The same sentiments have been expressed for online shopping [8,9]. The interactive nature of the Internet offers numerous opportunities to enrich customers' online shopping experiences by improving accessibility to product information, enabling direct multi-attribute comparisons, reducing buyer search costs, and streamlining purchases [e.g., 10,11]. While substantive research has been conducted on these utilitarian facets of online shopping, the recognition of information technology as a hedonic medium has gained in momentum among both academics [1,2,12–26] and practitioners [27]. When transacting online, face-to-face interactions and social proximity between merchants and shoppers are replaced by IT-enabled web interfaces [10], which culminate in distant consumer-vendor relations. Such estranged transactional environments could inhibit the growth of online shopping [28].

Past studies have illustrated that customers treat technological artifacts embedded within e-commerce sites as social actors and ascribe humanlike characteristics to them during interactions [29]. Insofar as e-commerce sites are deemed as social entities by customers, online shopping must not only fulfill its intended utilitarian function [10], it should also deliver a hedonically charged transactional experience [1,2,13–15,17,19,20,26,30–36]. Though prior research has argued for a

dual role of online shopping in fulfilling both utilitarian and hedonic functions, scholars have largely emphasized "a behavioral or cognitive focus, with less attention to hedonic elements of the consumption experience that focus on affective consumer behavior as elicited from emotive and multisensory elements." [14, p. 540]. Given the duality of cognitive and affective elements in online shopping experience, it is imperative to uncover both hedonic and utilitarian determinants of customer satisfaction for e-commerce sites.

Drawing on the Expectation Disconfirmation Theory (EDT) [37–39], we advance a model of utilitarian and hedonic determinants of customer satisfaction for online shopping. The model proposes that feelings of satisfaction arise from customers' evaluation of whether the functional and aesthetic performance of an e-commerce site caters sufficiently to the fulfillment of their utilitarian and hedonic expectations respectively. In this sense, this study endeavors to contribute to extant literature in three ways. First, we extend the expectation disconfirmation perspective by delineating between utilitarian and hedonic antecedents of customer satisfaction with e-commerce sites. Second, given the saliency of customers' utilitarian and hedonic motivations for online shopping behavior [8,9], this study aims to identify constituent dimensions of utilitarian and hedonic expectations as well as considerations underpinning their performance evaluation of e-commerce sites. Particularly, we derive separate typologies of utilitarian and hedonic expectations as the baseline from which e-commerce sites are evaluated. Third, we synthesize extant literature on customer expectations and performance evaluation of e-commerce sites to explore the role of expectation disconfirmation in shaping one's utilitarian and hedonic satisfaction.

The remainder of this paper is organized as follows. In the next section, we build on past studies to construct a theoretical model of utilitarian and hedonic consumption behaviors in online shopping together with testable hypotheses. Specifically, our model draws on the EDT in

distinguishing between utilitarian and hedonic elements of online shopping as focal antecedents of customer satisfaction towards e-commerce sites. Next, we arrive at separate typologies of utilitarian and hedonic expectations that drive customers' evaluation of e-commerce sites and prescribe design features, which could be offered by e-merchants to fulfill these expectations. Subsequently, in the methodology section, we outline an empirical study to validate the hypothesized relationships in our theoretical model and summarize key analytical findings. We conclude the paper with a discussion section that highlights the insights to be gleaned from this investigation in informing the design of e-commerce sites. We also point out potential limitations and suggest probable avenues for future research.

2. AN EXPECTATION DISCONFIRMATION PERSPECTIVE OF UTILITARIAN AND HEDONIC CONSUMPTION BEHAVIORS IN ONLINE SHOPPING

The Expectation Disconfirmation Theory (EDT) was proposed by Oliver [37,40] as an explanatory framework to comprehend the process of expectation disconfirmation. The EDT posits that expectations, together with product/service performance, determine customer satisfaction [38]. This effect is in turn mediated by the positive or negative disconfirmation of customers' expectations through product/service performance: expectations will be: (1) negatively disconfirmed whenever the product/service performs below expectations; (2) confirmed whenever the product/service performs as expected, and; (3) positively disconfirmed whenever the product/service outperforms expectations [37,39]. Although the EDT originates from investigations of physical products, its growing application to a wide range of Internet-related phenomena suggest that the theory is versatile in explaining and predicting users' reactions towards web technologies [e.g., 41–45]. Extending the EDT, we construct a theoretical model that delineates between utilitarian and hedonic elements of online shopping as predictors of customer satisfaction towards e-commerce sites.

We attempt to consolidate and formulate a comprehensive collection of functionalities that customers expect from e-commerce sites. Such an endeavor allows us to ascertain the baseline requirements to be achieved by e-commerce sites in order to avoid negative disconfirmation. Consequently, this study shed lights on how negative disconfirmation, which is detrimental to customer satisfaction, can be avoided by delivering services that do not disappoint [37,39]. Besides, as acknowledged in Tan et al.'s [46] work on e-service failures, negative experiences are more likely to invoke enduring and temperamental responses from customers. In other words, despite accumulated positive experience with an e-commerce site, customers can still forsake the e-merchant after having encountered a singular episode of negative shopping experience [46]. Figure 1 illustrates our proposed theoretical model of utilitarian and hedonic consumption behaviors in online shopping

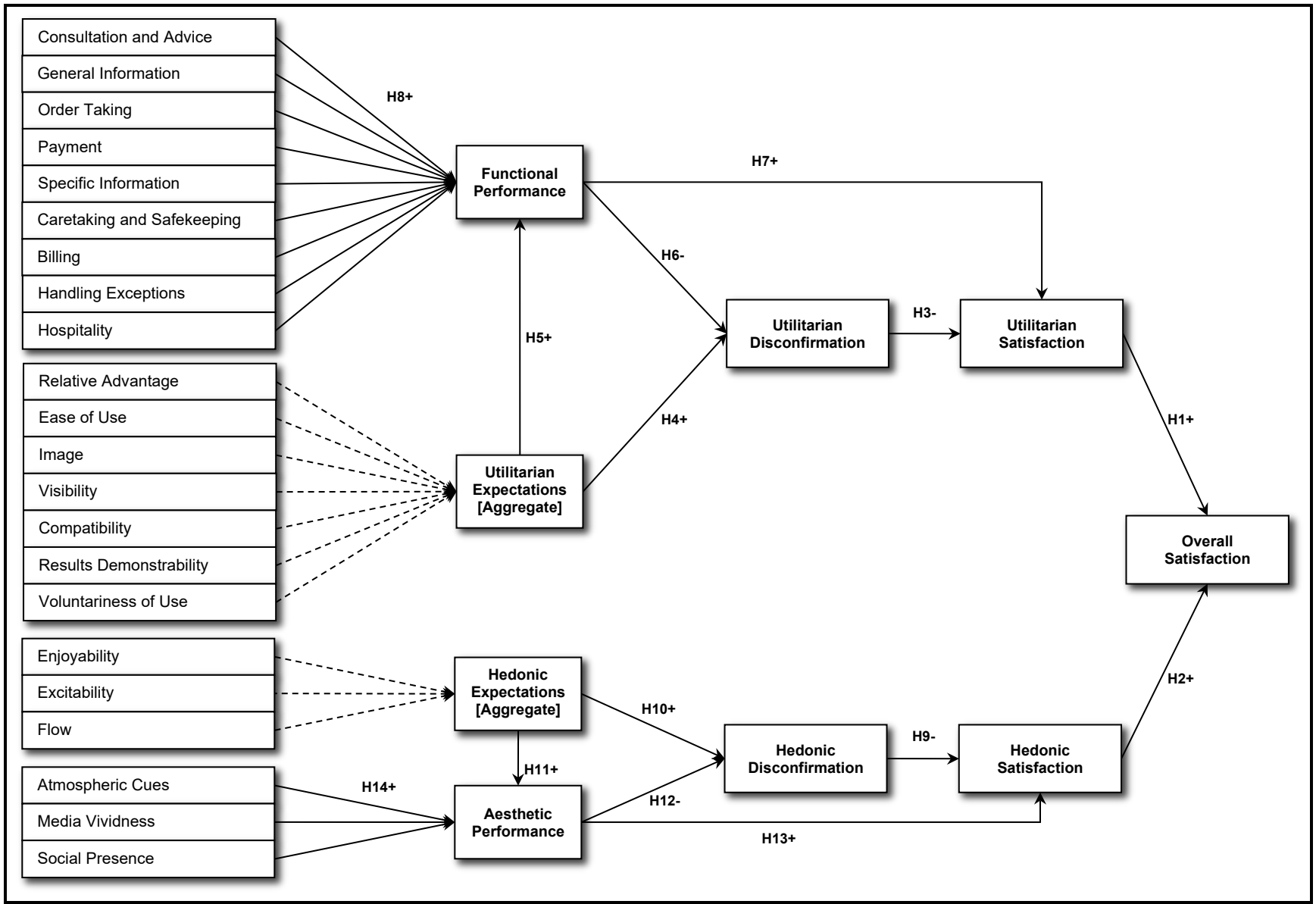

Figure 1: Proposed Theoretical Model of Utilitarian and Hedonic Consumption Behaviours in Online Shopping

Scholars have associated shopping with the derivation of both utilitarian [e.g., 5] and hedonic benefits [e.g., 46]. Though a few consumer behavioral studies have labeled shopping as a chore or ordeal [e.g., 47,48], others have challenged this parochial view by depicting it as a fun and memorable activity [e.g., 6,46,49]. Babin et al. [3] maintained that a holistic appreciation of the shopping experience must capture the duality of rewards for human behavior by explicitly recognizing: "(1) a utilitarian outcome resulting from some type of conscious pursuit of an intended consequence, and; (2) an outcome related more to spontaneous hedonic responses" [p. 645; see also 7]. Within the e-commerce domain, Childers et al. [8] echoed an identical message by distinguishing between utilitarian and hedonic factors as distinct but equally salient influences on customers' attitudes towards online shopping [see also 9,20]. This paper therefore posits that customers' satisfaction with online shopping experiences is reliant on the attainment of both utilitarian and hedonic outcomes. Adapting Oliver's [40] definition, we henceforth refer to ***utilitarian satisfaction*** as the *psychological state arising from disconfirmed utilitarian expectations* and ***hedonic satisfaction*** as the *psychological state arising from disconfirmed hedonic expectations*. Because overall satisfaction is founded on customers' evaluation of the shopping experience in its entirety [39], we hypothesize that:

> ***Hypothesis 1***: A customer's utilitarian satisfaction with an e-commerce site is positively related to their overall satisfaction with the site.
>
> ***Hypothesis 2***: A customer's hedonic satisfaction with an e-commerce site is positively related to their overall satisfaction with the site.

2.1 Intellectual Buy-In: Fulfilling Utilitarian Expectations via Functional Performance

Utilitarian value has been the center of attention for much of the research conducted in the area of consumer behavior [47]. Utilitarian consumption behavior has been described as rational and task-oriented [51–53] such that customers' functional utility is dependent on whether the consumption need, which inspires the shopping activity, was met successfully [3]. Often, this

translates to the hassle-free acquisition of goods or services, but occasionally, utilitarian value might also be derived from information gathering activities performed by a customer (e.g., a computer novice might exploit shopping as a means of augmenting their knowledge of laptops in anticipation of a future purchase) [54].

The recognition of e-commerce sites as a means to attain utilitarian ends permeates past studies [e.g., 10,29,45,54–60]. Findings have attested to the importance of rational motives (e.g., perceived usefulness and perceived ease of use) in determining customers' willingness to transact via e-commerce sites. Specifically, prior research has isolated transactional functionalities, which support customers in acquiring products/services, as being instrumental to the attainment of utilitarian outcomes during online shopping. Wang and Benbasat [29] demonstrated that the inclusion of facilities explaining the rationale behind product recommendations by recommender systems is crucial in empowering customers to reason about the suitability of a recommended product in comparison to their requirements. Cenfetelli et al. [10] on the other hand, proved that the functional quality of e-commerce sites, as represented by the breadth and depth of supportive transactional functionalities from pre- to post-consumption stages, plays a pivotal role in shaping customers' cognitive attitudes towards online shopping. ***Utilitarian disconfirmation*** is hence conceived in this study as *a customer's evaluation of the extent to which the functional performance of an e-commerce site matches their utilitarian expectations*. Due to an abundance of research testifying to the impact of expectation disconfirmation on satisfaction [see 61 for a comprehensive review], we hypothesize that customers' utilitarian expectations will be negatively disconfirmed if the functional performance of an e-commerce site fails to match their expectations, thereby culminating in feelings of low satisfaction with the functional elements of the site:

> ***Hypothesis 3***: A customer's utilitarian disconfirmation of an e-commerce site is negatively related to their utilitarian satisfaction with the site.

According to Bitner [63], a series of *psychological triggers* is responsible for ascertaining customers' satisfaction with consumption encounters, the most salient of which is the set of intrinsic expectations that every customer brings to a transaction [38,64]. Bitner [63] noted that customers' pre-consumption expectations are one of the principal drivers behind dissatisfactory service encounters: "if expectations exceed performance, dissatisfaction results" (p. 70). Conceivably, it is harder to satisfy customers with higher levels of pre-conceived expectations as they are more likely to report a disconfirmation of their expectations. The same inference can be made in the context of e-commerce transactions. Though there is a prevailing assumption that attributes vendors as the culpable party whenever desired services are absent from e-commerce sites, more recent research has begun to dispel this myth [65,66]. The reason being that customers are equally likely to be responsible for errors made in the online transactional process (e.g., entering the wrong quantity during online purchases). Yet, instead of taking responsibility for mistakes made during online shopping, Holloway and Beatty [65] observed that unreasonably high expectations may cause customers to develop perceptions of service failures if the e-commerce site is unable to offer any means of rectification. Cenfetelli et al. [10] reached an identical conclusion by empirically demonstrating that transactional functionalities made available on e-commerce sites must meet customers' service expectations to be effective in fostering system usage behaviors.

To derive a comprehensive typology of utilitarian expectations influencing customers' receptivity towards e-commerce sites, we turn to Moore and Benbasat's [67] refinement of Rogers' [68] Innovation Diffusion Theory (IDT) for inspiration. The IDT holds that an individual's decision to adopt or reject an innovation is dependent on the extent to which the innovation exhibits certain characteristics (i.e., relative advantage, compatibility, complexity, trialability and

observability), which facilitate its diffusion [68]. Yet, Moore and Benbasat [67] stressed that Rogers' [68] conceptualization of the five characteristics of innovation diffusion "are based on perceptions of the innovation itself, and not on perceptions of actually using the innovation" (p. 196). Moreover, the aforementioned characteristics are targeted at innovations in general and do not take into account the unique contextual attributes of technological innovations. For these reasons, Moore and Benbasat [67] supplemented Rogers' [68] IDT with contemporary work on technology acceptance to arrive at seven characteristics of technological innovations that drive users' adoption decisions (see Table 1). Together, these seven characteristics capture the range of benefits one hopes to gain from the *utilization* of technological innovations. Because the validity and applicability of Moore and Benbasat's [67] proposed technological innovation characteristics in predicting individuals' adoption decisions have received extensive corroboration in past studies [see 68–72], we posit that these characteristics are analogous with customers' utilitarian expectations of e-commerce sites.

Table 1 summarizes our adaption of Moore and Benbasat's [67] technological innovation characteristics to the e-commerce context.

Table 1. Adaptation of Moore and Benbasat's (1991) Technological Innovation Characteristics as Utilitarian Expectations of E-Commerce Sites

Utilitarian Expectation	Original Definition	Adapted Definition
Relative Advantage	"Degree to which an innovation is perceived as being better than its precursor" (p. 195)	Degree to which the e-commerce site offers transactional content that is unavailable offline
Ease of Use	"Degree to which an innovation is perceived as being difficult to use" (p. 195)	Degree to which the utilization of the e-commerce site is free of effort
Image	"Degree to which use of an innovation is perceived to enhance one's image or status in one's social system" (p. 195)	Degree to which the e-commerce site enhances one's image or status in one's social system
Visibility	Degree to which one can perceive others to be using the system	Degree to which the e-commerce site is being utilized by others
Compatibility	"Degree to which an innovation is perceived as being consistent with the existing values, needs, and past experiences of potential adopters" (p. 195)	Degree to which the e-commerce site is consistent with one's existing needs and past transactional experiences
Results Demonstrability	"Tangibility of the results of using the innovation, including their observability and communicability" (p. 203)	Degree to which the outcome generated from the e-commerce site is tangible, observable and communicable
Voluntariness of Use	"Degree to which use of the innovation is perceived as being voluntary, or of free will" (p. 195)	Degree to which usage of the e-commerce site is voluntary or of free will

Arguably, the greater the importance a customer attaches to each of the seven utilitarian expectations, the more tenuous it will be for an e-commerce site to satisfy their expectations [37–40]. We therefore hypothesize that:

> ***Hypothesis 4***: A customer's perceived importance of the seven utilitarian expectations associated with an e-commerce site is positively related to their utilitarian disconfirmation of the site.

Past studies have documented a dominant effect of expectations on performance [e.g., 37,39,73–75]. Results point to the tendency of individuals to selectively and voluntarily raise or lower their evaluation of product performance to synchronize with pre-consumption expectations. That is, product performance is a function of pre-exposure expectations. Because the positive relationship between expectations and performance has received ample empirical support in past studies of technology adoption [e.g., 41–45,76,77], it should hold for e-commerce sites as well:

> ***Hypothesis 5***: A customer's perceived importance of the seven utilitarian expectations associated with an e-commerce site is positively related to their evaluation of the functional performance of the site.

Contrary to pre-consumption expectations, customers' evaluation of the functional performance of e-commerce site should exert an opposite effect on perceptions of expectancy disconfirmation [63]. High levels of post-exposure performance should reduce the likelihood of disconfirmation for customers' expectations, thereby preventing the corresponding manifestation of negative attitudes and emotions [41,77,78]. Prior research has linked the presence of transactional functionalities of e-commerce sites to a host of positive customer attitudes, especially satisfaction [10]. We hence define ***functional performance*** as *a customer's evaluation of the extent to which an e-commerce site is able to offer transactional functionalities that cater to their functional needs* and hypothesize that:

> ***Hypothesis 6***: A customer's evaluation of the functional performance of an e-commerce site is negatively related to their utilitarian disconfirmation of the site.

Hypothesis 7: A customer's evaluation of the functional performance of an e-commerce site is positively related to their utilitarian satisfaction with the site.

Conceivably, the abovementioned definition underscores the multi-dimensionality of functional performance and the necessity to treat it as such. Within the marketing discipline, the term—augmented or supplementary service—has been espoused to denote services, which are devised to complement a core product to generate additional value for the customer [79–82]. Cenfetelli et al. [10] alleged that supplementary services form an inevitable and yet, invaluable part of the customer service experience for e-commerce sites. These supplementary services permit e-merchants to differentiate their e-commerce sites from those of competitors, thereby enhancing the appeal and long-term lucrativeness of these sites [45]. Lovelock [80] thus formalized an elaborate model consisting of eight 'pedals' of supplementary services, which "capture the complete range of supplementary services generally associated with products and services" [45, p.427; see also 81]. Grounded in Lovelock's [80] supplementary service model, we explicate the spectrum of transactional functionalities that shape customers' evaluation of functional performance (see Table 2). Drawing on Dimoka et al.'s [83] delineation between seller and product uncertainties, we distinguish between general and specific information, resulting in a typology with nine dimensions. General information concerns the vendors of products or services whereas specific information enables diagnosis of products or services. We therefore hypothesize that:

Hypothesis 8: A customer's evaluation of the presence of each of the nine transactional functionalities within an e-commerce site is positively related to their evaluation of the functional performance of the site.

