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# Merchandising the Intangibles: Unraveling the Benefits of Visualizing Consumption Experience in Service E-Tailing

*Research-in-Progress*

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## Abstract

*Images have been extensively employed in service e-tailing to overcome the intangible nature of services. Despite the importance of delineating the physical vibe where service is delivered, there is a paucity of research on how visual cues can be designed in images to communicate the actual consumption experience of a service offering and in turn, drive customers' purchasing behavior. Synthesizing extant literature on service tangibility, we identify consumption process and outcome as two predominant dimensions of service consumption that entice purchase by enhancing the informativity of a service offering both associatively and epistemically. Additionally, we consider consumer's reliance on service tangibility as an impetus that alters the power of visualizations. Conceiving human elements as the communicator that transmits consumption information, we employ computer vision techniques to extract human in the portal images of more than 299,000 localized service offerings and propose an experimental design for future investigations.*

**Keywords:** Service e-tailing, service tangibility, informativity, computer vision

## Introduction

Broadcasting services online can be challenging due to their intangible nature (Hellén and Gummerus 2013). With an abundance of empirical evidence attesting to the criticality of service tangibility in

diminishing consumers' risk perceptions and enticing purchases (An 2014), visual demonstration has been advocated as one of the primary modalities to communicate the tangibles of a service by conveying a concrete image of the service offering (McDougall and Snetsinger 1990; Zhang et al. 2014). Although past studies have alluded to the decisive role of visual evidence in bolstering purchases through the depiction of the physical servicescape (Hellén and Gummerus 2013), there is comparatively little work done to unravel how visuals can be provided to guide consumers' mental comprehension of the servicing process. Aligned with prior research that bear witness to the effects of mental imagery on consumption experience (Krishna Erramilli 1990; Tsiotsou and Wirtz 2015) and the importance of mental tangibility in service consumption (An 2014), this study offers an in-depth appreciation of how visual cues can be devised to concretize the mental image of a service offering by narrating the expected consumption experience and in turn, drive online consumers' purchase decisions for services.

Due to inseparability between service production and consumption processes, the consumption process and outcome constitute complementary factors affecting consumers' consumption experience for services (Krishna Erramilli 1990; Tsiotsou and Wirtz 2015). Consumption process can elicit lasting emotional response during and after consumption that could influence consumers' evaluation of the overall service quality (Korai and Souiden 2017). We hence submit that the consumption process and outcome of a service serve as focal cues in boosting the mental tangibility of the service offering (An 2014). Particularly, given the inevitable need for human presence in portraying service consumption (Li et al. 2018), we endeavor to uncover how humanistic elements can be encapsulated in images to communicate the mental tangibles of a service offering by elucidating the two dimensions of service consumption.

Service vendors have employed a myriad of communication strategies to provide information for tangibilizing their offering. While verbal documentation could differentiate service content (Berry and Clark 1986), visual-centric modalities, such as association and visualization, are more effective in enhancing the mental concreteness of services (Berry and Clark 1986; Hill et al. 2004; Li et al. 2018). Specifically, reminding consumers of the value and outcome of a service offering is a form of associative information (Miller and Foust 2003), whereas visualization, which aids consumers to mentally picture the delivery of the service, can be conceived as epistemic information (An 2014; Berry and Clark 1986). Accordingly, we subscribe to the aforementioned communication strategies to postulate that the visualizations of the consumption process and outcome could spur purchases by disseminating distinct forms of informativity for a given service offering. Because consumers' reliance on tangible evidence of service consumption varies with their desirability for mentally imagery (Ding and Keh 2017), we accommodate variations in consumers' perceived importance of mental tangibility and explore how such heterogeneity could dictate the persuasiveness of visual cues.