Table 2. Typology of Transactional Functionalities

Construct	Definition (E-commerce site provides functionalities that...)
Consultation and Advice	Establish dialogue with the customer in order to probe product or service requirements before developing a tailored solution
General Information	Allow customers to learn more about the products and services offered by different vendors as well as to contact these companies through various channels
Order Taking	Facilitate customers in placing purchase orders or making reservations

Payment	Simplify and convenience the transfer of funds
Specific Information	Provide customers with relevant information pertaining to products or services such as schedules, operating instructions, and user warnings
Caretaking and Safekeeping	Assist the customer with caring for purchased products or services
Billing	Offer clear and understandable listing of charges
Handling Exceptions	Personalize customers' experience and interaction through accommodating special requests, solving problems, as well as handling complaints/suggestions, compliments and restitutions
Hospitality	Treat customers as valued guests by granting efficient and effective access to offered products and services

2.2 Emotional Buy-In: Fulfilling Hedonic Expectations via Aesthetic Performance

Comparatively, the epicurean aspects of shopping have received far less attention in extant literature [3,50]. Unlike utilitarian value, hedonic value is more personal and subjective in that it is realized through the amount of entertainment experienced in the shopping process [84]. Hedonic value thus reflects the emotional worth to be gained by customers in performing the shopping activity [4,85]. Here, "the purchase of goods may be incidental to the experience of shopping. People buy so they can shop, not shop so they can buy" [85, p. 428]. Vicarious consumption can grant hedonic value by enabling customers to gain gratification without committing to any actual purchases [48,87,88] even though the act of purchasing products or services can also produce hedonic value and may at times, serve as the climax of the entire shopping experience [3].

Enjoyment has been frequently hailed as a core hedonic benefit of shopping [89]. Another common source of hedonic value is derived from bargains where the discrepancy between the selling price of a product and the internal reference price of a customer extends beyond functional utility to foster feelings of anxiety and excitement [90]. Indeed, affective emotions such as increased arousal, heightened involvement, perceived freedom, fantasy fulfillment, and escapism have been found to be indicative of a hedonically charged shopping experience [6,54]. Likewise, prior research has borne witness to alternate factors that drive customers' adoption of e-commerce sites and yet cannot be readily subsumed under the category of utilitarian expectations. The concept of enjoyment has been touted in past studies as a key determinant of attitude in e-

commerce transactions [8,13,17,32,33,36,91,92]. Flow—the holistic experience that people feel when they act with total involvement [93]—is another hedonically-driven motive that has been shown to be predictive of customers' adoption of e-commerce sites [e.g., 32,93–97]. Other hedonic aspects of online shopping that have attracted similar scholarly attention include arousal [15,99], cognitive absorption [41,100], fun [101,102], mystery [103,104], playfulness [100,105], pleasure [99] and stimulation [106]. To address the myriad of hedonic expectations, Cyr et al. [91] alleged that the aesthetic performance of e-commerce sites is of the utmost importance. We therefore define ***hedonic disconfirmation*** as *a customer's evaluation of the extent to which the aesthetic performance of an e-commerce site fails to match their hedonic expectations.* Customers' hedonic expectations will be negatively disconfirmed if the aesthetic performance of an e-commerce site fails to meet their expectations. Consistent with the EDT, we hypothesize that disconfirmed hedonic expectations are likely to give rise to feeling of low satisfaction with the capacity of the site to cater to customers' emotive needs:

> ***Hypothesis 9***: A customer's hedonic disconfirmation of an e-commerce site is negatively related to their hedonic satisfaction with the site.

Childers et al. [8] observed that motivations to engage in online shopping comprise both utilitarian and hedonic dimensions because the malleability of e-commerce sites presents "an expanded opportunity to create a cognitively and aesthetically rich shopping environment" (p. 511). Inability to synchronize the aesthetic design of e-commerce sites with pre-consumption expectations should therefore lead to perceptions of expectation disconfirmation or failure [65]. This stance coincides with the work of Khalifa and Liu [42], who witnessed a positive impact of pre-adoption desires on expectation disconfirmation for Internet-based services.

Not unlike utilitarian expectations, hedonic expectations are also likely to assume the form of a multi-dimensional construct as evidenced by the multitude of hedonically-driven motivations

uncovered in prior research [e.g., 13,15,33,90,96–102,104,105]. Yet, despite the acknowledgement of hedonic motivations as salient drivers of consumer behavior, the noticeable absence of a systematic categorization of relevant dimensions driving hedonic expectations has created a knowledge gap in our attempt to comprehend how hedonic expectations could be managed in the e-commerce context.

To arrive at an explanatory set of dimensions constituting hedonic expectations, we reviewed articles from journals, which have published research on subject matters touching on emotions and/or e-commerce in the past, namely the *European Journal of Information Systems* (EJIS), *Information Systems Journal* (ISJ), *Information Systems Research* (ISR), *International Journal of Electronic Commerce* (IJEC), *Journal of the Association of Information Systems* (JAIS), *Journal of Information Technology* (JIT), *Journal of Management Information Systems* (JMIS), *Journal of Strategic Information Systems* (JSIS) and *MIS Quarterly* (MISQ). We searched for articles dated between 2000 and 2017 that have been published in the aforementioned journals. This process yielded a total of 168 articles for review (see Table 3).

Initial screening of the retrieved articles reveals diverse positions taken by scholars in theorizing how hedonism can be realized through information technology. Whereas some scholars chose to concentrate on the hedonic benefits one could possibility gain from technology utilization (i.e., hedonic expectations) [e.g., 9,12,16,20–22,24,25,41,106,107], others opted to either focus on actionable design principles that could be leveraged by developers to bring about such benefits (i.e., aesthetic properties) [e.g., 26,31,108] or attempt to propose a combination of both [e.g., 14,17–19,22,23,98,109]. To disentangle hedonic expectations from that of aesthetic properties, unlabeled sorting was carried out on constructs extracted from the retrieved articles.

Table 3. Breakdown of Journal Papers Published on Emotions in Online Shopping [% - Divided over total papers]																			
Journal	**Publication Year**																		**Total**
	2000	**2001**	**2002**	**2003**	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	
EJIS	0 [0.0%]	0 [0.0%]	1 [0.6%]	0 [0.0%]	0 [0.0%]	3 [1.8%]	1 [0.6%]	1 [0.6%]	1 [0.6%]	0 [0.0%]	1 [0.6%]	1 [0.6%]	4 [2.4%]	2 [1.2%]	2 [1.2%]	1 [0.6%]	4 [2.4%]	0 [0.0%]	**22 [13.1%]**
ISJ	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	2 [1.2%]	1 [0.6%]	0 [0.0%]	0 [0.0%]	2 [1.2%]	2 [1.2%]	0 [0.0%]	0 [0.0%]	1 [0.6%]	**8 [4.8%]**
ISR	1 [0.6%]	0 [0.0%]	1 [0.6%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	1 [0.6%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	2 [1.2%]	7 [4.2%]	1 [0.6%]	3 [1.8%]	5 [2.4%]	1 [0.6%]	**22 [13.1%]**
IJEC	0 [0.0%]	1 [0.6%]	0 [0.0%]	0 [0.0%]	1 [0.6%]	1 [0.6%]	1 [0.6%]	0 [0.0%]	2 [1.2%]	1 [0.6%]	0 [0.0%]	0 [0.0%]	2 [1.2%]	1 [0.6%]	7 [4.2%]	3 [1.8%]	11 [6.5%]	0 [0.0%]	**31 [18.5%]**
JAIS	0 [0.0%]	0 [0.0%]	0 [0.0%]	1 [0.6%]	0 [0.0%]	1 [0.6%]	1 [0.6%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	1 [0.6%]	0 [0.0%]	0 [0.0%]	1 [0.6%]	2 [1.2%]	3 [1.8%]	2 [1.2%]	1 [0.6%]	**13 [7.7%]**
JIT	0 [0.0%]	0 [0.0%]	0 [0.0%]	1 [0.6%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	2 [1.2%]	0 [0.0%]	0 [0.0%]	1 [0.6%]	0 [0.0%]	1 [0.6%]	0 [0.0%]	1 [0.6%]	1 [0.6%]	**7 [4.2%]**
JMIS	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	2 [1.2%]	0 [0.0%]	0 [0.0%]	1 [0.6%]	6 [3.6%]	10 [6.0%]	6 [3.6%]	6 [3.6%]	0 [0.0%]	**31 [18.5%]**
JSIS	0 [0.0%]	0 [0.0%]	1 [0.6%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	2 [1.2%]	2 [1.2%]	1 [0.6%]	2 [1.2%]	1 [0.6%]	**9 [5.4%]**
MISQ	0 [0.0%]	0 [0.0%]	0 [0.0%]	0 [0.0%]	1 [0.6%]	1 [0.6%]	1 [0.6%]	0 [0.0%]	0 [0.0%]	1 [0.6%]	1 [0.6%]	0 [0.0%]	0 [0.0%]	5 [5.0%]	7 [4.2%]	1 [0.6%]	4 [2.4%]	3 [1.8%]	**25 [14.9%]**
Total	1 [0.6%]	1 [0.6%]	3 [1.8%]	2 [1.2%]	2 [1.2%]	6 [3.6%]	4 [2.4%]	2 [1.2%]	3 [1.8%]	8 [4.8%]	4 [2.4%]	1 [0.6%]	10 [6.0%]	26 [15.5%]	34 [20.2%]	18 [10.7%]	35 [20.8%]	8 [4.8%]	**168 [100%]**

EJIS – European Journal of Information Systems; ISJ – Information Systems Journal; ISR – Information Systems Research; IJEC – International Journal of Electronic Commerce; JAIS – Journal of the Association of Information Systems; JIT – Journal of Information Technology; JMIS – Journal of Management Information Systems; JSIS – Journal of Strategic Information Systems; MISQ – MIS Quarterly

To begin, each retrieved article was reviewed by the authors to isolate constructs related to hedonic elements of e-commerce sites. Two independent coders were then recruited and briefed on what constitute hedonic expectations and aesthetic properties. Elicited constructs were then subjected to a round of unlabeled sorting by these two coders in which they were asked to organize the constructs into broader categories of hedonic expectations and aesthetic properties according to their theoretical proximity (i.e., how these constructs have been defined). Unlabeled sorting eventually led to the identification of three hedonic expectations (see Table 4) and three aesthetic properties (see Table 5) with an inter-coder Kappa value of 0.86.

Table 4. Hedonic Expectations of E-Commerce Sites

Construct	Definition
Enjoyability	Degree to which the e-commerce site is expected to accord feelings of pleasure in the customer through its utilization
Excitability	Degree to which the e-commerce site is expected to engage the customer in a state of heightened arousal through its utilization
Flow	Degree to which the e-commerce site is expected to induce a sense of rhythmic continuity that keeps the customer involved and preoccupied during its utilization

Enjoyability, as a hedonic motivation of customer action, has been affirmed by numerous researchers [see 8,13,17,32,33,36,90,91,110]. As an influential factor of customer attitudes in e-commerce transactions, enjoyability deals with the entertaining and experiential aspects of shopping [112] to the extent to which Davis et al. [113] classified it as an intrinsic motivation of technology acceptance. Although Dabholkar [101], Dabholkar and Bagozzi [102] employed the term 'fun' in place of enjoyability in their research, they admitted that its meaning is no different from that of the latter [see also 98]. Enjoyability, as a hedonic expectation, is thus defined in this study as the *degree to which the e-commerce site is able to accord feelings of pleasure in the customer through its utilization*.

The term ***excitability*** is advanced in this study as an overarching construct from which to classify hedonic motivations like play [100,105], mystery [103] and stimulation [106]. While the aforementioned constructs may differ slightly in their conceptions, they share commonalities in

their emphasis on shopping as an engaging and adventurous journey, thereby leading to emotional arousal on the part of the customer. We hence define excitability as the *degree to which the e-commerce site is able to engage the customer in a state of heightened arousal through its utilization*.

The notion of ***flow*** has been well-accepted in extant literature as a hedonic motivational factor driving users' acceptance of technology [e.g., 20,32,93–95,97,113]. When people are trapped in the flow state, they become totally involved in the ongoing activity and are unable to detect changes in their immediate surroundings [93]. Ha et al. [114] hence characterizes flow as a psychological state of individuals that exhibits: (1) a sense of playfulness; (2) a feeling of being in control; (3) strong concentration and loss of self-consciousness; (4) a distorted reality of time, and; (5) mental delight in an activity purely on its own. In this sense, flow is an *end* in itself as the activity must be intrinsically rewarding to secure people's involvement [96]. Such a characterization of flow coincides with the state of cognitive absorption that may arise from technology usage [41,100]. In keeping with the spirit of flow as a hedonic expectation associated with e-commerce sites, this study defines it as the *degree to which the e-commerce site is able to involve the customer and keep him/her preoccupied through its utilization*.

Since enjoyability, excitability, and flow mirror a substantial portion of customers' expectations of e-commerce sites as entertaining retail channels (see Appendix A), it is deducible that customers' satisfaction with online shopping will be dictated by the capacity of e-commerce sites to meet these hedonic expectations. Because the positive relationship between expectations and disconfirmation has been empirically validated in past studies [37–40], we anticipate that the greater the importance a customer attaches to each of the three hedonic expectations, the more

challenging it will be for an e-commerce site to meet these expectations, thereby amplifying the likelihood of disconfirming their expectations. We therefore hypothesize that:

> ***Hypothesis 10***: A customer's perceived importance of the three hedonic expectations associated with an e-commerce site is positively related to their hedonic disconfirmation of the site.

Though there is no empirical evidence that alludes to the positive linkages between hedonic expectations and the aesthetic performance of e-commerce sites, this relationship should hold given that it is inherited from the EDT and has been corroborated by evidence from offline retail settings [e.g., 37,39,73–75]. We therefore hypothesize that:

> ***Hypothesis 11***: A customer's perceived importance of the three hedonic expectations associated with an e-commerce site is positively related to their evaluation of the aesthetic performance of the site.

The aesthetic performance of e-commerce sites in addressing customers' hedonic motivations has been well-investigated within extant literature [91]. Whether it is the effect of social presence on perceived enjoyment [17], the impact of media vividness on involvement [95] or the influence of atmospheric cues on flow perceptions [94], there is an abundance of empirical evidence attesting to the viability of designing e-commerce sites with an eye towards aesthetics so as to match the hedonic expectations of customers during online shopping. We hence define ***aesthetic performance*** as *a customer's evaluation of the extent to which an e-commerce site is able to offer a multi-sensory shopping experience that cater to their entertainment needs* and hypothesize that:

> ***Hypothesis 12***: A customer's evaluation of the aesthetic performance of an e-commerce site is negatively related to their hedonic disconfirmation of the site.

By the same rationale, a customer whose hedonic expectations has been fulfilled or met through the aesthetics made accessible from the e-commerce site is more likely to be satisfied with the online shopping experience. We therefore hypothesize that:

Hypothesis 13: A customer's evaluation of the aesthetic performance of an e-commerce site is positively related to their hedonic satisfaction with the site.

From the unlabeled sorting exercise described earlier, three dimensions of aesthetic properties (i.e., social presence, media vividness and atmospheric cues) were consolidated (see Appendix B). Social presence—"the extent to which a medium allows users to experience others as psychologically present" [114, p. 11]—refers to the capacity of communication medium to transmit information richness [116] and has been proven to positively influence the aesthetic performance of online shopping experiences by fostering a psychological connection between e-commerce sites and customers in order to encourage feelings of warmth and sociability towards the former much like human contact [14,17,22,23,26,109,117,118]. Conversely, Griffith et al. [95] noted that media vividness (i.e., engaging and interactive user interface) is critical in retaining customers' involvement during online shopping. It can thus be inferred that media vividness impacts customers' evaluation of the aesthetic performance of e-commerce sites through cultivating an immersive online shopping experience [18,19,31,96,104,109,110,117]. Other aesthetic design implications involve the provision of atmospheric cues [15,18,19,31,94,99,118,119] such as animation [120], pleasurable background music [121,122] and high resolution videos [22] to induce a sense of excitement during the online shopping process. Table 5 summarizes the aesthetic properties impacting customers' evaluation of aesthetic performance for e-commerce sites and we further hypothesize that:

Hypothesis 14: A customer's evaluation of the presence of each of the three aesthetic properties within an e-commerce site is positively related to their aesthetic performance of the site.

Table 5. Taxonomy of Aesthetic Properties

Construct	Definition
Social Presence	Enable customers to experience others as though they are psychologically present
Media Vividness	Is engaging and interactive
Atmospheric Cues	Immersive interface elements such as animation, pleasurable background music and high-resolution videos

3. METHODOLOGY

This study adopts the field survey methodology for data collection. Data is gathered on a variety of e-commerce sites with the aid of student respondents. Students attending an undergraduate course were invited to participate in the survey. Because students mirror the demographics of the younger generation for which online transactions have been popular, they can be regarded as exemplary customers of e-commerce sites. Each respondent is asked to recall an e-commerce site they frequently visit and to evaluate the extent to which transactional functionalities and aesthetic properties accessible from this site disconfirm their utilitarian and hedonic expectations. As reported by the respondents, they have utilized a diversity of e-commerce sites, with the most prominent being Amazon, eBay, and Best Buy. Collected data is then analyzed via Structural Equation Modeling (SEM) techniques to validate our theoretical model.

3.1 Development of Survey Measures

Measurement items for constructs in the theoretical model are either adapted from extant literature or generated in accordance with standard psychometric procedures [123] whenever necessary. Measures for the seven dimensions of utilitarian expectations are adapted from Moore and Benbasat [67,72]. Measures for enjoyability are adapted from Hassanein and Head [17]. Measures for five of the nine transactional functionalities (i.e., general information, order taking, payment, specific information, caretaking and safekeeping) as well as those for satisfaction are adapted from Cenfetelli et al. [10]. Social presence is measured via five items adapted from Gefen and Straub [115]. Finally, we referenced Bhattacherjee's [77] work in wording measurement items for the two disconfirmation constructs. The complete list of measurement items for constructs in our theoretical model is summarized in Appendix C.

3.2 Design of Survey Questionnaire

Given the predominantly Internet-savvy target audience, we opted for an electronic survey during data collection [124]. An online questionnaire is crafted and circulated among graduate students and faculty members to solicit feedback on its format and presentation. This initial review is crucial in establishing the clarity of survey instructions, as there will not be any face-to-face interaction between investigators and respondents. We also assessed the proper functioning of the survey questionnaire across a variety of browsers (e.g., Google Chrome, Microsoft Internet Explorer, Mozilla Firefox and Netscape), display resolutions and hardware systems (e.g., Pentium PCs, Macintoshes). Other than minor formatting issues, no major problem surfaced during a pre-test conducted prior to the launch of the actual survey.

3.3 Sample and Data Collection Procedures

Respondents for the survey are recruited from students attending an undergraduate course in a large North American university. According to Comley [125], a much higher response rate can be expected when respondents have given their prior consent for participation. An email containing explanations on the purpose of this research together with detailed descriptions of the survey procedures is sent to each student to invite him/her to participate in the study. The email also contains a hyperlink to the online questionnaire for students, who are willing to participate in the survey, to click through. Additionally, the first page of the survey questionnaire displays a consent form that potential respondents must acknowledge electronically before they can proceed further. Participation is voluntary, and respondents are reminded that they can choose to withdraw from answering the survey at any moment in time by simply closing their browser.

Survey respondents are requested to assess an e-commerce site for which they have performed a transaction within the last six months [see 10]. Each site is evaluated based on the

transactional functionalities and aesthetic properties offered relative to the individual's utilitarian and hedonic expectations as well as their perceptions of the remaining seven cognitive constructs (i.e., *functional performance*, *aesthetic performance*, *utilitarian disconfirmation*, *hedonic disconfirmation*, *utilitarian satisfaction*, *hedonic satisfaction* and *overall satisfaction*). One of the challenges in web data collection is in the computation of non-response bias because it is difficult to keep track of multiple submissions by the same respondent or the contamination of the data sample by outsiders [124]. Fortunately, because respondents are recruited from a class of 387 students, we obtain a response rate of 82.95% (321/387). After deleting another 18 responses due to data runs, we arrive at an eventual sample of 303 (78.29%) data points for analysis. On average, the sample consists of 145 (or 47.85%) females who carry out e-commerce transactions at least once a month.

3.4 Data Analysis

Because survey methodologies may be plagued by common method bias, we applied Harman's [126] one-factor extraction test to our data sample. No single factor accounted for more than 50% of total variance explained [127]. We further partialled out common method factor in our structure model by adhering to advocated procedures [128–130]. Results demonstrate that the substantive loading of each single-indicator construct largely surpasses its common method loading (see Appendix C). Taken together, the preceding results imply that common method bias is not a threat in this study.

Partial Least Squares (PLS) analysis is employed to analyze the gathered data [131,132]. The PLS analytical technique is chosen for its ability in handling highly complicated predictive models comprising a combination of formative and reflective constructs [133]. For data analysis, we modeled utilitarian and hedonic expectations as second-order aggregates, each comprising a

weighted sum of its respective constituent dimensions. Unlike functional and aesthetic performance which reflect holistic evaluations of the performance of transactional functionalities and aesthetic properties on e-commerce sites [134], each dimension of utilitarian and hedonic expectations can manifest independently of one another: just because a customer expects an e-commerce to be easy to use does not necessarily imply that they expect the site to improve their image as well. Consequently, the manifestation of any one specific dimension of utilitarian expectations or hedonic expectations is not indicative of the presence of another, be it Moore and Benbasat's [67] technological innovation characteristics or the notions of enjoyability, excitability and flow as synthesized from extant literature in this study.

3.4.1 Test of Measurement Model

The verification of the measurement model involves the estimation of internal consistency as well as the convergent and discriminant validity of the measurement items included in our survey instrument. Because reflective items capture the effects of the construct under scrutiny [135], internal consistency can be assessed through standard estimates of Cronbach's alpha [123], composite reliability and the Average Variance Extracted (AVE) [136]. After dropping 10 measurement items due to low factor loadings (i.e., < .70), the latent constructs exceed prescribed thresholds (see Appendix D), thus supporting convergent validity. To determine discriminant validity, the square root of the AVE for each construct was compared against its correlations with other constructs [136]. For the criterion of discriminant validity to hold, the square root of the AVE for each construct should be greater than its correlations with any other construct. Based on the inter-construct correlation matrix generated from PLS, all constructs display sufficient

discriminant validity (see Appendix E). Of the 406 unique bivariate correlations[1] among the 29 latent constructs in our measurement model, only 3 pairs (1%) surpass the 0.70 mark for the dataset, and even then, their values are still much lower than the square root of intra-construct AVE for each (see Appendix E). This indicates that respondents are able to distinguish among the constructs in our theoretical model when answering the survey questionnaire. Convergent and discriminant validity are further confirmed when individual items load above 0.5 on their associated factors (see Appendix D).

3.4.2 Test of Structural Model

The test of the structural model includes estimates of the path coefficients that indicate the strengths of the relationships between the dependent and independent variables as well as the R^2 values that represent the amount of variance explained by the independent variables on its dependent counterpart. Taken together, the R^2 values and the path coefficients (the loadings and the significance respectively) offer an indication of how well the hypothesized model is substantiated by the data. Results from PLS analysis of the structural model, including path coefficients and their statistical significance[2], are depicted in Figure 2.

[1] Number of unique bivariate correlations can be calculated with the formula $\frac{\chi}{2}(\chi - 1)$, where χ is the given number of constructs.

[2] Standard errors were computed via a bootstrapping procedure with 500 re-samples.

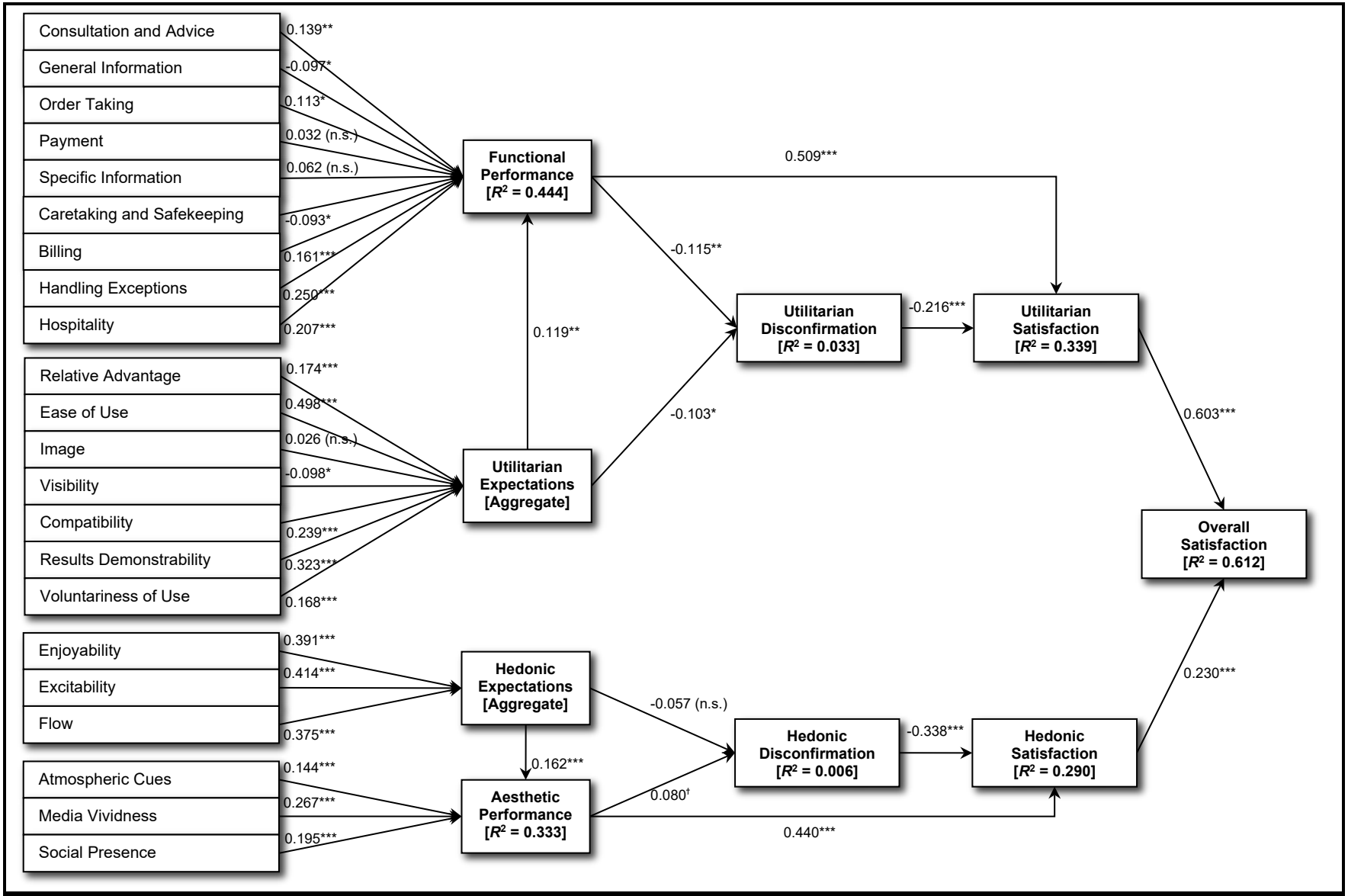

Figure 2. Analytical Results of Test of Structural Model

**** Correlation is significant at 0.001; ** Correlation is significant at 0.01; * Correlation is significant at 0.05; [1] Correlation is significant at 0.10; n.s. Correlation is NOT significant at 0.05*

From our data analysis, majority of hypothesized relationships are substantiated by the empirical evidence. As postulated, *utilitarian satisfaction* (β = 0.60, $p < 0.001$) and *hedonic satisfaction* (β = 0.23, $p < 0.001$) exert positive and significant effects on customers' *overall satisfaction* towards e-commerce sites, explaining 61% of variance in the latter and substantiating hypotheses 1 and 2. In turn, *utilitarian disconfirmation* (β = -0.22, $p < 0.001$) and *hedonic disconfirmation* (β = -0.34, $p < 0.001$) have significantly negative impacts on *utilitarian satisfaction* and *hedonic satisfaction* respectively, thus corroborating hypotheses 3 and 9. Further, *functional performance* ($\beta = 0.51, p < 0.001$) and *aesthetic performance* ($\beta = 0.44, p < 0.001$) exert positive and significant effects on *utilitarian satisfaction* and *hedonic satisfaction*, which when combined with their corresponding disconfirmation constructs, account for 34% and 29% of variance explained in *utilitarian satisfaction* and *hedonic satisfaction* respectively. This reinforces hypotheses 7 and 13. *Functional performance* has a significantly negative impact on *utilitarian disconfirmation* (β = -0.12, $p < 0.01$) whereas *aesthetic performance* has a weakly significant positive relationship with *hedonic disconfirmation* (β = 0.08, $p < 0.10$). Hypothesis 6 is hence supported whereas hypothesis 12 is not. Contrary to our anticipations, *utilitarian expectations* exert significantly negative effect on *utilitarian disconfirmation* (β = -0.10, $p < 0.05$) whereas *hedonic expectations* have no effect on *hedonic disconfirmation*. Hypotheses 4 and 10 are unsupported. Combining expectations and performance constructs, our model explains only 3% and 1% of variance in *utilitarian disconfirmation* and *hedonic disconfirmation*. The low variance explained of utilitarian disconfirmation can be attributed to the marginal effect of functional performance on utilitarian disconfirmation and the insignificant impact of utilitarian expectations on utilitarian disconfirmation (see Figure 2). Likewise, as shown in Figure 2, the low variance

explained of hedonic disconfirmation is due to the insignificant effect of hedonic expectations and aesthetic performance on hedonic disconfirmation (see Figure 2).

Consistent with hypotheses 5 and 11, *utilitarian expectations* (β = 0.12, $p < 0.01$) and *hedonic expectations* (β = 0.16, $p < 0.001$) have positive and significant impacts on *functional performance* and *aesthetic performance*. Of the seven constituent dimensions comprising the second-order aggregate construct of *utilitarian expectations*, most are significantly positive contributors except for *image* (β = 0.03, $p > 0.05$) and *visibility* (β = -0.10, $p < 0.05$). Conversely, *enjoyability* (β = 0.39, $p < 0.001$), *excitability* (β = 0.41, $p < 0.001$) and *flow* (β = 0.38, $p < 0.001$) are positive and significant contributors to the second-order aggregate construct of *hedonic expectations*. With the exception of *general information* (β = -0.10, $p < 0.05$), *payment* (β = 0.03, $p > 0.05$), *specific information* (β = 0.06, $p > 0.05$) as well as *caretaking and safekeeping* (β = -0.10, $p < 0.05$), the remaining five transactional functionalities exert significantly positive effects on *functional performance*. Together with the aggregate construct of *utilitarian expectations*, we observe 44% of variance explained in the latter. Consequently, hypothesis 8 is partially validated. In line with hypothesis 14, *atmospheric cues* (β = 0.14, $p < 0.001$), *media vividness* (β = 0.27, $p < 0.001$) and *social presence* (β = 0.20, $p < 0.001$) have positive and significant impacts on *aesthetic performance*. Coupled with the aggregate construct of *hedonic expectations*, 33% of variance is accounted for in the latter through our model.

Table 6 summarizes the results of our hypotheses testing.

Table 6. Results of Hypotheses Testing

Hypothesis		Supported
H1	A customer's utilitarian satisfaction with an e-commerce site is positively related to their overall satisfaction with the site.	Supported
H2	A customer's hedonic satisfaction with an e-commerce site is positively related to their overall satisfaction with the site.	Supported
H3	A customer's utilitarian disconfirmation of an e-commerce site is negatively related to their utilitarian satisfaction with the site.	Supported

H4	A customer's perceived importance of the seven utilitarian expectations associated with an e-commerce site is positively related to their utilitarian disconfirmation of the site.	Not Supported
H5	A customer's perceived importance of the seven utilitarian expectations associated with an e-commerce site is positively related to their evaluation of the functional performance of the site.	Supported
H6	A customer's evaluation of the functional performance of an e-commerce site is negatively related to their utilitarian disconfirmation of the site.	Supported
H7	A customer's evaluation of the functional performance of an e-commerce site is positively related to their utilitarian satisfaction with the site.	Supported
H8	A customer's evaluation of the presence of each of the nine transactional functionalities within an e-commerce site is positively related to their functional performance of the site.	Partially Supported
H9	A customer's hedonic disconfirmation of an e-commerce site is negatively related to their hedonic satisfaction with the site.	Supported
H10	A customer's perceived importance of the three hedonic expectations associated with an e-commerce site is positively related to their hedonic disconfirmation of the site.	Not Supported
H11	A customer's perceived importance of the three hedonic expectations associated with an e-commerce site is positively related to their evaluation of the aesthetic performance of the site.	Supported
H12	A customer's evaluation of the aesthetic performance of an e-commerce site is negatively related to their hedonic disconfirmation of the site.	Not Supported
H13	A customer's evaluation of the aesthetic performance of an e-commerce site is positively related to their hedonic satisfaction with the site.	Supported
H14	A customer's evaluation of the presence of each of the three aesthetic properties within an e-commerce site is positively related to their aesthetic performance of the site.	Supported

3.4.3 Post-Hoc Analysis

In contrast to past empirical findings, several hypothesized relationships are not supported by the empirical evidence. Whereas Cenfetelli et al. [10] revealed functionalities resembling *general information*, *payment*, *specific information* as well as *caretaking and safekeeping* to be key determinants of service quality for e-commerce sites, our empirical findings demonstrate otherwise (see Figure 2). Likewise, counterintuitive results were obtained for the utilitarian expectations of *image* and *visibility* [see 66,71] as well as the impact of utilitarian expectations and hedonic expectations on functional disconfirmation and aesthetic disconfirmation respectively [see 39].

A plausible explanation for these contradictory findings can be found in the work of Bhattacherjee and Premkumar [78], who illustrated the existence of a continuous feedback loop that causes users' evaluation of information technology at later stages of usage to be predicated on their corresponding beliefs and attitudes at earlier stages. Bhattacherjee and Premkumar [78]

alleged that the longer a user is exposed to an information technology, the more stabilized are their expectations and the lesser the dissonance between the user's expectations and their observed performance of the technology. Similar claims were echoed by Tan et al. [137] in the context of e-government. As noted by Tan et al. [137], citizens who are frequent users of e-government services have expectations that are distinct from those of non-frequent users and as a consequence, demand functionalities over and above what has been provided to the latter. We therefore postulate that deviations from our hypothesized relationships could be triggered by differences in customers' transactional frequency in online shopping.

To test our proposition, a post-hoc analysis was performed in accordance with procedures adapted from Henseler [138] and Tan et al. [137]. We begin by introducing transactional frequency as a moderator to our original structural model and re-analyzing it to determine whether moderating effects exist. To pinpoint potential moderating effects, we conducted Multi-Group Analysis (MGA) following the guideline prescribed by Henseler [138]. Accordingly, we stratified our sample into three groups on the basis of the transactional frequency. The group consisting of customers who transact more than once per fortnight is *high frequency*. *Low frequency* group comprises customers who transact less than once per 6 months. All remaining customers are categorized into the group labelled *medium frequency*. As summarized in Table 7, transactional frequency moderates a handful of relationships hypothesized in our theoretical model, the majority of which relates to unsupported hypotheses. Next, we divide the entire sample into five datasets that are assembled from the sequential inclusion of responses based on reported transactional frequency categories (i.e., *at least once per month*, *at least once per three months*, *at least once per six months*, *at least once per year* and *less than once per year*). That is, the dataset for respondents who transact 'at least once per three months' contains responses from those who

'transact at least once per month' and so on and so forth. We then analyzed five separate structural models corresponding to these datasets. Path coefficients for hypothesized relationships from the analyses of the five structural models are summarized in Table 8 below.

Table 7. Multi-Group Analysis Results

Relationship	Comparison	Mean Difference	$t_{Parametric}$	$p_{Parametric}$	$t_{Permutation}$	$p_{Permutation}$
Utilitarian Expectations [Second-Order Aggregate Construct]						
REL → UEXP	High vs. Medium Frequencies	-0.151	-0.766	0.444	-0.772	0.442
	Medium vs. Low Frequencies	0.622	2.087*	0.038	1.792†	0.078
	High vs. Low Frequencies	0.471	1.574	0.117	1.403	0.165
EOU → UEXP	High vs. Medium Frequencies	-0.283	-1.173	0.242	-1.163	0.247
	Medium vs. Low Frequencies	-0.412	-1.467	0.144	-1.352	0.181
	High vs. Low Frequencies	-0.695	-2.094*	0.038	-2.330*	0.038
IMG → UEXP	High vs. Medium Frequencies	0.036	0.174	0.862	0.173	0.863
	Medium vs. Low Frequencies	-0.180	-0.633	0.528	-0.580	0.564
	High vs. Low Frequencies	-0.144	-0.459	0.647	-0.432	0.667
VIS → UEXP	High vs. Medium Frequencies	-0.182	-0.590	0.556	-0.583	0.561
	Medium vs. Low Frequencies	-0.086	-0.260	0.795	-0.275	0.784
	High vs. Low Frequencies	-0.267	-0.675	0.501	-0.765	0.447
COM → UEXP	High vs. Medium Frequencies	0.699	2.830**	0.005	2.844**	0.005
	Medium vs. Low Frequencies	-0.239	-0.700	0.485	-0.654	0.515
	High vs. Low Frequencies	0.460	1.357	0.177	1.268	0.209
RES → UEXP	High vs. Medium Frequencies	-0.371	-1.617	0.107	-1.581	0.117
	Medium vs. Low Frequencies	0.315	1.118	0.265	0.976	0.333
	High vs. Low Frequencies	-0.056	-0.166	0.869	-0.168	0.867
VOL → UEXP	High vs. Medium Frequencies	0.152	0.664	0.508	0.661	0.510
	Medium vs. Low Frequencies	-0.116	-0.430	0.667	-0.417	0.678
	High vs. Low Frequencies	0.036	0.122	0.903	0.128	0.898
Transactional Functionalities → Functional Performance						
CON → FUN	High vs. Medium Frequencies	-0.255	-2.045*	0.042	-2.046*	0.043
	Medium vs. Low Frequencies	-0.102	-0.692	0.490	-0.651	0.517
	High vs. Low Frequencies	-0.357	-2.290*	0.023	-2.224*	0.030
GEN → FUN	High vs. Medium Frequencies	-0.145	-1.013	0.312	-1.031	0.305
	Medium vs. Low Frequencies	0.330	1.638	0.103	1.598	0.115
	High vs. Low Frequencies	0.185	1.096	0.275	1.016	0.313
ORD → FUN	High vs. Medium Frequencies	0.380	2.836**	0.005	2.868**	0.005
	Medium vs. Low Frequencies	-0.284	-1.649	0.101	-1.663	0.101
	High vs. Low Frequencies	0.096	0.568	0.571	0.563	0.575
PAY → FUN	High vs. Medium Frequencies	-0.218	-1.525	0.128	-1.548	0.124

	Medium vs. Low Frequencies	0.348	1.652	0.100	1.534	0.130
	High vs. Low Frequencies	0.130	0.658	0.512	0.593	0.555
SPC → FUN	High vs. Medium Frequencies	0.136	0.832	0.406	0.824	0.411
	Medium vs. Low Frequencies	0.133	0.711	0.478	0.689	0.493
	High vs. Low Frequencies	0.269	1.211	0.227	1.204	0.233
CAR → FUN	High vs. Medium Frequencies	0.110	0.790	0.430	0.782	0.436
	Medium vs. Low Frequencies	-0.560	-3.262***	0.001	-2.996**	0.004
	High vs. Low Frequencies	-0.451	-2.420*	0.017	-2.330*	0.023
BIL → FUN	High vs. Medium Frequencies	0.216	1.571	0.117	1.590	0.115
	Medium vs. Low Frequencies	-0.048	-0.271	0.786	-0.271	0.787
	High vs. Low Frequencies	0.168	1.044	0.298	0.992	0.325
HAN → FUN	High vs. Medium Frequencies	0.098	0.760	0.448	0.764	0.447
	Medium vs. Low Frequencies	0.219	1.328	0.186	1.349	0.182
	High vs. Low Frequencies	0.316	1.941*	0.050	1.919*	0.059
HOS → FUN	High vs. Medium Frequencies	-0.316	-2.480*	0.014	-2.464*	0.015
	Medium vs. Low Frequencies	-0.140	-0.876	0.382	-0.835	0.406
	High vs. Low Frequencies	-0.456	-2.630**	0.009	-2.562*	0.013
Hedonic Expectations [Second-Order Aggregate Construct]						
ENJ → HEXP	High vs. Medium Frequencies	0.071	0.184	0.854	0.177	0.859
	Medium vs. Low Frequencies	0.445	1.106	0.270	0.909	0.367
	High vs. Low Frequencies	0.516	0.849	0.397	0.894	0.374
EXT → HEXP	High vs. Medium Frequencies	-0.376	-0.810	0.419	-0.776	0.439
	Medium vs. Low Frequencies	-0.777	-1.684†	0.094	-1.359	0.179
	High vs. Low Frequencies	-1.153	-1.608	0.110	-1.665†	0.100
FLO → HEXP	High vs. Medium Frequencies	0.282	0.862	0.389	0.829	0.409
	Medium vs. Low Frequencies	0.794	1.884†	0.061	1.434	0.157
	High vs. Low Frequencies	1.076	1.780†	0.077	1.685†	0.097
Aesthetic Properties → Aesthetic Performance						
ATM → AES	High vs. Medium Frequencies	-0.113	-1.024	0.307	-1.026	0.307
	Medium vs. Low Frequencies	0.082	0.583	0.560	0.617	0.539
	High vs. Low Frequencies	-0.032	-0.232	0.817	-0.223	0.824
MED → AES	High vs. Medium Frequencies	0.265	1.929†	0.055	1.913†	0.058
	Medium vs. Low Frequencies	-0.088	-0.525	0.600	-0.491	0.625
	High vs. Low Frequencies	0.177	0.966	0.336	0.935	0.353
SoP → AES	High vs. Medium Frequencies	-0.076	-0.717	0.474	-0.710	0.479
	Medium vs. Low Frequencies	-0.068	-0.516	0.606	-0.477	0.635
	High vs. Low Frequencies	-0.144	-0.962	0.337	-0.941	0.350
Expectations → Performance						
UEXP → FUN	High vs. Medium Frequencies	-0.094	-0.459	0.647	-0.482	0.631
	Medium vs. Low Frequencies	-0.250	-0.835	0.405	-0.935	0.353
	High vs. Low Frequencies	-0.344	-1.947†	0.053	-1.628	0.109