By seeking to disentangle how service offerings processed through the visual reproduction of the actual consumption experience, we shed light on the mechanisms underlying how these visual elements shape purchase behavior in service e-tailing environment. Specifically, we advance a research model to: (1) uncover how the consumption process and outcome can be delivered to enrich the informativity of a service offering via associative and epistemic mechanisms in shaping consumers' purchase behaviour, and; (2) articulate how consumer's reaction to the visual evidence of consumption experience could be altered by their perceived importance of the mental tangibility of services. Compelled by the indispensable role of actual customer in demonstrating consumption experience, we leverage on computer vision techniques to extract human elements in service offerings from a leading service e-tailing site and propose an experimental design that incorporates real service offerings to empirically validate our research model.

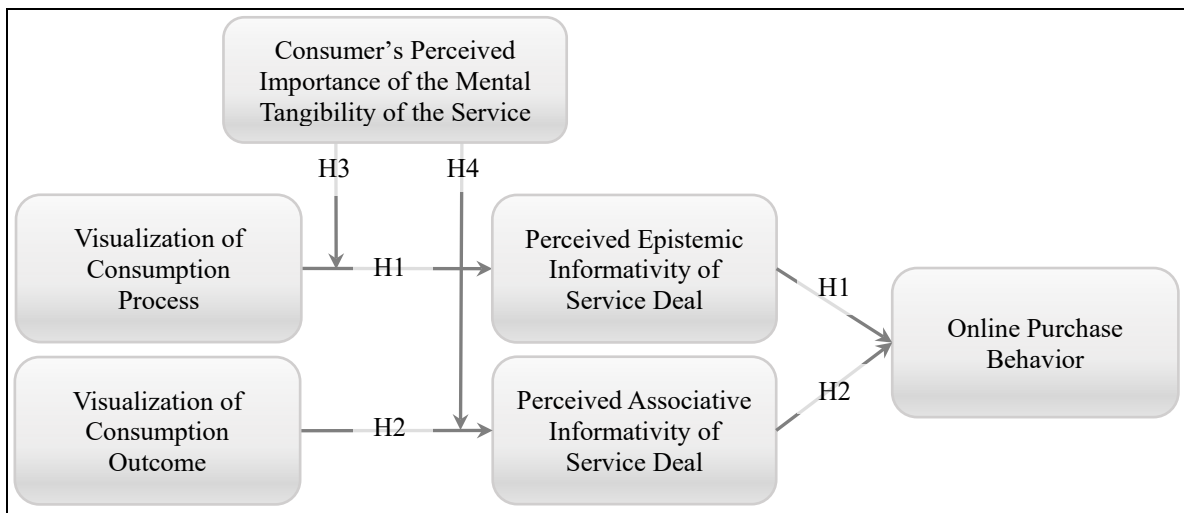
## **Theory Development and Hypotheses Formulation**

Synthesizing extant literature on communication strategies and service tangibility, we construct a research model (see Figure 1) to depict the role of visualizations of the two dimensions of consumption experience: consumption process and outcome, in determining the associative and epistemic aspects of service informativity, which in turn shapes consumers' purchases in service e-tailing environment. Additionally, we take into account consumer's reliance on the mental aspects of tangibility and explore

how such individual heterogeneity would moderate the effectiveness of the visualizations of consumption experience.

### ***Service Tangibility and Communication Strategy***

Service differs from physical product due to its intangibility, perishability, variability, as well as its inseparability between production and consumption (Miller and Foust 2003). The intangible nature of services is the biggest hurdle for consumers to evaluate the value, quality, and outcome of a service (Hellén and Gummerus 2013; Reddy et al. 1993). This is especially salient in online environment, where sensory interactions are impracticable (Miller and Foust 2003). Consequently, past studies on service marketing has bear witness to the importance of service tangibility as a salient driver of consumers' purchase behavior (Laroche et al. 2001; McDougall and Snetsinger 1990).