HEXP → AES	High vs. Medium Frequencies	-0.141	-0.909	0.364	-0.869	0.386
	Medium vs. Low Frequencies	0.191	1.306	0.193	1.063	0.292
	High vs. Low Frequencies	0.050	0.208	0.836	0.222	0.825
Expectations + Performance → Disconfirmation						
UEXP → UDC	High vs. Medium Frequencies	0.209	0.808	0.420	0.813	0.418
	Medium vs. Low Frequencies	0.448	1.570	0.118	2.016*	0.047
	High vs. Low Frequencies	0.656	2.469*	0.015	2.995**	0.004
FUN → UDC	High vs. Medium Frequencies	-0.279	-1.679†	0.094	-1.716†	0.089
	Medium vs. Low Frequencies	-0.128	-0.522	0.602	-0.493	0.624
	High vs. Low Frequencies	-0.407	-1.926†	0.056	-1.664†	0.101
HEXP → HDC	High vs. Medium Frequencies	0.080	0.341	0.733	0.339	0.735
	Medium vs. Low Frequencies	-0.649	-2.503*	0.013	-2.692**	0.009
	High vs. Low Frequencies	-0.569	-2.013*	0.046	-2.202*	0.031
AES → HDC	High vs. Medium Frequencies	-0.304	-1.996*	0.047	-2.028*	0.045
	Medium vs. Low Frequencies	0.242	1.249	0.213	1.363	0.177
	High vs. Low Frequencies	-0.062	-0.375	0.708	-0.374	0.710
Performance + Disconfirmation → Satisfaction						
FUN → UST	High vs. Medium Frequencies	0.004	0.038	0.969	0.038	0.970
	Medium vs. Low Frequencies	0.263	1.812†	0.072	1.496	0.140
	High vs. Low Frequencies	0.267	1.676†	0.096	1.473	0.146
UDC → UST	High vs. Medium Frequencies	0.010	0.085	0.932	0.085	0.933
	Medium vs. Low Frequencies	0.001	0.007	0.995	0.007	0.995
	High vs. Low Frequencies	0.011	0.073	0.942	0.077	0.939
AES → HST	High vs. Medium Frequencies	-0.084	-0.754	0.452	-0.743	0.459
	Medium vs. Low Frequencies	0.198	1.361	0.175	1.159	0.251
	High vs. Low Frequencies	0.114	0.673	0.502	0.628	0.532
HDC → HST	High vs. Medium Frequencies	-0.020	-0.156	0.876	-0.154	0.878
	Medium vs. Low Frequencies	0.066	0.473	0.637	0.460	0.647
	High vs. Low Frequencies	0.046	0.265	0.791	0.283	0.778
Utilitarian + Hedonic Satisfaction → Overall Satisfaction						
UST → OST	High vs. Medium Frequencies	0.048	0.407	0.684	0.402	0.689
	Medium vs. Low Frequencies	-0.010	-0.064	0.949	-0.056	0.956
	High vs. Low Frequencies	0.038	0.223	0.824	0.211	0.833
HST → OST	High vs. Medium Frequencies	-0.105	-0.863	0.389	-0.852	0.396
	Medium vs. Low Frequencies	0.043	0.289	0.773	0.263	0.793
	High vs. Low Frequencies	-0.062	-0.365	0.716	-0.358	0.721

AES – Aesthetic Performance; ATM – Atmospheric Cues; BIL – Billing; CAR – Caretaking and Safekeeping; COM – Compatibility; CON – Consultation and Advice; EOU – Ease of Use; ENJ – Enjoyability; EXT – Excitability; FLO – Flow; FUN – Functional Performance; GEN – General Information; HAN – Handling Exceptions; HDC – Hedonic Disconfirmation; HEXP – Hedonic Expectations; HST; Hedonic Satisfaction; HOS – Hospitality; IMG – Image; MED – Media Vividness; ORD – Order Taking; OST – Overall Satisfaction; PAY – Payment; REL – Relative Advantage; RES – Results Demonstrability; SoP – Social Presence; UDC – Utilitarian Disconfirmation; UEXP – Utilitarian Expectations; UST – Utilitarian Satisfaction; VIS – Visibility; VOL – Voluntariness of Use

Table 8. Test of Frequency as a Moderator								
Relationships	**Comparison of Transactional Frequency**			**Path Coefficients of Separate Structural Models**				
	High vs. Mid	**Mid vs. Low**	**High vs. Low**	**At Least Once per Month [*N* = 194]**	**At Least Once per 3 Months [*N* = 243]**	**At Least Once per 6 Months [*N* = 278]**	**At Least Once per Year [*N* = 296]**	**Less than Once per Year [*N* = 303]**
Utilitarian Expectations [Second-Order Aggregate Construct]								
REL → UEXP	-0.151	0.622*	0.471	0.156***	0.160***	0.191***	0.181***	0.174***
EOU → UEXP	-0.283	-0.412	-0.695*	0.476***	0.484***	0.488***	0.492***	0.498***
IMG → UEXP	0.036	-0.180	-0.144	0.022	0.027	0.041	0.025	0.026
VIS → UEXP	-0.182	-0.086	-0.267	-0.055	-0.087†	-0.080†	-0.095*	-0.098*
COM → UEXP	0.699**	-0.239	0.460	0.246***	0.249***	0.240***	0.242***	0.239***
RES → UEXP	-0.371	0.315	-0.056	0.362***	0.352***	0.323***	0.324***	0.323***
VOL → UEXP	0.152	-0.116	0.036	0.170***	0.161***	0.173***	0.171***	0.168***
Transactional Functionalities → Functional Performance								
CON → FUN	-0.255*	-0.102	-0.357*	0.039	0.083†	0.088*	0.154***	0.139**
GEN → FUN	-0.145	0.330	0.185	-0.069	-0.010	-0.017	-0.087†	-0.097*
ORD → FUN	0.380**	-0.284	0.096	0.140***	0.079†	0.092*	0.105*	0.113*
PAY → FUN	-0.218	0.348†	0.130	0.098*	0.091*	0.060	0.036	0.032
SPC → FUN	0.136	0.133	0.269	0.100*	0.054	0.071	0.074	0.062
CAR → FUN	0.110	-0.560***	-0.451*	-0.165***	-0.163***	-0.154***	-0.110*	-0.093*
BIL → FUN	0.216	-0.048	0.168	0.186***	0.167***	0.169***	0.149***	0.161***
HAN → FUN	0.098	0.219	0.316*	0.256***	0.294***	0.265***	0.260***	0.250***
HOS → FUN	-0.316*	-0.140	-0.456**	0.163***	0.169***	0.189***	0.191***	0.207***
Hedonic Expectations [Second-Order Aggregate Construct]								
ENJ → HEXP	0.071	0.445	0.516	0.374***	0.388***	0.391***	0.393***	0.391***
EXT → HEXP	-0.376	-0.777†	-1.153†	0.411***	0.417***	0.417***	0.417***	0.414***
FLO → HEXP	0.282	0.794†	1.076†	0.393***	0.378***	0.377***	0.374***	0.375***
Aesthetic Properties → Aesthetic Performance								
ATM → AES	-0.113	0.082	-0.032	0.124**	0.139**	0.163***	0.165***	0.144***
MED → AES	0.265†	-0.088	0.177	0.312***	0.274***	0.278***	0.266***	0.267***
SoP → AES	-0.076	-0.068	-0.144	0.154***	0.170***	0.186***	0.185***	0.195***
Expectations → Performance								
UEXP → FUN	0.094	0.250	-0.344†	0.106*	0.111*	0.119**	0.117**	0.119**
HEXP → AES	-0.141	0.191	0.050	0.171***	0.206***	0.191***	0.183***	0.162***
Expectations + Performance → Disconfirmation								
UEXP → UDC	0.209	0.448*	0.656**	-0.002	-0.047	-0.069	-0.089*	-0.103*
FUN → UDC	-0.279†	-0.128	-0.407†	-0.181***	-0.175***	-0.143***	-0.123**	-0.115**
HEXP → HDC	0.080	-0.649**	-0.569*	0.017	-0.019	-0.049	-0.049	-0.057
AES → HDC	-0.304*	0.242	-0.062	0.025	0.028	0.068	0.077†	0.080†
Performance + Disconfirmation → Satisfaction								
FUN → UST	0.004	0.263†	0.267†	0.580***	0.561***	0.506***	0.510***	0.509***

UDC → UST	0.010	0.001	0.011	-0.204***	-0.213***	-0.201***	-0.210***	-0.216***
AES → HST	-0.084	0.198	0.114	0.499***	0.467***	0.438***	0.443***	0.440***
HDC → HST	-0.020	0.066	0.046	-0.292***	-0.321***	-0.339***	-0.339***	-0.338***
Utilitarian + Hedonic Satisfaction → Overall Satisfaction								
UST → OST	0.048	-0.010	0.038	0.624***	0.604***	0.607***	0.604***	0.603***
HST → OST	-0.105	0.043	-0.062	0.188***	0.232***	0.222***	0.231***	0.230***

AES – Aesthetic Performance; ATM – Atmospheric Cues; BIL – Billing; CAR – Caretaking and Safekeeping; COM – Compatibility; CON – Consultation and Advice; EOU – Ease of Use; ENJ – Enjoyability; EXT – Excitability; FLO – Flow; FUN – Functional Performance; GEN – General Information; HAN – Handling Exceptions; HDC – Hedonic Disconfirmation; HEXP – Hedonic Expectations; HST; Hedonic Satisfaction; HOS – Hospitality; IMG – Image; MED – Media Vividness; ORD – Order Taking; OST – Overall Satisfaction; PAY – Payment; REL – Relative Advantage; RES – Results Demonstrability; SoP – Social Presence; UDC – Utilitarian Disconfirmation; UEXP – Utilitarian Expectations; UST – Utilitarian Satisfaction; VIS – Visibility; VOL – Voluntariness of Use

For each hypothesized relationship where customers' transactional frequency acts as a statistically significant moderator, its path coefficients for the five structural models are plotted against the cumulative transactional frequency distribution as depicted in Appendix F. Together, the analytical results and graphical plots offer a comprehensive picture of trends in hypothesized relationships based on cumulative transactional frequencies of responses [see 133]. While our post-hoc analysis indicates that the bulk of our hypothesized relationships remain invariant with respect to customers' transactional frequency, there are additional insights to be gleaned from the analytical findings.

First, as transactional frequency decreases, the positive effect of *relative advantage* ($\Delta\mu$ = 0.622*, p = 0.038) and *compatibility* ($\Delta\mu$ = 0.699**, p = 0.005) on *utilitarian expectations* are attenuated, whereas the positive influence induced by *ease of use* ($\Delta\mu$ = -0.695*, p = 0.038) on *utilitarian expectations* is strengthened. As depicted in Figure F-1, there is a sudden plummet of the impact of compatibility on utilitarian expectations before the once per 6 months mark while the effect of relative advantage steadily declines after the once per 6 months mark. Moreover, Figure F-2 attests to a persistent growth in the influence of ease of use on utilitarian expectations as transactions become less frequent.

Second, the positive impact of *consultation and advice* ($\Delta\mu$ = -0.357*, p = 0.023) and *hospitality* ($\Delta\mu$ = -0.456**, p = 0.009) on *functional performance* are reinforced as transactional frequency decreases. Conversely, transactional frequency attenuates the positive effects of *order taking* ($\Delta\mu$ = 0.380**, p = 0.005), *payment* ($\Delta\mu$ = 0.348†, p = 0.100), and *handling exceptions* ($\Delta\mu$ = 0.361*, p = 0.050) as well as the negative influence engendered by *caretaking and safekeeping* ($\Delta\mu$ = -0.560***, $p < 0.001$) on *functional performance*. Figure F-3 alludes to the steady increment in the impact of consultation and advice as well as hospitality on functional performance as transactional frequency decreases. On the contrary, Figure F-4 illustrates how the effect of order taking drops before the once per 3 months mark whereas payment declines persistently alongside the decrease in transactional frequency. Likewise, Figure F-5 shows the declining influence of handling exceptions on functional performance after passing the once per 3 months mark. Similarly, the impact of caretaking and safekeeping on functional performance is weakened as transactional frequency decreases.

Third, the decrease in transactional frequency strengthens the positive relationship between *excitability* and *hedonic expectations* ($\Delta\mu$ = -0.344†, p = 0.094) while attenuating that between *flow* and *hedonic expectations* ($\Delta\mu$ = 0.794*, p = 0.061). As can be discerned from Figure F-6, the positive effect of excitability on hedonic expectations rises whereas that of flow diminishes noticeably prior to the once per 3 months mark.

Fourth, as transactional frequency decreases, the positive relationship between *media vividness* and *aesthetic performance* ($\Delta\mu$ = 0.265†, p = 0.055) is attenuated whereas the positive relationship between *utilitarian expectations* and *functional performance* ($\Delta\mu$ = -0.777†, p = 0.094) is reinforced. Accordingly, Figure F-7 reveals a declining trend in the influence exerted by media vividness on aesthetic performance. Additionally, Figure F-7 shows how the relationship between

utilitarian expectations and functional performance is rendered more salient as transactional frequency decreases before reaching the once per 6 months mark.

Fifth, customers' transactional frequency attenuates the negative impact induced by *utilitarian expectations* ($\Delta\mu$ = 0.656*, p = 0.015) while reinforcing the negative influence exerted by *functional performance* ($\Delta\mu$ = -0.407†, p = 0.056) on *utilitarian disconfirmation*. As a consequence, the less frequently customers transact via e-commerce sites, the more likely their utilitarian expectations will be disconfirmed by these sites. Conversely, functional performance is less likely to mitigate customers' utilitarian disconfirmation when they engage in less frequent transactions. Both moderating effects are reflected in Figure F-8 whereby the plot displays a steady growth in the magnitude of path coefficients between utilitarian expectations and utilitarian disconfirmation while exhibiting a persistent decline in the magnitude of path coefficients between functional performance and utilitarian disconfirmation as transactional frequency decreases. Conversely, transactional frequency attenuates the relationships between *hedonic expectations* and *hedonic disconfirmation* ($\Delta\mu$ = -0.649*, p = 0.013) as well as between *aesthetic performance* and *hedonic disconfirmation* ($\Delta\mu$ = -0.304*, p = 0.047). Thereby, the less frequently customers transact via e-commerce sites, the more likely their hedonic expectations will be disconfirmed by the aesthetic performance of these sites. Figure F-9 unveils a constant increase in the magnitude of path coefficients between hedonic expectations and hedonic disconfirmation while highlighting a steady growth in the magnitude of path coefficients between aesthetic performance and hedonic disconfirmation.

Finally, transactional frequency attenuates the positive relationship between *functional performance* and *utilitarian satisfaction* ($\Delta\mu$ = 0.267†, p = 0.095) such that the less frequent customers transact via e-commerce sites, the less likely they will be satisfied with the functional

performance of these sites. As depicted in Figure F-10, there is a steady decline in the impact exerted by functional performance on utilitarian satisfaction prior to the once per 6 months mark as transactional frequency diminishes.

4. DISCUSSION

Within extant literature, there exist dual research streams on how e-commerce sites can be designed to induce customer satisfaction. Whereas the utilitarian research stream advocates the provision of transactional functionalities to assist customers in the attainment of functional outcomes [e.g., 10], the hedonic research stream urges the consideration of aesthetics as an answer to customers' demand for an entertaining shopping experience. Building on the EDT, we construct and test a theoretical model of online consumption behaviors that distinguishes between utilitarian and hedonic elements of e-commerce sites as core determinants of customer satisfaction. Findings from our empirical validation of the model raise several points of interest.

First, out of the seven utilitarian expectations, image and visibility are not found to be crucial determinants of customers' utilitarian expectations towards e-commerce sites. Such an observation contradicts the work of Moore and Benbasat [67] in that these seven utilitarian expectations supposedly capture the range of benefits one hopes to gain from the utilization of technological innovations. Yet, as noted by Anderson and Anderson [139], an appeal of e-commerce sites stems from preserving customers' anonymity during online transactions. By the same rationale, customers of e-commerce sites, due to their preferences for transactional anonymity, are less likely to expect visibility and one's image improvements for online shopping.

Second, general information and specific information are not explanatory of functional performance for e-commerce sites. As maintained by Chen and Dubinsky [140], the provision of irrelevant information contributes to information overload and excessive cognitive processing on

the part of customers during online shopping. For this reason, customers could deem both general and specific information to be redundant due to the demand for additional cognitive processing. This is also consistent with our empirical findings whereby general information exerts a statistically significant negative impact on functional performance as compared to specific information.

Third, as uncovered in our empirical investigation, payment functionalities exert an increasingly positive impact on customers' evaluation of the functional performance of e-commerce sites as transactional frequency increases whereas the reverse is true for caretaking and safekeeping functionalities. A possible explanation of this observation could be due to the fact that payment errors could prove to be more problematic for customers who transact frequently on e-commerce sites. Conversely, caretaking and safekeeping functionalities are likely to be more bothersome for frequent customers as it culminates in higher informational loads of e-commerce sites.

Fourth, our empirical investigation reveals that media vividness exerts an increasingly positive impact on customers' evaluation of the aesthetic performance of e-commerce sites as transactional frequency increases whereas the reverse is true for social presence. A plausible reason behind this observation could be that frequent customers share a desire to engage in prolonged relationships with e-commerce sites and are thus likely to view engagement by these sites as a priority [141]. On the other hand, social presence is valued more highly by less frequent customers because it could be that these customers, having limited exposure to e-commerce sites, are more likely to feel reassured in the presence of others. Less frequent customers would display greater confidence in the aesthetic performance of e-commerce sites if they believe that others also frequently visit these sites.

Fifth, our empirical investigation shows that in our original research model, utilitarian expectations exert negative impact on utilitarian disconfirmation, whereas hedonic expectations have no significant impact on hedonic disconfirmation. Utilitarian and hedonic expectations exert diminishingly negative impacts on customers' utilitarian and hedonic disconfirmation of e-commerce sites as transactional frequency increases. Though the negative relationships between expectations and disconfirmation violate the premise of the EDT, these observations may be attributable to customers' tendency to avoid cognitive dissonance. According to the cognitive dissonance theory [142], individuals tend to withdraw from beliefs leading to inconsistencies in cognition and are inherently compelled to alter their perceptions to attain mental alignment. Consequently, customers with high utilitarian and hedonic expectations may exhibit propensities to confirm rather than disconfirm their expectations of e-commerce sites in order to evade circumstances of cognitive dissonance. This explanation is further corroborated by from our post-hoc analysis whereby customers, who transact less frequently on e-commerce sites, are less likely to report a disconfirmation of their expectations: they tend to give e-commerce sites the benefit of the doubt in terms of performance due to unfamiliarity. Likewise, the same reasoning can be applied to our observation in that functional performance exerts an increasingly negative impact on utilitarian disconfirmation while aesthetic performance induces a positive influence on hedonic disconfirmation of e-commerce sites as transactional frequency increases. That is, frequent customers, due to their familiarity with e-commerce sites, are capable of maximizing the utility to be gleaned from these sites. Therefore, frequent customers possess more realistic expectations of the performance of e-commerce sites and as such, are less likely to encounter situations whereby their expectations would be negatively disconfirmed by these sites.

Lastly, our empirical investigation demonstrates that functional and aesthetic performances exert an increasingly positive impact on customers' utilitarian and hedonic satisfaction with e-commerce sites as transactional frequency increases. Because frequent customers are sensitized to performance issues on e-commerce sites, they are more likely to report greater satisfaction with an e-commerce site if its performance were to improve and vice versa if failures were to occur.

4.1 Implications for Theory

From a theoretical standpoint, this paper contributes to extant literature in five ways. First, this study contributes to the operationalization of customer satisfaction with online shopping sites by disentangling both the hedonic and utilitarian satisfaction in online shopping based on EDT. This study answers to the call for research on adequately reflecting of the full online shopping experience including both utilitarian and hedonic facets. It enriches prior research findings on user satisfaction in online shopping by highlighting the importance of hedonic performance of e-commerce sites in predicting hedonic satisfaction that will also lead to users' overall satisfaction together with utilitarian satisfaction. It also offers clear guideline on the design of e-commerce sites that provides good hedonic and utilitarian performance and meet customers' expectations in online shopping.

Second, this study extends the EDT by delineating customer satisfaction of e-commerce sites into utilitarian and hedonic elements that are founded on customers' expectations as well as the functional and aesthetic performance of these sites. Specifically, the reconceptualization of the monolithic disconfirmation construct underscores the baseline from which expectations are contrasted with performance (i.e., functional performance for utilitarian expectations and aesthetic performance for hedonic expectations).

Third, given that both utilitarian and hedonic expectations are multi-dimensional constructs, this study proposes separate typologies that delineate the two constructs into their respective constituent dimensions. The sub-dimensions for utilitarian expectations stem from Moore and Benbasat's [67] adaptation of Rogers' [68] IDT whereas hedonic expectations are split into its sub-dimensions based on an inductive classification of extant literature. We hope that our proposed typologies can bring clarity to the vast amount of extant e-commerce literature, which give rise to diverse and often contradictory views on what customers expect from online shopping.

Forth, this study identifies dimensions of transactional functionalities and aesthetic properties that translate into actionable design prescriptions for improving the functional and aesthetic performance of e-commerce sites respectively. While prescriptions for transactional functionalities were derived from Lovelock's [80] supplementary service model, our recommendations for aesthetic properties were synthesized from extant literature. Together, these dimensions of transactional functionalities and aesthetic properties represent a collection of generic design principles that can be applied in inquiries of various online transactional environments.

Finally, the substantiation of the majority of hypothesized relationships lends credibility to our theoretical model in predicting utilitarian and hedonic consumption behaviors in online shopping. We further found that unsubstantiated hypotheses in our theoretical model are, to a large extent, caused by design preferences due to customers' familiarity with e-commerce sites. As highlighted through our post-hoc analysis, most of our hypothesized relationships remain invariant to customers' transactional frequency, thereby attesting to the robustness of our theoretical model. This is especially apparent for our proposed typologies of utilitarian and hedonic expectations in that the importance of these expectations (or lack thereof) remains constant regardless of

customers' transactional frequency. Indeed, our study is the first of its kind to prove that hypothesized relationships enshrined in the original EDT are more likely to hold for repeated rather than initial customers. This bears important implications for future research in that scholars cannot ignore users' familiarity with technology as a potential moderator of their acceptance decisions.

4.2 Implications for Practice

From a pragmatic standpoint, this study highlights the criticality of striking a balance in the design of e-commerce sites in order to satisfy both utilitarian and hedonic expectations. Our theoretical model therefore offers a preliminary glimpse into a holistic technological solution for promoting customer satisfaction towards e-commerce sites. An overemphasis on functional performance can easily lead to the creation of website functionalities which fulfill customers' utilitarian needs, but concurrently, e-merchants may miss out on any probable benefits arising from hedonically-driven shopping activities. Conversely, enhancing aesthetic performance can entice potential customers to shop on the e-commerce site, but without the availability of transaction-oriented functionalities, it is practically impossible for customers to acquire desired products or services even if they wish to do so. To this end, this paper accomplishes four vital functions: (1) it derives separate typologies of utilitarian and hedonic expectations driving customers' evaluation of e-commerce sites; (2) it prescribes actionable design principles which could be leveraged by e-merchants to improve the functional and aesthetic performance of these sites; (3) it validates the practical value of these expectations and performance dimensions, and; (4) it sheds light on why certain expectations and performance dimensions may not be equally salient for the entire population of online shoppers.

Our empirical findings thus inform the development of e-commerce sites in three ways. First, with the exception of image and visibility, our proposed typologies of utilitarian and hedonic

expectations can assist e-merchants to better appreciate customers' motivation for transacting via e-commerce sites and tailor their business strategies accordingly. For instance, while e-commerce sites could appeal to customers through fulfilling their utilitarian and hedonic expectations, it should not happen at the expense of customers' anonymity. Second, our prescribed design principles could be harnessed by developers as an analytical toolkit from which to: (1) benchmark the functional and aesthetic performance of their e-commerce sites; (2) to pinpoint missing transactional functionalities and aesthetic properties which are deemed essential by customers; (3) to remove undesirable web elements (e.g., general and specific information), and (4) to decide whether features available on e-commerce sites are sufficient in fulfilling customers' utilitarian and hedonic expectations. Third, because the relevance of certain transactional functionalities varies with customers' transactional frequency, developers can profile customers and tailor e-commerce sites to match individual requirements. As maintained by Piccoli et al. [143], web technologies can simplify the transactional process by retaining reusable customer information. As such, profiling becomes a feasible solution for identifying repeated customers and personalizing the design of e-commerce sites to accentuate features tailored to their needs. E-commerce sites could better prioritize the provision of tailored transaction functionalities to accommodate the expectations of distinct customer groups to enhance their evaluation of the functional performance of e-commerce sites. For instance, e-merchants could prioritize personalized payment feature over consultation and advice as well as hospitality features for frequent customers. Conversely, for non-frequent customers, especially those who access e-commerce sites less than once per six months, e-merchants could prioritize consultation and advice, order taking, and hospitality features over that of payment.

4.3 Limitations and Future Research

There are five main limitations to this study, within which lie probable avenues for future research. First, our theoretical model caters exclusively to Business-to-Consumer (B2C) e-commerce and does not take into account other online transactional environments such as Business-to-Business (B2B) e-commerce. Unlike B2C e-commerce, B2B e-commerce (e.g., electronic marketplaces) places greater emphasis on reduced transaction costs [144] and expanded opportunities for competitive sourcing [145]. For this reason, we speculate that the pertinence of hedonic dimensions in our theoretical model may not be as pronounced as those of utilitarian dimensions, an area for future research.

Second, this study primarily examines utilitarian and hedonic functionalities of e-commerce sites that support direct interaction between customers and e-merchants. For this reason, we do not take into account other peripheral functionalities of e-commerce sites (e.g., social networking features). Additionally, we do not deny that utilitarian and hedonic consumption behaviors may influence each other. For instance, hedonic disconfirmation could affect utilitarian satisfaction whereas utilitarian disconfirmation might influence hedonic satisfaction. Nonetheless, excluding these relationships from our theoretical model aids in clarifying the impact of functionalities on customers' evaluation of e-commerce sites, the prime focus of this study. Future research could incorporate other tangential functionalities of e-commerce sites into our theoretical model and also investigate the interplay among differing consumption behaviors in online shopping.

Third, due to our choice of perceptual measures for validating our theoretical model, our empirical findings may be subjected to response bias in that social desirability may affect how survey respondents react to the online questionnaire. While we have controlled for response bias by computing the amount of common method variance across measurement items, future research could explore ways of validating the theoretical model objectively. For instance, collaborations

may be sought with e-merchants to obtain web analytics data that exposes the extent to which the transactional functionalities and aesthetic properties advocated in our theoretical model are utilized by customers of e-commerce sites.

Forth, 'ceiling effects' may exist due to the self-selective nature of the sample population. Because respondents were recruited from existing customers of e-commerce sites, it is likely that they already possess favorable impressions of the sites being evaluated: we are likely to witness relatively higher means for the constructs being investigated. Nevertheless, as the primary objective of this paper is to validate the pragmatic significance of utilitarian and hedonic aspects of e-commerce sites, it would have been meaningless to survey respondents without prior exposure to online transactions. Still, we call for further empirical inquiries in the future to ascertain the predictability of our theoretical model for potential adopters.

Fifth, as we uncovered in our post-hoc analysis, transaction frequency moderates the effect of expectations on disconfirmation. It is meaningful to explore how the impact of customer expectations on disconfirmation will change with increased usage experience of e-commerce sites. We thus call for further empirical research that sheds light on the relationship between expectation and disconfirmation from a longitudinal standpoint.

Finally, our sample is drawn from a relatively homogenous population of online shoppers. We therefore caution against generalizing our empirical findings beyond customer populations that share similar demographic compositions. Past studies have attested to variations in design preferences of e-commerce sites across cultures [14,91]. As alleged by Weiss [146], cultural discrepancies in technology adoption can be traced to the effects of power distance, uncertainty avoidance, individualism, masculinity, and long-term orientation. We hence call for future

research to incorporate cultural elements into our theoretical model in order to refine bolster its explanatory and predictive powers across cultures.

4.4 Conclusion

In summary, we approach the topic of customer satisfaction for e-commerce sites from its most primordial component, the duality of utilitarian and hedonic expectations as intrinsic motivations. We purport and test a model of e-commerce consumption behaviors that details the set of utilitarian and hedonic expectations, which should accompany any design blueprint of e-commerce sites to ensure a rewarding online shopping experience. Together with concerted investigative efforts in the future, we believe that our theoretical model will spawn a new genre of thinking with regards to how e-commerce technologies can be better structured to match behavioral motivations for customers during online shopping.

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Appendix A – Summary of Extant Literature on Hedonic Expectations

Author(s)	Theory	*Construct* + Definition	Enjoyability	Excitability	Flow
***European Journal of Information Systems* [*N* = 7]**			**4 [57.14%]**	**5 [71.43%]**	**4 [57.14%]**
Deng et al. (2010)	Expectation Disconfirmation Theory	***Cognitive Absorption***: Positive, highly enjoyable experience which occurs when a user is fully immersed in the interaction with IT characterized by total attention and engagement, a sense of control, and feelings of heightened enjoyment and curiosity, such that nothing else seems to matter and time no longer seems to pass the way it ordinarily does	X	X	X
Dickinger et al. (2008)	Technology Acceptance Model	***Perceived Enjoyment***: Extent to which fun can be derived from the use of the information system	X		
Jahng et al. (2002)	Theory of Psychological Types	***Intuitive Personality***: Degree to which a user is oriented by feelings or emotions		X	
Santosa et al. (2005)	N.A.	***User Involvement***: Psychological state of an individual user in terms of the importance that he attaches to a given system		X	X
Singh et al. (2005)	Informational Model	***Web Page Involvement***: Extent to which the information/content can hold visitors' interest ***Mystery***: Extent to which the richness of information is based not only on the features that are actually present or what is happening at the surface level, but also on the promise of what is to come		X	X
Wakefield and Whitten (2006)	Technology Acceptance Model	***Cognitive Absorption***: Positive, highly enjoyable experience which occurs when a user is fully immersed in the interaction with IT characterized by total attention and engagement, a sense of control, and feelings of heightened enjoyment and curiosity, such that nothing else seems to matter and time no longer seems to pass the way it ordinarily does. ***Playfulness***: Intrinsic motivator that prompts users to engage technology for internal benefits, namely enjoyment	X	X	X
Wakefield et al. (2011)	Technology Acceptance Model + Social Response Theory	***Enjoyment***: Extent to which using a computer was enjoyable in its own right, without consideration of performance consequences	X		
***Information Systems Journal* [*N* = 2]**			**1 [50.00%]**	**1 [50.00%]**	**1 [50.00%]**
Guo and Poole (2009)	Flow Theory	***Flow***: The holistic sensation that people feel when they act with total involvement			X
Lin and Bhattacherjee (2010)	Technology Acceptance Model	***Perceived Enjoyment***: Excitement and happiness derived from IT use	X	X	
***Information Systems Research* [*N* = 3]**			**3 [100.00%]**	**0 [0.00%]**	**2 [66.67%]**
Jiang and Benbasat (2007)	Technology Acceptance Model	***Shopping Enjoyment***: Extent to which the shopping experience is considered as playful, interesting, challenging, and meaningful	X		
Koufaris (2002)	Technology Acceptance Model	***Shopping Enjoyment***: Extent to which the shopping experience is considered as	X		X

		playful, interesting, challenging, and meaningful ***Concentration***: Extent to which consumers are able to focus their attention on the web store			
Venkatesh (2000)	Technology Acceptance Model	***Perceived Enjoyment***: Extent to which the activity of using an information system is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated ***Computer Playfulness***: Degree of a user's cognitive spontaneity in microcomputer interactions	X		X
International Journal of Electronic Commerce **[*N* = 7]**			**7 [100.00%]**	**3 [42.86%]**	**3 [42.86%]**
Angst et al. (2008)	N.A.	***Hedonic Need***: Extent to which buyers are energized by the very act of online shopping itself that may include the need for novelty, fun, or surprise	X	X	X
Dellaert and Dabholkar (2009)	N.A.	***Perceived Enjoyment***: Consumer's perception of the pleasure associated with the experience of using on-line mass customization	X		
Gretzel and Fesenmaier (2006)	N.A.	***Perceived Enjoyment***: Extent to which using a recommender system was enjoyable in its own right, without consideration of performance consequences	X		
Hassanein and Head (2005)	Technology Acceptance Model	***Enjoyment***: Extent to which using a website was enjoyable in its own right, without consideration of performance consequences	X		
Koufaris et al. (2001)	N.A.	***Shopping Enjoyment***: Extent to which shopping online was enjoyable in its own right, without consideration of performance consequences ***Positive Challenges***: Extent to which users shopping online are required to use their skills and abilities in navigating the Web site, learning the interface, processing information, and making decisions to find and buy the right products or services ***Product Involvement***: Comprises of one's motivational state toward an object that is activated by the relevance or importance of the object	X	X	X
Lin and Bhattacherjee (2008)	Technology Acceptance Model	***Perceived Enjoyment***: Refers to hedonic utility expected from IT usage, such as joy, social image, or personal fulfillment	X		
Standifird et al. (2004)	N.A.	***Hedonic Benefits***: Benefits that a shopper gains based primarily on the non-instrumental, experiential, and affective aspects of a transaction which are appreciated for their own sake, without further regard to their practical purpose	X	X	X
Journal of the Association for Information Systems **[*N* = 4]**			**4 [100.00%]**	**0 [0.00%]**	**0 [0.00%]**
Lee et al. (2003)	N.A.	***Shopping Enjoyment***: Extent to which the shopping experience is considered as playful, interesting, challenging, and meaningful	X		

Li et al. (2005)	Technology Acceptance Model	***Perceived Enjoyment***: Perception of the fun, enjoyment, and pleasure inherent in using communication technology	X		
Sun (2010)	Technology Acceptance Model	***Perceived Enjoyment***: Extent to which the activity of using an information system is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated	X		
Sun and Zhang (2006)	Technology Acceptance Model	***Perceived Enjoyment***: Extent to which the activity of using an information system is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated	X		
***Journal of Information Technology* [*N* = 2]**			**2 [100.00%]**	**2 [100.00%]**	**1 [50.00%]**
Adelaar et al. (2003)	Environmental Psychology Approach	***Pleasure***: State of feeling that is described as the degree to which a person feels good, joyful, happy or satisfied with a particular situation ***Arousal***: State of feeling that varies from feelings of excitement, stimulation, alertness or activeness to feelings of being tired, sleepy or bored ***Dominance***: Extent to which an individual feel in control of or free to act in a particular situation	X	X	X
Kim and Han (2009)	Technology Acceptance Model	***Hedonic Value***: Reflects enjoyment, pleasure, and anxiety related to the use of a product/service	X	X	
***Journal of Management Information Systems* [*N* = 2]**			**2 [100.00%]**	**0 [0.00%]**	**1 [50.00%]**
Füller et al. (2009)	N.A.	***Experienced Enjoyment***: Extent to which an experience is considered as playful, interesting, challenging, and meaningful ***Task Involvement***: Extent to which a user maintains a behavior in a given situation depends on the person's perceived competence, choice potential, and impact as well as the meaningfulness of a task	X		X
Qiu and Benbasat (2009)	Technology Acceptance Model Social Agency Theory	***Perceived Enjoyment***: Extent to which the activity of using an information system is perceived to be enjoyable in its own right, apart from any performance consequences that may be anticipated	X		
***Journal of Strategic Information Systems* [*N* = 1]**			**1 [100.00%]**	**0 [0.00%]**	**0 [0.00%]**
Belanger et al. (2002)	N.A.	***Pleasure***: State of feeling that is described as the degree to which a person feels good, joyful, happy or satisfied with a particular situation	X		
***MIS Quarterly* [*N* = 7]**			**6 [85.71%]**	**3 [42.86%]**	**5 [71.43%]**
Agarwal and Karahanna (2000)	Technology Acceptance Model	***Cognitive Absorption***: Positive, highly enjoyable experience which occurs when a user is fully immersed in the interaction with IT characterized by total attention and engagement, a sense of control, and feelings of heightened enjoyment and curiosity, such that nothing else seems to matter and time no longer seems to pass the way it ordinarily does	X	X	X

Beaudry and Pinsonneault (2010)	Model of User Adaption + Appraisal Theories of Emotions	***Happiness***: Emotional state of enjoyment and pleasure ***Excitement***: Emotional state of heightened arousal to be similar to state of playfulness and flow	X	X	X
Cyr et al. (2009)	Theory of Visual Rhetoric + Social Presence Theory	***Image Appeal***: Extent to which human images on websites increase their aesthetic playfulness ***Perceived Social Presence***: Extent to which a medium allows users to experience others as being psychologically present	X		X
Deng and Poole (2010)	The M-R Environmental Psychology Model	***Arousal***: Extent to which a user's interest is stimulated ***Pleasantness***: Extent to which a user if feeling a positive state of emotion	X	X	X
Pavlou and Fygenson (2006)	Theory of Planned Behavior	***Perceived Behavior Control***: Judgment about the availability of resources and opportunities to perform behavior			X
Van der Heijden (2004)	Technology Acceptance Model	***Perceived Enjoyment***: Extent to which fun can be derived from the use of the information system	X		
Venkatesh and Brown (2001)	Theory of Planned Behavior	***Hedonic Outcomes***: Extent to which pleasure and satisfaction is derived from specific behavior	X		
Total Number of Articles [*N* = 35]			**30 [85.71%]**	**14 [40.00%]**	**17 [48.57%]**

Appendix B – Summary of Extant Literature on Aesthetic Properties of E-Commerce Websites