**Figure 1. Research Model**

Prior research has accentuated the multi-facet nature of service tangibility in that it not only comprises evidence of the physical environment where service is delivered (Laroche et al. 2001; McDougall and Snetsinger 1990), but also the mental imagination of the actual production process and outcome (Pleger Bebko 2000). For example, Chang and Tarn (2008) argued the physical tangibility of a hotel service to be the presence of tangible cues such as its cleanliness, communication materials, facilities, staffs, and vibes. Likewise, Panda and Das (2014) discovered that the physical conditions of facilities in a hotel could alter consumers' evaluation of service quality and drive their satisfaction. Yet, despite overwhelming empirical evidence confirming the significance of physical tangibility in shaping consumer's decisions, the components and consequences of mental tangibility, the extent to which mental imagery on the service offering can be activated (Miller and Foust 2003), has been ignored. In line with Pleger Bebko's (2000) work, we conceive the visibility of tangible evidence pertaining to consumption experience as essential in shaping the mental tangibility of a service deal and seek to unveil how such information can be delivered via images to overcome the abstract nature of services.

Scholars have espoused Berry and Clark (1986)'s classification of communication strategies that emphasize documentation, physical representation, association, and visualization as core strategies for tangibilizing services. Apart from documentation which relies on verbal cues to describe the services, the later three tangibilization strategies are visual-centric. While physical representation could enhance the physical tangibility of services and ultimately boost sales by materializing the facilities and servicescape (Koernig 2003), association and visualization could assist consumers to mentally experience the service (Miller and Foust 2003; Stafford 1996). According to Stafford (1996), association strategy involves extrinsic objects and human to stimulate viewer's association to the core value of the service. For example, a picture of a group of guests who are romping on the beach and vineyards nearby a hotel was found to evoke consumer's mental attachment to the consumption experience (Koernig 2003). Likewise, visualization strategy could offer visual evidence that elevates

consumer's mental imagery on the quality of the service (An 2014; Berry and Clark 1986). Bang and Sook Moon (2002) explained how a couple enjoying a romantic dinner in a cozy and moonlit environment could activate consumers' mental experience and shape their perceived quality of the advertised restaurant. Synthesizing extant literature on communication strategies and service tangibility, we construe consumption experience as the key impetus for influencing consumers' mental tangibility of a service offering and strive to explore how consumption experience can be visually presented in images via association and visualization tactics.

### ***Benefits of visualizing consumption experience***

Services are experiential products and the actual consumption experience is shaped by both service delivery process and its outcome (Helkkula 2011). Specifically, the consumption process has been deemed as one of the core phases where consumers form their perception on the service experience (Helkkula 2011), and it also endows consumers with a mental mark about the service quality that forms their cognitive, emotional, and behavioral responses on the offering (Edvardsson et al. 2005). In this sense, customers being able to solidify in their minds, the actual consumption process would be key for them to mentally comprehend the service deal to stimulate the start of the purchase decision and the visualization of the desired consumption process of the service could provide evidence of the service experience and entice purchases.

An image that conveys vivid information about the consumption process is postulated to affect consumer's buying-decisions by increasing the epistemic informativity of a service deal. In particular, an individual's perception of the epistemic informativity is defined as the informativeness of a service deal that is related to its nature, its truth value, and the justification criteria of the deal (Mason et al. 2010). First, the demonstration of how people consume the given service lays the cornerstone for consumers in validating the content of a service deal (Lim and Kim 2018). For example, Grace and O'Cass (2004) found that the interpersonal interaction between service provider and customers before service delivery can sensitize customers' to the awareness of how service would be conducted and affect their reaction to the actual performance of the service offering. Second, the visualization of the consumption process may serve as visual evidence in assisting the consumer's interpretation of the true value of the service offering (Korai and Souiden 2017), which are testified to be the predominant components of epistemic informativity. Taken together, it is conceivable that the positive role of the visual evidence of the consumption process in fostering purchases can be stimulated by the enhancement of the perceived epistemic informativity of a service deal, we hence posit that:

***H1: Visualization of consumption process positively influences consumers' purchase of a service deal by enriching their perceived epistemic informativity of the deal.***