Author(s)	Theory	*Construct* + Definition	Atmospheric Cues	Media Vividness	Social Presence
***European Journal of Information Systems* [*N* = 5]**			**4 [80.00%]**	**3 [60.00%]**	**1 [20.00%]**
Jahng et al. (2002)	Media Richness Theory	***Presentation Richness***: Extent of symbol variety, reprocessability and feedback immediacy	X	X	
Jahng et al. (2007)	Media Richness Theory	***Interaction Richness***: Extent of symbol variety, reprocessability and feedback immediacy	X	X	
Santosa et al. (2005)	N.A.	***Situational Motivators***: Wide variety of specific stimuli and cues of the intermediate environment	X		
Singh et al. (2005)	Informational Model	***Diversity***: Extent to which a webpage is engaging and offers possibilities of immediate exploration		X	
Wakefield et al. (2011)	Technology Acceptance Model + Social Response Theory	***Perceived Website Socialness***: Extent to which consumers detect socialness on a website; specifically, perceptions of human-like traits such as friendliness, politeness and helpfulness			X
***Information Systems Journal* [*N* = 3]**			**1 [33.33%]**	**2 [66.67%]**	**2 [66.67%]**
Guo and Poole (2009)	Flow Theory	***Unambiguous Feedback Mechanism***: Level of stimuli in response to inputs from users of Information Systems		X	
Lin and Bhattacherjee (2010)	Technology Acceptance Model	***Interaction Quality***: Extent to which a system allows individual users to cultivate, foster and maintain online relationships with others in their social network ***Technical Quality***: Technological sophistication and the availability of enhanced features in a given hedonic system, such as high-resolution displays, greater audio/video quality and high-definition programming, that have greatly improved the technical quality of systems	X		X
Tomiuk and Pinsonneault (2009)	Communal-Relationship Theory	***Good Cheer***: Extent to which the content of the web site conveys a sense of friendliness and positive feelings toward customers ***Approachability***: Extent to which the web site's content makes the visitor feel that the company facilitates, encourages and is receptive to customer contact		X	X
***Information Systems Research* [*N* = 1]**			**1 [100.00%]**	**1 [100.00%]**	**0 [0.00%]**
Jiang and Benbasat (2007)	Technology Acceptance Model	***Vividness***: Convey more information cues due to involvement of nonverbal language and multiple sensory channels ***Interactivity***: Extent to which online representation of products react to users' inputs both to understand the products and to properly interact with them	X	X	
***International Journal of Electronic Commerce* [*N* = 2]**			**0 [0.00%]**	**1 [50.00%]**	**2 [100.00%]**
Dellaert and Dabholkar (2009)	N.A.	***Visualization***: Ability to interactively evaluate the products that users are composing and also provide them with a deeper understanding of the overall implications of the changes in product features ***Social Interactions***: Ability to make contact with sales representatives that may assist consumers in developing and understanding their own preferences		X	X

Hassanein and Head (2005)	Technology Acceptance Model	***Social Presence***: Extent to which a medium allows users to experience others as psychologically present			X
***Journal of Information Technology* [*N* = 1]**			**1 [100.00%]**	**0 [0.00%]**	**0 [0.00%]**
Adelaar et al. (2003)	Environmental Psychology Approach	***Media Format***: Mediated message that can be represented by a combination of audio, text, picture and motion video stimuli	X		
***Journal of Management Information Systems* [*N* = 2]**			**0 [0.00%]**	**1 [50.00%]**	**1 [50.00%]**
Füller et al. (2009)	N.A.	***Effective Interaction Tools***: Enable consumers to actively engage in virtual co-creation by allowing realistic product understanding and enhancing consumers' creative articulation		X	
Qiu and Benbasat (2009)	Technology Acceptance Model + Social Agency Theory	***Social Presence***: Extent to which a medium allows users to experience others as being psychologically present			X
***MIS Quarterly* [*N* = 3]**			**2 [66.67%]**	**1 [33.33%]**	**2 [66.67%]**
Cyr et al. (2009)	Theory of Visual Rhetoric + Social Presence Theory	***Human Images***: Refers to the representation of humans in website images			X
Deng and Poole (2010)	The M-R Environmental Psychology Model	***Visual Complexity***: Diversity and number of information cues that require from the user considerable attention and time to view and comprehend	X		
Suh and Lee (2005)	Theory of Cognitive Fit	***Media Richness***: Level of sensory depth and breadth of an interface where depth refers to the quality of information within each channel and breadth refers to the number of sensory dimensions simultaneously presented. ***Telepresence***: Sense of "being there" in an environment by means of a communication medium	X	X	X
Total Number of Articles [*N* = 17]			**9 [52.29%]**	**9 [52.29%]**	**8 [47.06%]**

Appendix C – Results of Partialling Out Common Method Factor

Table C. Substantive Construct Loading and Method Factor Loading				
Single-Indicator Construct	**Substantive Construct Loading**	**Percent of Indicator Variance Caused by Substantive Construct**	**Method Factor Loading**	**Percent of Indicator Variance Caused by Method**
AES1	0.798***	0.637	0.045 n.s.	0.002
AES2	0.922***	0.850	-0.043 n.s.	0.002
AES3	0.873***	0.762	0.035 n.s.	0.001
AES4	0.798***	0.637	0.042 n.s.	0.002
ATM1	0.877***	0.769	-0.032 n.s.	0.001
ATM2	0.934***	0.872	-0.074*	0.005
ATM3	0.901***	0.812	-0.076*	0.006
ATM4	0.668***	0.446	0.205***	0.042
BIL1	0.844***	0.712	0.029 n.s.	0.001
BIL2	0.958***	0.918	-0.041 n.s.	0.002
BIL3	0.901***	0.812	0.041 n.s.	0.002
BIL4	0.908***	0.824	0.039 n.s.	0.002
CAR1	0.952***	0.906	-0.060*	0.004
CAR2	0.963***	0.927	-0.060*	0.004
CAR3	0.973***	0.947	-0.070*	0.005
CAR4	0.687***	0.472	0.208***	0.043
COM1	0.766***	0.587	0.086*	0.007
COM2	0.917***	0.841	-0.108*	0.012
COM3	0.847***	0.717	0.035 n.s.	0.001
CON1	0.816***	0.666	0.054 n.s.	0.003
CON2	0.813***	0.661	-0.089 n.s.	0.008
CON3	0.875***	0.766	-0.033 n.s.	0.001
CON4	0.818***	0.669	0.046 n.s.	0.002
ENJ1	0.769***	0.591	0.080 n.s.	0.006
ENJ2	0.879***	0.773	0.031 n.s.	0.001
ENJ3	0.823***	0.677	-0.079 n.s.	0.006
ENJ4	0.821***	0.674	-0.037 n.s.	0.001
EOU1	0.910***	0.828	0.031 n.s.	0.001
EOU2	0.805***	0.648	-0.038 n.s.	0.001
EOU3	0.853***	0.728	0.037 n.s.	0.001

EOU4	0.841***	0.707	0.030 n.s.	0.001
EOU5	0.908***	0.824	-0.042 n.s.	0.002
EXT1	0.746***	0.557	0.042 n.s.	0.002
EXT2	0.857***	0.734	-0.065 n.s.	0.004
EXT3	0.904***	0.817	-0.07 n.s.	0.005
EXT4	0.853***	0.728	0.030 n.s.	0.001
EXT5	0.768***	0.590	0.120**	0.014
FLO1	0.866***	0.750	-0.053 n.s.	0.003
FLO2	0.767***	0.588	0.106**	0.011
FLO3	0.872***	0.760	-0.027 n.s.	0.001
FLO4	0.868***	0.753	-0.055 n.s.	0.003
FUN1	0.784***	0.615	0.061 n.s.	0.004
FUN2	0.824***	0.679	0.076 n.s.	0.006
FUN3	0.888***	0.789	-0.066 n.s.	0.004
FUN4	0.886***	0.785	-0.072 n.s.	0.005
GEN1	0.871***	0.759	-0.030 n.s.	0.001
GEN2	0.561***	0.315	0.208**	0.043
GEN3	0.913***	0.834	-0.033 n.s.	0.001
GEN4	0.924***	0.854	-0.143**	0.020
HAN1	0.906***	0.821	-0.048 n.s.	0.002
HAN2	0.838***	0.702	0.070 n.s.	0.005
HAN3	0.954***	0.910	-0.067*	0.004
HAN4	0.762***	0.581	0.061 n.s.	0.004
HDC1	0.958***	0.918	0.029 n.s.	0.001
HDC2	0.946***	0.895	0.027 n.s.	0.001
HDC3	0.955***	0.912	-0.024 n.s.	0.001
HDC4	0.947***	0.897	-0.029 n.s.	0.001
HST1	0.935***	0.874	-0.033 n.s.	0.001
HST2	0.921***	0.848	-0.053 n.s.	0.003
HST3	0.955***	0.912	-0.046 n.s.	0.002
HST4	0.770***	0.593	0.127*	0.016
HOS1	0.778***	0.605	0.093 n.s.	0.009
HOS2	0.798***	0.637	-0.113*	0.013
HOS3	0.624***	0.389	0.089 n.s.	0.008
HOS4	0.935***	0.874	-0.105*	0.011

HOS5	0.888***	0.789	-0.065 n.s.	0.004
HOS6	0.752***	0.566	0.100*	0.010
IMG1	0.940***	0.884	0.034 n.s.	0.001
IMG2	0.955***	0.912	-0.035 n.s.	0.001
MED1	0.772***	0.596	0.066 n.s.	0.004
MED2	0.923***	0.852	-0.077 n.s.	0.006
MED3	0.821***	0.674	0.043 n.s.	0.002
MED4	0.814***	0.663	-0.043 n.s.	0.002
ORD1	0.872***	0.760	-0.039 n.s.	0.002
ORD2	1.006***	1.012	-0.104**	0.011
ORD3	0.922***	0.850	0.024 n.s.	0.001
ORD4	0.811***	0.658	0.107**	0.011
OST1	0.894***	0.799	-0.046 n.s.	0.002
OST2	0.880***	0.774	-0.046 n.s.	0.002
OST3	0.966***	0.933	-0.062 n.s.	0.004
OST4	0.722***	0.521	0.131*	0.017
PAY1	0.886***	0.785	-0.147**	0.022
PAY2	0.712***	0.507	0.074 n.s.	0.005
PAY3	0.834***	0.696	0.051 n.s.	0.003
PAY4	0.831***	0.691	0.045 n.s.	0.002
REL1	0.843***	0.711	-0.036 n.s.	0.001
REL2	0.615***	0.378	0.100*	0.010
REL3	0.814***	0.663	-0.057 n.s.	0.003
REL4	0.809***	0.654	-0.098*	0.010
REL5	0.591***	0.349	0.114*	0.013
RES1	0.798***	0.637	0.034 n.s.	0.001
RES2	0.703***	0.494	0.164***	0.027
RES3	0.870***	0.757	-0.065 n.s.	0.004
RES4	0.898***	0.806	-0.109**	0.012
SoP1	0.914***	0.835	0.031 n.s.	0.001
SoP2	0.951***	0.904	-0.057*	0.003
SoP3	0.926***	0.857	-0.056 n.s.	0.003
SoP4	0.905***	0.819	0.052 n.s.	0.003
SoP5	0.864***	0.746	0.037 n.s.	0.001
SPC1	0.921***	0.848	0.034 n.s.	0.001

SPC2	0.976***	0.953	-0.092*	0.008
SPC3	0.900***	0.810	-0.031 n.s.	0.001
SPC4	0.806***	0.650	0.087 n.s.	0.008
UST1	0.895***	0.801	-0.035 n.s.	0.001
UST2	0.877***	0.769	-0.098 n.s.	0.010
UST3	0.882***	0.778	-0.030 n.s.	0.001
UST4	0.735***	0.540	0.076 n.s.	0.006
UDC1	0.927***	0.859	0.031 n.s.	0.001
UDC2	0.957***	0.916	-0.025 n.s.	0.001
UDC3	0.951***	0.904	-0.024 n.s.	0.001
UDC4	0.932***	0.869	0.027 n.s.	0.001
VIS1	0.921***	0.848	-0.020 n.s.	0.000
VIS2	0.927***	0.859	-0.024 n.s.	0.001
VIS3	0.868***	0.753	0.024 n.s.	0.001
VIS4	0.814***	0.663	0.035 n.s.	0.001
VOL1	0.604***	0.365	0.059 n.s.	0.003
VOL2	0.788***	0.621	0.044 n.s.	0.002
VOL3	0.823***	0.677	-0.082 n.s.	0.007
VOL4	0.783***	0.613	0.047 n.s.	0.002

$p^* < 0.05$, $p^{**} < 0.01$, $p^{***} < 0.001$

Appendix D – List of Measurement Items

Construct	Definition	Measurement Item	Mean [S.D.]	Before Dropping Item	After Dropping Item
Utilitarian Expectations **(as adapted from** [67,72]**)**					
Relative Advantage	Degree to which the e-commerce site is expected to offer transactional content that is unavailable offline	The e-commerce website should enable me to accomplish shopping tasks that are not feasible via physical stores.	2.51 [1.32]	0.703	0.849
		The e-commerce website should enable me to access content that is not available via physical stores.	2.52 [1.36]	0.716	0.900
		The e-commerce website should allow me to access functionalities that are not offered via physical stores.	2.52 [1.28]	0.785	0.879
		The e-commerce website, as compared to physical stores, should make shopping easier.	2.06 [1.21]	0.745	-
		The e-commerce website, as compared to physical stores, should enable me to accomplish my shopping more quickly.	2.04 [1.25]	0.726	-
Ease of Use	Degree to which the utilization of the e-commerce site is expected to be free of effort	The e-commerce website should be easy to operate.	1.61 [1.05]	0.891	0.891
		The e-commerce website should be easy to use.	1.49 [0.95]	0.926	0.926
		The e-commerce website should make it easy for me to learn how to operate it.	1.62 [0.97]	0.854	0.854
		The e-commerce website should easily do what I want it to do.	1.71 [1.03]	0.869	0.869
		The e-commerce website should be free from problems.	1.67 [1.04]	0.793	0.793
Image	Degree to which the e-commerce site is expected to enhance one's image or status in one's social system	The e-commerce website should give me prestige through its usage.	3.66 [1.50]	0.969	0.988
		The e-commerce website should improve my image through its usage.	3.84 [1.50]	0.712	0.877
		The e-commerce website should enhance my social status through its usage.	4.33 [1.37]	0.505	-
Visibility	Degree to which the e-commerce site is expected to be utilized by others	The e-commerce website should allow me to see what fellow users are doing.	4.72 [1.63]	0.872	0.872
		The e-commerce website should allow me to observe fellow users.	5.21 [1.52]	0.960	0.960
		The e-commerce website should make fellow users visible to me.	5.00 [1.59]	0.932	0.932
Compatibility	Degree to which the e-commerce site is expected to be consistent with one's existing needs and past transactional experiences	The e-commerce website should be compatible with my current needs.	2.09 [0.87]	0.833	0.875
		The e-commerce website should fit into my life style.	2.44 [1.05]	0.830	0.837
		The e-commerce website should be consistent with my past experiences with other e-commerce websites.	2.75 [1.25]	0.653	-
		The e-commerce website should fit well with the way I like to shop.	2.32 [1.05]	0.823	0.814
Results Demonstrability	Degree to which outcomes generated from the e-commerce site are expected to be tangible, observable and communicable	The e-commerce website should generate results that are apparent to me.	2.13 [0.98]	0.816	0.816
		The e-commerce website should allow me to communicate to others the consequences of its usage.	2.40 [1.12]	0.814	0.814
		The e-commerce website should allow me to easily explain to others why its usage may or may not beneficial.	2.38 [1.08]	0.811	0.811
		The e-commerce website should produce clear and understandable results.	1.77 [0.87]	0.837	0.837

Voluntariness of Use	Degree to which usage of the e-commerce site is expected to be voluntary or of free will	The e-commerce website should not force its usage upon me.	1.78 [1.14]	0.702	-
		The e-commerce website should grant me total control over its usage.	2.39 [1.28]	0.781	0.821
		The e-commerce website should not compel me to adhere to rigid transactional procedures.	2.73 [1.48]	0.743	0.798
		The e-commerce website should empower me through its usage.	2.75 [1.26]	0.780	0.848
Hedonic Expectations **(Measures newly created unless stated otherwise)**					
Enjoyability (as adapted from [17])	Degree to which the e-commerce site is expected to accord feelings of pleasure in the customer through its utilization	I should feel delighted using the e-commerce website.	2.46 [1.11]	0.816	0.816
		I should feel entertained using the e-commerce website.	2.84 [1.18]	0.787	0.787
		I should enjoy using the e-commerce website.	2.06 [0.98]	0.813	0.813
		I should feel happy using the e-commerce website.	2.26 [1.06]	0.875	0.875
Excitability	Degree to which the e-commerce site is expected to engage the customer in a state of heightened arousal through its utilization	I should feel excited using the e-commerce website.	2.98 [1.21]	0.836	0.873
		I should feel stimulated using the e-commerce website.	3.07 [1.18]	0.849	0.859
		I should feel thrilled using the e-commerce website.	3.45 [1.19]	0.847	0.869
		I should feel exhilarated using the e-commerce website.	3.54 [1.16]	0.824	0.823
		I should feel intrigued using the e-commerce website.	3.15 [1.25]	0.737	
		I should feel surprised using the e-commerce website.	4.02 [1.35]	0.577	
Flow	Degree to which the e-commerce site is expected to induce a sense of rhythmic continuity that keeps the customer involved and preoccupied during its utilization	I should feel a sense of involvement using the e-commerce website.	2.66 [1.13]	0.815	0.839
		I should feel that the e-commerce website is interacting with me.	2.50 [1.07]	0.858	0.862
		I should feel interested using the e-commerce website.	2.33 [0.97]	0.824	0.838
		I should feel a sense of continuity using the e-commerce website.	2.50 [1.08]	0.835	0.835
		I should not feel lost as to what to do next using the e-commerce website.	1.79 [1.06]	0.601	-
Transactional Functionalities **(Measures newly created unless stated otherwise)**					
Consultation and Advice	Establish dialogue with the customer in order to probe product or service requirements before developing a tailored solution	The e-commerce website allows me to communicate my product requirements.	2.36 [1.08]	0.838	0.838
		The e-commerce website prompts me about products matching my requirements.	2.36 [1.05]	0.851	0.851
		The e-commerce website allows me to specify my product requirements.	2.35 [1.12]	0.879	0.879
		The e-commerce website advises me on products that are of interest to me.	2.37 [1.07]	0.743	0.743
General Information (as adapted from [10])	Allow customers to learn more about the products and services offered by different vendors as well as to contact these companies through various channels	The e-commerce website provides general information about products I am interested in.	2.13 [0.90]	0.755	0.755
		The e-commerce website provides contact information about the manufacturers of products I am interested in.	2.90 [1.40]	0.796	0.796
		The e-commerce website provides information on how I can learn more about products I am interested in.	2.64 [1.24]	0.892	0.892
		The e-commerce website provides various channels through which I can learn more about products I am interested in.	2.77 [1.33]	0.850	0.850
Order Taking (as adapted from [10])	Facilitate customers in placing purchase orders or making reservations	The e-commerce website facilitates the ordering process.	1.90 [0.90]	0.903	0.903
		The e-commerce website allows me to place orders for products online.	1.72 [0.87]	0.937	0.937

		The e-commerce website provides the necessary functions to order products.	1.74 [0.86]	0.929	0.929
		The e-commerce website allows me to order products.	1.69 [0.95]	0.847	0.847
Payment (as adapted from [10])	Simplify and convenience the transfer of funds	The e-commerce website provides the necessary functions to make payments.	1.72 [0.86]	0.858	0.858
		The e-commerce website provides multiple options of how to pay.	2.06 [1.22]	0.767	0.767
		The e-commerce website allows me to pay for shopping transactions online.	1.61 [0.77]	0.865	0.865
		The e-commerce website allows me to make payments.	1.77 [0.89]	0.757	0.757
Specific Information (as adapted from [10])	Provide customers with relevant information pertaining to products or services such as schedules, operating instructions, and user warnings	The e-commerce website provides all the necessary information that I need to know before purchasing products.	2.35 [1.28]	0.886	0.886
		The e-commerce website provides detailed product specifications for me to make informed purchases.	2.35 [1.21]	0.938	0.938
		The e-commerce website grants me access to comprehensive product information to assist my purchases.	2.55 [1.29]	0.901	0.901
		The e-commerce website gives me a good idea of what I will be getting if I were to make the purchase.	2.28 [1.21]	0.878	0.878
Caretaking and Safekeeping (as adapted from [10])	Assist the customer with caring for purchased products or services	The e-commerce website helps me learn about the products that I have purchased.	2.65 [1.23]	0.856	0.856
		The e-commerce website shows me how to use the products that I have purchased.	3.20 [1.58]	0.909	0.909
		The e-commerce website helps me use products that I have purchased to their fullest extent.	3.33 [1.66]	0.917	0.917
		The e-commerce website lets me discover different ways of using the products that I have purchased.	3.44 [1.67]	0.899	0.899
Billing	Offer clear and understandable listing of charges	The e-commerce website provides a breakdown of the items included in my bill.	1.95 [1.04]	0.848	0.848
		The e-commerce website provides clear understanding of how I am being charged for my purchases.	1.96 [1.04]	0.932	0.932
		The e-commerce website lets me know exactly what I am paying for.	1.87 [1.01]	0.919	0.919
		The e-commerce website lets me understand my billing charges.	1.93 [1.05]	0.910	0.910
Handling Exceptions	Personalize customers' experience and interaction through accommodating special requests, solving problems, as well as handling complaints/suggestions, compliments and restitutions	The e-commerce website is accommodating to any special requests I have.	3.43 [1.50]	0.787	0.786
		The e-commerce website is equipped to handle my complaints.	2.85 [1.41]	0.886	0.886
		The e-commerce website is receptive to my feedback.	3.07 [1.49]	0.909	0.909
		The e-commerce website is capable of solving problems that may occur during shopping transactions.	3.03 [1.56]	0.884	0.884
Hospitality	Treat customers as valued guests by granting efficient and effective access to offered products and services	The e-commerce website treats me like a valued guest.	2.86 [1.27]	0.834	0.875
		The e-commerce website grants me privileged offers to products.	3.03 [1.33]	0.843	0.893
		The e-commerce website grants me unique offers to products.	3.01 [1.32]	0.855	0.893
		The e-commerce website remembers my shopping preferences.	2.84 [1.31]	0.698	-
		The e-commerce website offers me more than what I asked for.	3.32 [1.38]	0.700	-
		The e-commerce website knows my needs as a customer very well.	3.36 [1.42]	0.851	0.819