In the same vein, consumption outcome of a service offering has been touted as another core dimension of the service experience (Helkkula 2011) and the consumers' expectation of such an outcome is likely to drive their buying behavior (Zhang et al. 2014). Accordingly, visualizing the outcome of a service consumption could bolster consumers' favorable attitudes by reinforcing their mental association toward the value of the service (Riegelsberger et al. 2003). In particular, we define associative informativity as individuals' perceived informativeness of a service offering that elicits their mental attachment toward the service. The associations between the visualized and the actual consumption outcome could be activated in two ways. First, the visualization of the hedonic outcome of a service consumption, such as a picture depicting how guests are enjoying their dinners in a restaurant allows consumers to formulate association to the hedonic benefits of the service and to other attachments such as excitement, comfort, or romance could all play a significant role in eliciting consumer's emotional response to a service deal (Han et al. 2010). Second, the visual appeal of consumption outcome urges service consumers to project the own desired experience onto the quality of the service and evokes their buying appetency (Stafford 1996). Hence, the visualization of consumption outcome is expected to foster consumer's buying behavior by enhancing the associativity of the information revealed in a service deal. Accordingly, we delve into the mediating effect of the associative informativity of a service deal, which comprises the richness of information in facilitating the consumer's mental association to the consequences of service consumption, and hypothesize that:

**H2:** *Visualization of consumption outcome positively influences consumers' purchase of a service deal by enriching their perceived associative informativity of the deal.*

### **Consumers' heterogeneity on perceived importance of service tangibility**

According to Parasuraman et al. (1988), the importance of mental over physical tangibility in forming consumer's evaluation on service quality varies from service to service. For example, the comfort and efficacy of a massage service are more likely to be the primary driver of satisfaction as opposite to that of the physical facilities. Whereas for restaurants, the sophistication of the food and the dining vibe might be deemed as more important than other intangible aspects (Chang and Tarn 2008). Likewise, a buyer's reliance on service tangibility has also found to be related to an individual's personal preference for the mental versus physical elements embodied in a service offering (Ding and Keh 2017).

In line with the above studies, we conceive the consumer's perceived importance of the mental tangibility of a service deal as a potential factor that moderates the effectiveness of the visualizations of the consumption experience. In particular, the perceived informativity of a service for individuals with less reliance on mental tangibility is likely to be less intense than the perceived informativity formed by consumers who allocate more weight to the mental aspects of the service. This is because: (1) consumer's would be more aware of the epistemic information conveyed through the visual elements when they spend more effort on forming their mental understanding through the tangible cues of the given deal (Hill et al. 2004); and (2) the perceptions of the mental elements in a service offering are more likely to be formed by consumer's associative efforts given the abstract nature of mental imagery (Reddy et al. 1993). As such, with the presence of visualization on the both dimensions of consumption experience, the perceived associative and epistemic informativity of the service deal are likely to be boosted by a high emphasis on mental tangibility, we thus posit:

**H3:** *Consumer's perceived importance of the mental tangibility of a service deal reinforces the positive linkage between the visualization of consumption process and their perceived epistemic informativity of the deal.*

**H4:** *Consumer's perceived importance of the mental tangibility of a service deal reinforces the positive linkage between the visualization of consumption outcome and their perceived associative informativity of the deal.*

## **Methodology**

We plan to validate our hypotheses through a lab experiment with student participants interacting with an experimental service e-tailing platform. To preserve the realism within the experimental setting, real data of service deals extracted from a leading service e-tailing site in China will be used to populate the experimental sites. The dataset consists of detailed information of over 299,000 service deals, including 4,280,021 images, from 24 different categories. Since the presence of humans in images is conceived to be the primary communicator that transmits the consumption experience to viewers We employ a multi-view face detection algorithm that has achieved the state-of-the-art performance on identifying human faces from different angles in previous study (Wu et al. 2017). In particular, we strive to implement the algorithm on a powerful GPU machine with 4 TITAN Xp GPUs to ensure time efficiency. 66,121 images from 7961 service deals are detected to have contained human elements. These service deals will serve as the initial data to be further analyzed before they are used to populate the experimental site. Together, the experimental service e-tailing platform offers a realistic but controlled platform for our experiment.

### **Future experimental settings**

Full factorial experimental design will be adopted by developing 2 X 2 versions of the experimental platform, each of which will present different composition of the presence/absence of the visuals of the consumption process/outcome. To control the heterogeneity of personal preference among service categories and ensure the consistency of data, each subject in the experiment will be required to make mock purchasing preference on service deals in 16 choice sets. Each choice set will include two service

options with similar content and price and differing only in the portal image (i.e., one with manipulated image with a specific configuration of the visualizations of consumption process/outcome and the other is a control image without visualizations of consumption process/outcome).

### Operationalization

Given the sequential nature of the consumption process, an image depicting consumer's actions, such as interactions with objects, is likely to generate a dynamic visualization of consumption process. Accordingly, we intend to operationalize the visualization of consumption process as the presence of human action and/or human-object interaction in an image. Specifically, deep learning and computer vision techniques will be deployed to extract human action (Kay et al. 2017) and human-object interaction (Chao et al. 2015). Conversely, as the consumption outcome of a service is usually hedonic-based, depicting a human with significant display of emotion in the image is conceived to be the main transmitter of consumption outcome. Therefore, Google's emotion recognition API (Cloud Vision 2019) will be performed in the initial image data to extract emotional human faces and the visualization of consumption outcome will be operationalized as the presence of human emotion in an image. For example, Figure 2 depicts the portal images of three spa resort deals in our datasets, with the first image (left) portraying a dynamic process of how the customers are enjoying in a spa resort, whereas the second image (middle) illustrates how the emotion of human can narrate the positive outcome of the spa offering. The last image (left) in Figure 2 depicts an example of the control image with the presence of human but lacks visualizations of consumption process/outcome.



**Figure 2. Examples the Visualizations of Consumption Process and Outcome**

Additionally, we will create new measurement items of perceived epistemic informativity and associative informativity inferred from definitions of informativity (Guo et al. 2016), epistemic belief (Mason et al. 2010), and associativity (Farah 1991), in order to pinpoint the variance in both constructs induced by the visualizations of consumption experience. Definitions of focal variables are summarized in Table 1.

**Table 1. Definitions of Focal Variables**

Variable	Definition
Visualization of Consumption Process	Presence of human action and/or human-object interaction
Visualization of Consumption Outcome	Presence of human emotion
Perceived Associative Informativity of a Service Deal	Newly developed measurement items that capture subject's perception of the richness of information that facilitates buyer's mental association to the consequences of service consumption
Perceived Epistemic Informativity of a Service Deal	Newly developed measurement items that capture subject's perception of the richness of information that pertains to the nature, the truth value, and the justification criteria of the deal (Mason et al. 2010)



Perceived Importance of the Mental Tangibility of the Service	Subject's reflection on the perceived importance of the visible evidence that links to the mental elements of a service
Online Purchase Decision	Subject's purchase decision

## Expected Contributions

This study expects to contribute to contemporary knowledge in three ways. First, while past studies have accentuated the indispensable role of physical tangibility in service marketing, we contribute to extant literature by illuminating the importance of the mental aspect of service tangibility in shaping consumers' purchase decisions and positing the consumption experience as the core component contributing to consumers' mental tangibility of services. Second, aligning with prior research on service experience (Helkkula 2011) and the persuasiveness of visual cues in service e-tailing (Li et al. 2018), we not only introduce consumption process and outcome as the primary dimensions of the consumption experience, but we also disentangle their impact on service tangibility by enriching the informativity of a service both associatively and epistemically. Third, our study draws attention to the human element as the transmitter of the consumption experience in that we expect the actions and emotions of humans portrayed in the portal image of a service to vivify viewer's imagery of the actual consumption experience. In turn, this inquiry could yield actionable prescriptions for how visuals, especially human elements, can be designed to help service vendors in tangibilizing their services.

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