Aesthetic Properties **(Measures newly created unless stated otherwise)**					
Social Presence (as adapted from [115]**)**	Enable customers to experience others as though they are psychologically present	I feel a sense of human contact when using the e-commerce website.	4.34 [1.58]	0.927	0.927
		I feel a sense of personalness when using the e-commerce website.	4.04 [1.59]	0.872	0.872
		I feel a sense of sociability when using the e-commerce website.	4.30 [1.56]	0.930	0.930
		I feel a sense of human warmth when using the e-commerce website.	4.75 [1.63]	0.926	0.926
		I feel a sense of human sensitivity when using the e-commerce website.	4.65 [1.65]	0.902	0.902
Media Vividness	Is engaging and interactive	I feel that the e-commerce website is interested in what I am doing.	2.77 [1.06]	0.810	0.810
		I feel that the e-commerce website engages me.	2.95 [1.07]	0.860	0.860
		I feel that the e-commerce website interacts with me.	3.34 [1.31]	0.846	0.846
		I feel that the e-commerce website grabs my attention.	2.95 [1.09]	0.817	0.817
Atmospheric Cues	Immersive interface elements such as animation, pleasurable background music and high-resolution videos	I feel immersed when using the e-commerce website.	3.46 [1.26]	0.805	0.805
		I lose track of time when using the e-commerce website.	3.65 [1.61]	0.831	0.831
		I forget about mundane tasks when using the e-commerce.	3.87 [1.51]	0.879	0.879
		I lose track of my surroundings when using the e-commerce website.	4.27 [1.58]	0.858	0.858
Performance Constructs **(Measures newly created unless stated otherwise)**					
Functional Performance	Customer's evaluation of the extent to which an e-commerce site is able to offer transactional functionalities that cater to their functional needs	The e-commerce website is competent in catering to my transactional needs.	2.65 [1.03]	0.832	0.832
		The e-commerce website is equipped to accommodate my shopping needs.	2.60 [1.03]	0.883	0.883
		I have no worries about completing my shopping transactions using the e-commerce website.	3.10 [1.49]	0.836	0.836
		I have no problems using the e-commerce website to complete my shopping transactions.	2.74 [1.29]	0.830	0.830
Aesthetic Performance	Customer's evaluation of the extent to which an e-commerce site is able to offer a multi-sensory shopping experience that cater to their entertainment needs	The e-commerce website has all the necessary elements that constitute a multi-sensory shopping experience.	3.44 [1.39]	0.797	0.797
		The e-commerce website is capable of catering to my shopping entertainment needs.	3.20 [1.27]	0.868	0.868
		The e-commerce website can fulfill my needs for a fun-filled shopping experience.	3.43 [1.33]	0.897	0.897
		It is fun to shop using the e-commerce website.	3.13 [1.22]	0.830	0.830
Disconfirmation Constructs **(as adapted from** [77]**)**					
Utilitarian Disconfirmation	Customer's evaluation of the extent to which the functional performance of an e-commerce site fails to match their utilitarian expectations	The functionalities offered on the e-commerce website are worse than what I expected.	4.50 [1.30]	0.919	0.919
		My expectations about the functionalities offered on the e-commerce website are not met.	4.49 [1.36]	0.963	0.963
		The performance of the functionalities offered on the e-commerce website is below my expectations.	4.62 [1.36]	0.957	0.957
		The functionalities offered on the e-commerce website fail to match my expectations.	4.68 [1.41]	0.929	0.929
Hedonic Disconfirmation	Customer's evaluation of the extent to which	The aesthetic properties of the e-commerce website are worse than what I expected.	4.55 [1.40]	0.944	0.944

	the aesthetic performance of an e-commerce site fails to match their hedonic expectations	My expectations about the aesthetic properties of the e-commerce website are not met.	4.54 [1.39]	0.955	0.955
		The aesthetic properties of the e-commerce website are not what I expected.	4.48 [1.41]	0.949	0.949
		The aesthetic properties of the e-commerce website fail to match my expectations.	4.56 [1.43]	0.959	0.959
Satisfaction Constructs **(as adapted from [10])**					
Utilitarian Satisfaction	Psychological state arising from emotions surrounding disconfirmed utilitarian expectations.	I am satisfied with the functionalities offered on the e-commerce website.	2.75 [0.96]	0.875	0.875
		The functionalities offered on the e-commerce website are satisfactory.	2.71 [0.93]	0.811	0.811
		I am pleased with the functionalities offered on the e-commerce website.	2.79 [0.99]	0.887	0.887
		I am delighted with the functionalities offered on the e-commerce website.	3.24 [1.16]	0.787	0.787
Hedonic Satisfaction	Psychological state arising from emotions surrounding disconfirmed hedonic expectations.	I am satisfied with the aesthetic properties of the e-commerce website.	2.85 [1.06]	0.918	0.918
		The aesthetic properties of the e-commerce website are satisfactory.	2.81 [1.04]	0.890	0.890
		I am pleased with the aesthetic properties of the e-commerce website.	2.99 [1.08]	0.929	0.929
		I am delighted with the aesthetic properties of the e-commerce website.	3.32 [1.17]	0.849	0.849
Overall Satisfaction	Psychological state arising from the extent to which the e-commerce site fulfills transactional expectations.	Overall, I am satisfied with the e-commerce website.	2.48 [0.95]	0.882	0.882
		Overall the e-commerce website is satisfactory.	2.47 [0.99]	0.853	0.853
		Overall, I am pleased with the e-commerce website.	2.65 [1.05]	0.929	0.929
		Overall I am delighted with the e-commerce website.	3.10 [1.18]	0.813	0.813

Appendix E – Inter-Construct Correlation Matrix

	Fornell	α	AES	ATM	BIL	CAR	COM	CON	EOU	ENJ	EXT	FLO	FUN	GEN	HAN	HDC	HST	HOS	IMG	MED	ORD	OST	PAY	REL	RES	SoP	SPC	UDC	UST	VIS	VOL
AES	**0.911**	**0.870**	**0.849**																												
ATM	**0.908**	**0.870**	0.355	**0.844**																											
BIL	**0.946**	**0.924**	0.288	-0.069	**0.903**																										
CAR	**0.942**	**0.919**	0.481	0.183	0.453	**0.896**																									
COM	**0.880**	**0.796**	0.266	0.121	0.361	0.284	**0.842**																								
CON	**0.898**	**0.849**	0.301	0.165	0.398	0.383	0.408	**0.829**																							
EOU	**0.938**	**0.917**	0.069	-0.106	0.320	0.091	0.347	0.323	**0.868**																						
ENJ	**0.894**	**0.841**	0.375	0.210	0.265	0.343	0.496	0.399	0.288	**0.823**																					
EXT	**0.917**	**0.879**	0.358	0.306	0.127	0.319	0.330	0.249	0.147	0.618	**0.856**																				
FLO	**0.908**	**0.865**	0.273	0.196	0.277	0.270	0.439	0.436	0.256	0.576	0.532	**0.843**																			
FUN	**0.909**	**0.867**	0.516	0.129	0.502	0.360	0.305	0.415	0.228	0.276	0.212	0.267	**0.846**																		
GEN	**0.894**	**0.844**	0.299	0.102	0.396	0.548	0.355	0.598	0.242	0.389	0.245	0.360	0.340	**0.825**																	
HAN	**0.924**	**0.890**	0.477	0.145	0.416	0.587	0.192	0.331	0.084	0.214	0.225	0.187	0.513	0.396	**0.868**																
HDC	**0.975**	**0.965**	0.058	0.262	-0.186	0.061	-0.040	-0.047	-0.276	-0.083	0.077	-0.064	-0.085	0.011	0.110	**0.952**															
HST	**0.943**	**0.919**	0.420	0.176	0.295	0.317	0.211	0.278	0.091	0.210	0.151	0.170	0.408	0.181	0.329	-0.312	**0.897**														
HOS	**0.926**	**0.894**	0.517	0.222	0.440	0.619	0.231	0.343	0.037	0.333	0.279	0.268	0.509	0.427	0.712	0.115	0.335	**0.871**													
IMG	**0.932**	**0.885**	0.290	0.284	-0.038	0.257	0.101	0.061	0.044	0.237	0.333	0.222	0.116	0.163	0.225	0.118	0.113	0.291	**0.934**												
MED	**0.901**	**0.853**	0.504	0.370	0.319	0.373	0.370	0.336	0.143	0.427	0.420	0.498	0.462	0.272	0.454	-0.017	0.393	0.507	0.259	**0.833**											
ORD	**0.947**	**0.927**	0.175	0.004	0.532	0.207	0.325	0.464	0.411	0.429	0.145	0.373	0.427	0.490	0.234	-0.221	0.202	0.299	-0.032	0.316	**0.905**										
OST	**0.926**	**0.893**	0.338	0.056	0.442	0.242	0.273	0.356	0.272	0.287	0.181	0.247	0.516	0.256	0.298	-0.288	0.653	0.315	0.068	0.421	0.390	**0.871**									
PAY	**0.886**	**0.829**	0.221	-0.014	0.614	0.347	0.400	0.417	0.456	0.354	0.142	0.362	0.445	0.469	0.325	-0.261	0.265	0.348	-0.022	0.325	0.659	0.411	**0.813**								
REL	**0.908**	**0.849**	0.113	0.039	0.125	0.135	0.183	0.140	0.285	0.184	0.165	0.143	0.264	0.160	0.143	-0.029	0.085	0.151	0.181	0.063	0.094	0.165	0.159	**0.876**							
RES	**0.891**	**0.839**	0.170	0.079	0.384	0.192	0.564	0.395	0.357	0.424	0.278	0.469	0.323	0.384	0.163	-0.099	0.157	0.225	0.020	0.337	0.452	0.320	0.487	0.194	**0.819**						
SoP	**0.961**	**0.949**	0.423	0.338	0.009	0.449	0.066	0.196	-0.107	0.186	0.318	0.190	0.252	0.225	0.522	0.201	0.251	0.515	0.416	0.503	-0.081	0.110	0.012	0.080	0.003	**0.911**					
SPC	**0.945**	**0.923**	0.396	0.093	0.610	0.666	0.323	0.489	0.241	0.326	0.266	0.288	0.484	0.559	0.569	-0.113	0.405	0.564	0.127	0.414	0.452	0.463	0.602	0.068	0.306	0.297	**0.901**				
UDC	**0.969**	**0.958**	0.063	0.255	-0.212	0.121	-0.019	-0.039	-0.184	0.010	0.132	-0.001	-0.154	0.001	0.032	0.757	-0.189	0.112	0.181	-0.054	-0.275	-0.324	-0.255	0.005	-0.089	0.269	-0.114	**0.942**			
UST	**0.906**	**0.861**	0.410	0.111	0.358	0.269	0.298	0.378	0.155	0.275	0.245	0.241	0.542	0.214	0.339	-0.226	0.700	0.326	0.088	0.444	0.318	0.765	0.319	0.102	0.263	0.168	0.440	-0.295	**0.841**		
VIS	**0.944**	**0.913**	0.102	0.236	-0.154	0.140	0.016	0.012	-0.277	0.017	0.110	0.124	-0.048	0.089	0.166	0.225	0.120	0.124	0.278	0.050	-0.187	-0.010	-0.152	0.084	-0.081	0.275	-0.005	0.242	-0.010	**0.922**	
VOL	**0.862**	**0.762**	0.139	0.132	0.195	0.242	0.345	0.279	0.302	0.311	0.251	0.338	0.184	0.269	0.162	-0.012	0.048	0.152	0.218	0.169	0.247	0.149	0.289	0.118	0.315	0.051	0.213	-0.014	0.139	0.087	**0.823**

AES – Aesthetic Performance; ATM – Atmospheric Cues; BIL – Billing; CAR – Caretaking and Safekeeping; COM – Compatibility; CON – Consultation and Advice; EOU – Ease of Use; ENJ – Enjoyability; EXT – Excitability; FLO – Flow; FUN – Functional Performance; GEN – General Information; HAN – Handling Exceptions; HDC – Hedonic Disconfirmation; HST; Hedonic Satisfaction; HOS – Hospitality; IMG – Image; MED – Media Vividness; ORD – Order Taking; OST – Overall Satisfaction; PAY – Payment; REL – Relative Advantage; RES – Results Demonstrability; SoP – Social Presence; UDC – Utilitarian Disconfirmation; UST – Utilitarian Satisfaction; VIS – Visibility; VOL – Voluntariness of Use

Appendix F – Graphical Plots of Path Coefficients

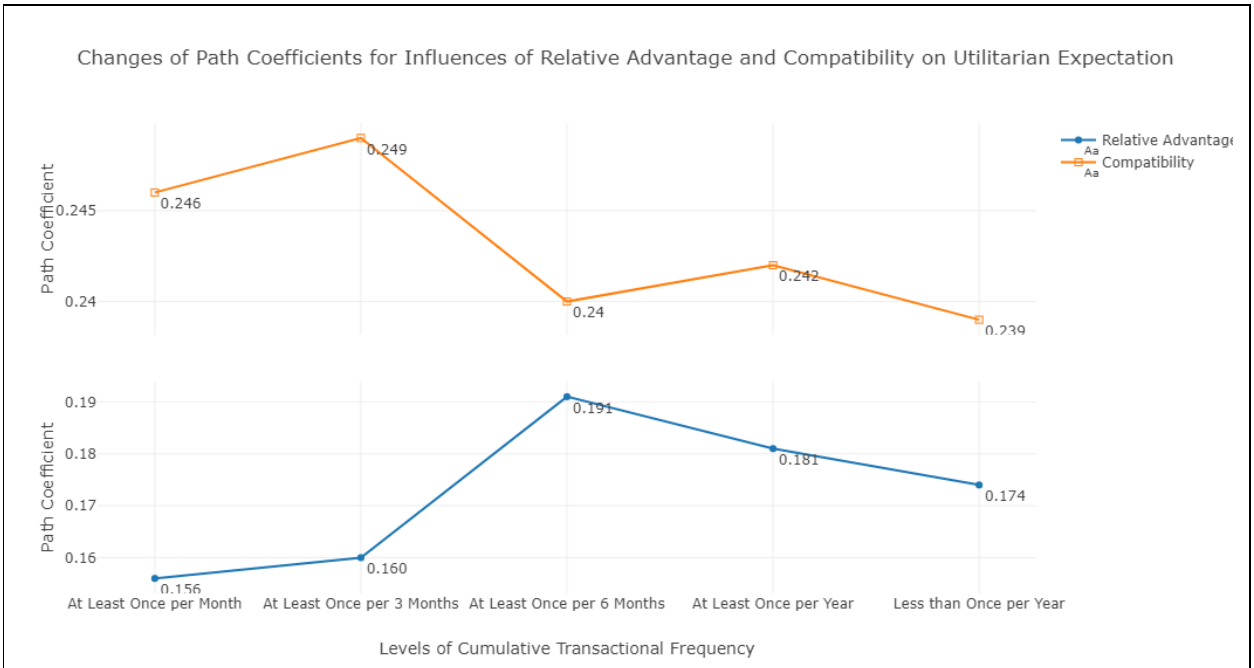

Figure F-1: Changes of Path Coefficients for Influences of Relative Advantage and Compatibility on Utilitarian Expectations

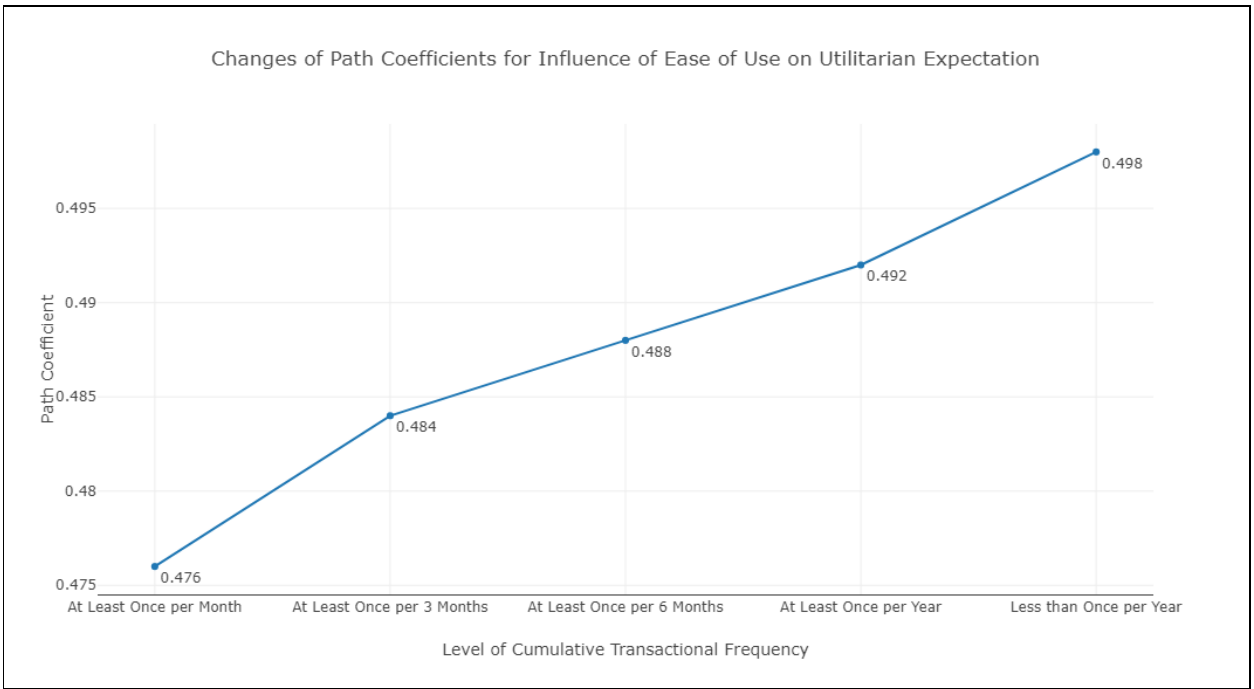

Figure F-2: Changes of Path Coefficients for Influence of Ease of Use on Utilitarian Expectations

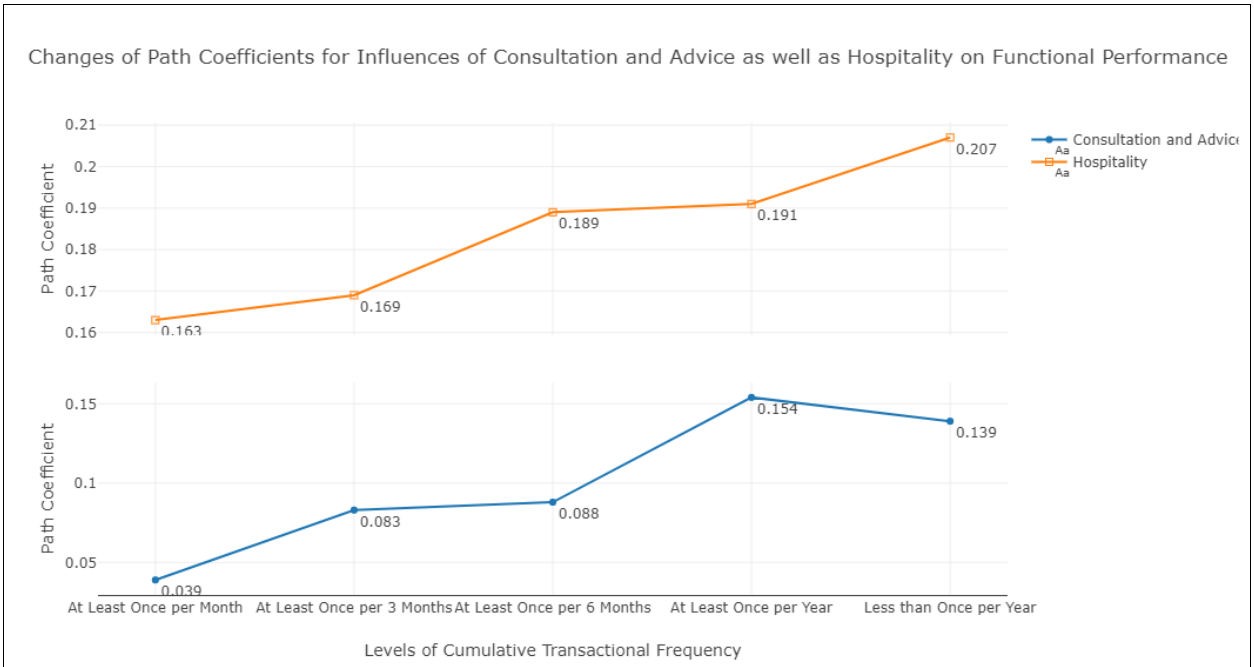

Figure F-3: Changes of Path Coefficients for Influences of Consultation and Advice as well as Hospitality on Functional Performance

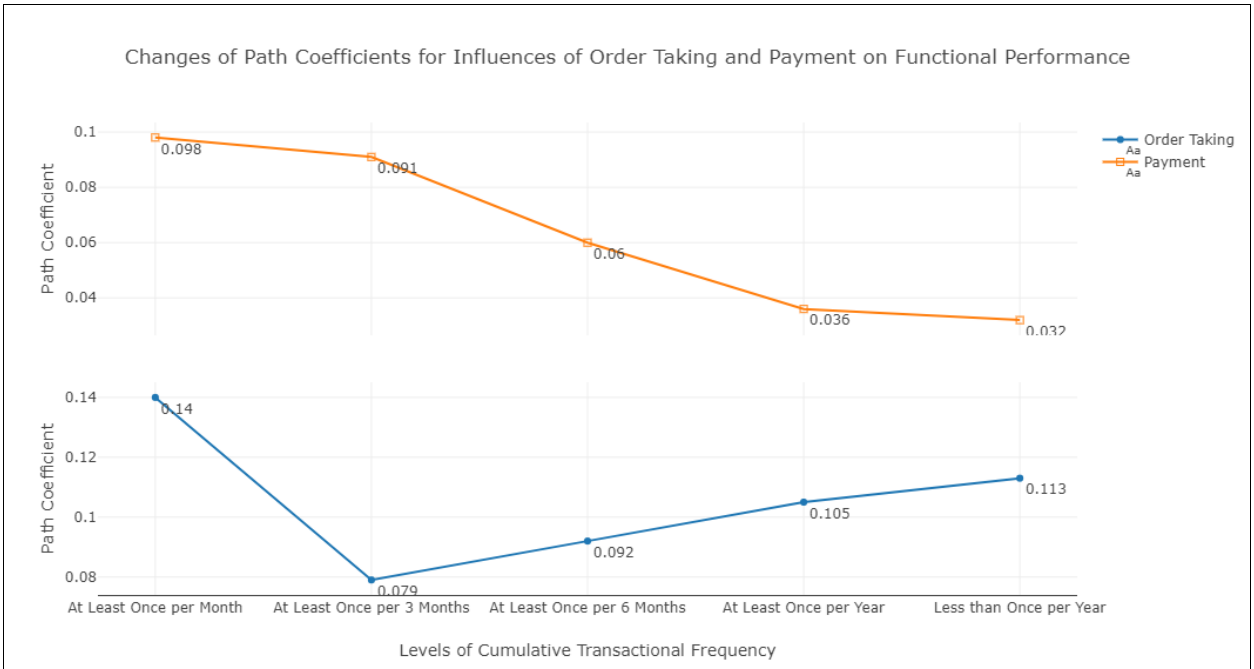

Figure F-4: Changes of Path Coefficients for Influences of Order Taking and Payment on Functional Performance

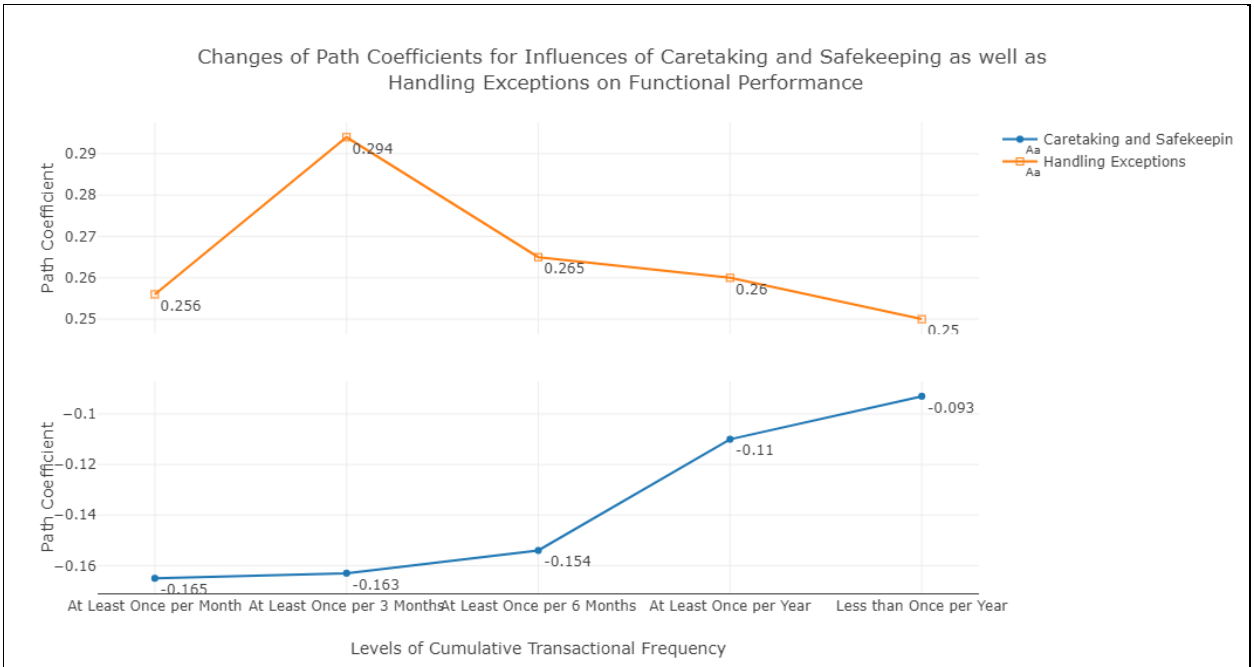

Figure F-5: Changes of Path Coefficients for Influences of Caretaking and Safekeeping as well as Handling Exceptions on Functional Performance

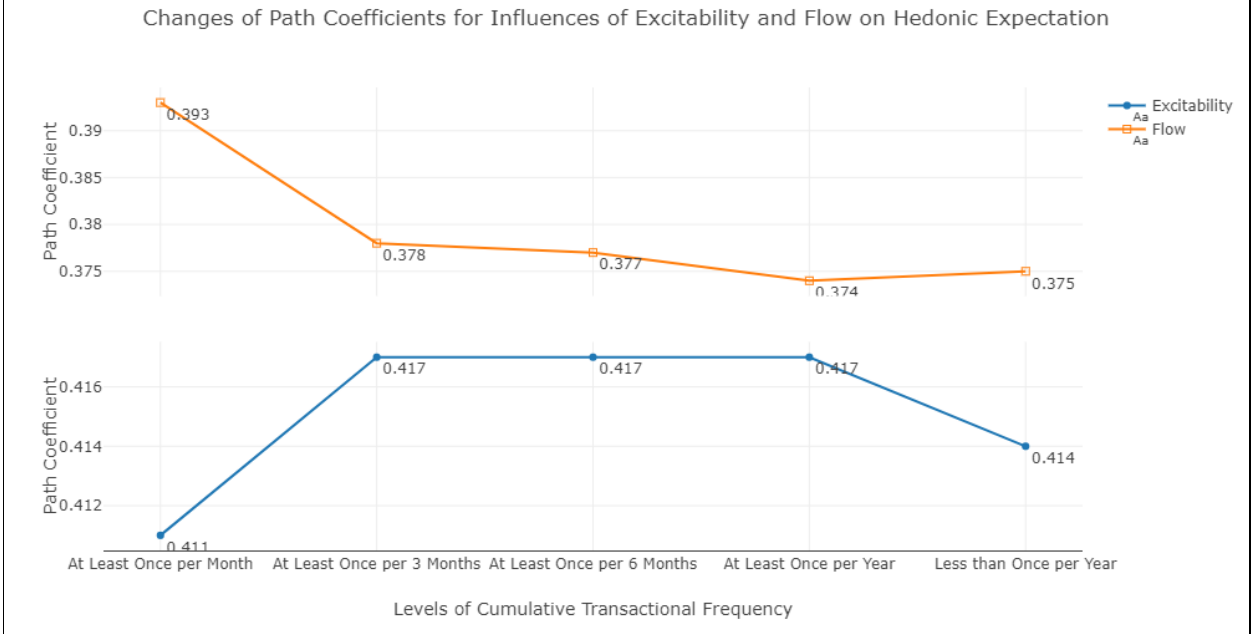

Figure F-6: Changes of Path Coefficients for Influences of Excitability and Flow on Hedonic Expectation

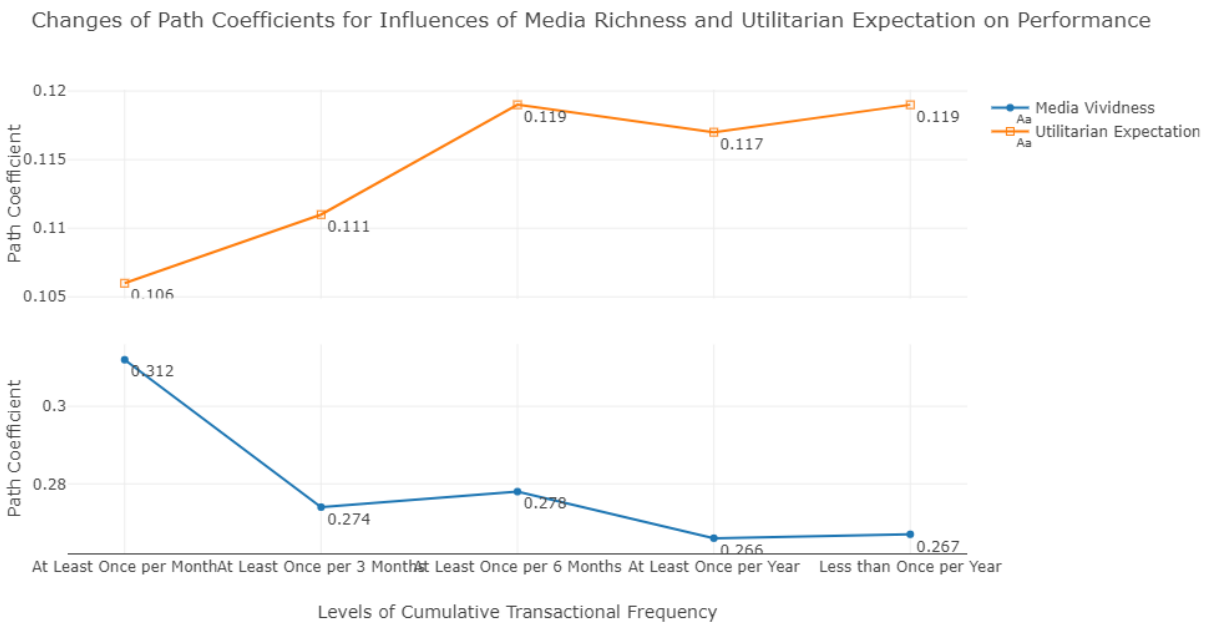

Figure F-7: Changes of Path Coefficients for Influences of Media Richness and Utilitarian Expectations on Functional Performance

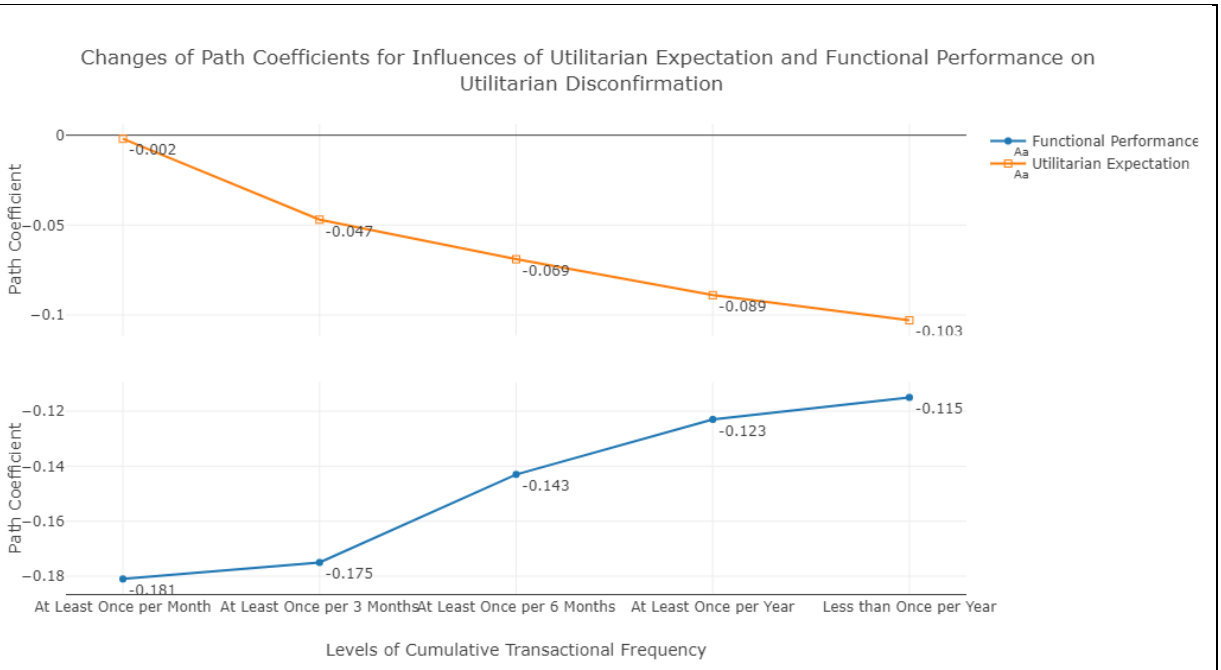

Figure F-8: Changes of Path Coefficients for Influences of Utilitarian Expectations and Functional Performance on Utilitarian Disconfirmation

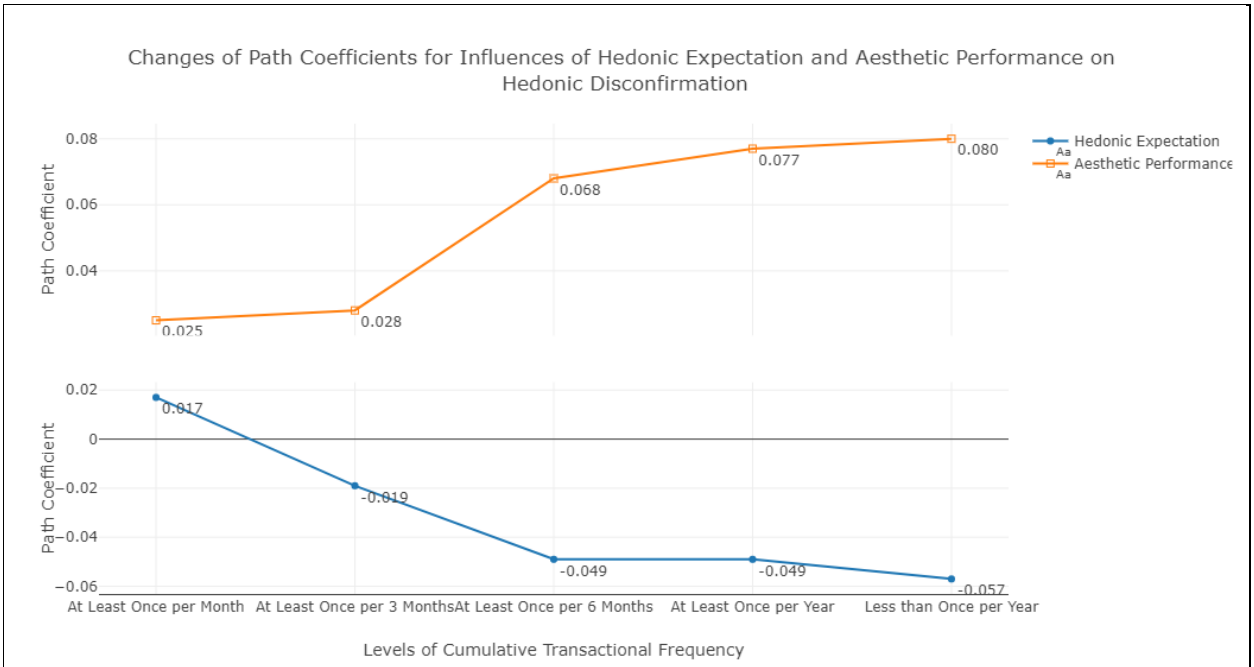

Figure F-9: Changes of Path Coefficients for Influences of Hedonic Expectations and Aesthetic Performance on Hedonic Disconfirmation

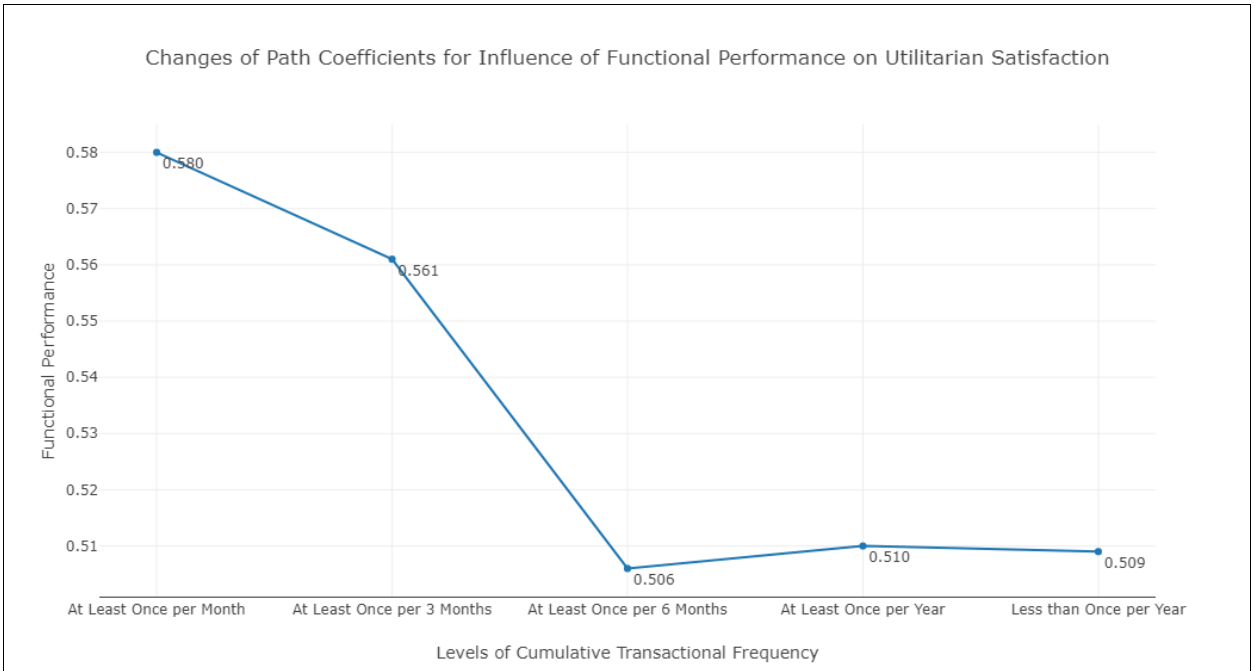

Figure F-10: Changes of Path Coefficients for Influence of Functional Performance on Utilitarian Satisfaction