Green Advertising and Purchase Decisions in Live-streaming B2C and C2C Interactive Marketing

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Abstract

Advertising is arguably the most apparent form of marketing. Different forms of advertising, such as posters, billboards, and emails, generate waste and are contrary to sustainability-oriented advertising. Live-Streaming; a new trend of green advertising, and sustainability marketing, promote co-creation, social presence, and sustainability lifestyle. This paper introduced a new social antecedent (value compatibility) and studied how social presence and interactivity promote sustainability purchase decisions. Linear regression was used in testing a total of 498 datasets from Taobao and JingDong, live-streaming platforms. Social present, value compatibility, interactivity, and visual appeal are vital characteristics of B2C and C2C live-streaming that promote sustainability purchase decisions. Live-streaming platforms will not only enhance green marketing but will create a community of consumers who share sustainable lifestyles in promoting global sustainability. The study also cleared the uncertainties surrounding the perceived benefits of sustainability compared to the cost of sustainability adoption.

Keywords: Sustainability marking, green advertising, social presence, live-streaming, value compatibility.

1. Introduction

The urgent need to meet the limit of 1.5C of global warming by 2030 calls for a holistic view of sustainability. Research shows that humanity has failed in achieving sustainability goals on national, corporate, and personal levels (see ONeill [42]). The United Nations (UN) called for not only awareness and preparedness to solve climate change issues, but the timeframe for action must be taken more seriously (see Steffen [52]).

The generally accepted definition of sustainability is the development that meets the needs of current generations without compromising future generations' needs (see Rakic and Rakic [48]). Production and consumption, as it used to be, is no longer an option. With about a decade more to the deadline set by the UN to attain Sustainable

Development Goals (SDGs) of the 2030 Agenda, it is becoming a more pressing issue to speed up efforts to find solutions to existing problems (see International Trade Centre (ITC) [23]). There is a growing commitment by industry and academia to the environmental and broader perspective of sustainability issues. However, it is noted that; the global economy is not doing enough in placing society on a more sustainable pathway (see Hayward et al. [18]). Because of the uncertainties surrounding the perceived benefits of sustainability compared to efforts, many companies, though agree sustainability is the way for a successful future, the efforts are frustrating (see Hayward et al. [18]).

Technological development has changed how, when, and what we buy, and consumers' priority and taste have also changed over time. Companies' sustainability efforts are successful when consumers receive perceived value during the purchase decision process. This is leading many industries to come up with new and innovative ways to reach their customers (see Hewitt [19]).

E-commerce provides a different paradigm to "green," "environmental," and "sustainable" marketing. Research and industry players are advocating for green products and green buying behaviors, and the understanding of sustainable marketing, market segmentation, and environmentally friendly products (see Dangelico and Vocalelli [9] and Kemper et al. [28]).

Research on marketing sustainability has, over the years, focused on environment and sustainability, yet the evidence of a significant contribution to improved sustainability at the global scale is debatable(see Kemper et al.[28] and Peattie and Crane [45]). The paradigm shift in advertising towards a sustainable lifestyle and marketing is not only awareness. Today advertising has moved away from email, posters, banners, and stickers to live streaming in an attempt to meet innovation, collaboration, communication, and commitment, which is driving consumers' belief in the benefits of sustainable consumption (see Obermiller et al. [43]). Consumers are part of a universal system of social presence and interaction that promotes a sustainable consumer community lifestyle and co-creation to meet the changing taste and consumer priority (see Hewitt [19]). Studies have shown that marketing not only has great potentials to promote sustainable propaganda but can also foster, sustainable lifestyle that contributes to businesses' bottom-line. However, the benefits businesses are supposed to derive from promoting sustainable consumer lifestyles are debatable (see Trivedi et al. [57]). Even though consumers believe in the promotion of sustainable business practices and expect businesses to promote this, it is on record that purchase decision does not reflect the practicality (see Hayward et al., 2014 [18]).

The present paper analyzed how live-streaming (LS) in consumer experience platforms promotes sustainability marketing and lifestyle. Profit-making is the primary aim of every business, and if this is guaranteed, we are very likely to meet the SDGs in the next decade. We singled out the LS online advertising and product sales, a new dimension of e-commerce advertising and sales that incorporates innovation, collaboration, communication, and commitment, as well as factors necessary to integrate sustainability vision into business strategy successfully (see Trivedi et al. [57]). LS is an aspect of e-commerce

that reduces patronizing of brick and mortar shops, human, vehicular traffics, noise pollution, and time associated with buying and selling, leading to environmental protection. LS also promotes a virtual community where co-consumers and businesses engage in a synchronous live interaction to share product-related experiences and to develop a sense of belonging to a global community promoting a sustainable lifestyle.

It is a common assumption that sustainability and marketing are set for a head-on collision because sustainability is about consuming less while marketing is about selling more. It is essential to define where marketing and sustainability can run alongside and be interdependent (Jones et al. [26]). Businesses will be more willing to adopt and sustain sustainability concepts if they can remain profitable, competitive, and remain in business. To address the link between sustainability and profitability, we studied how the characteristics of social presence, communication, business, and customer collaboration promote positive purchase decisions for sustainable marketing.

2. Related Studies

2.1. Sustainability marketing and innovation

In the quest to reduce poverty, the world is moving away from the self-sufficiency and barter system characterized by individuals and families producing what they eat and eating what they produce to a consumer-driven economy. Marketing processes, practices generally aid consumption, and thinking, a reason many blame marketing for the unsustainable way of our consumption, which compounds the primary challenge of businesses to create value for consumers (see Kjellberg [29]). Based on findings from previous studies on how businesses promote value creation and value compatibility for consumers (Wang, Zhang and Ouyang, 2009), we introduce a new social antecedent, "Value compatibility," in understanding how social-presence and interactive communication in LS increases consumer purchase decisions. To the best of our knowledge, this is the first study in marketing sustainability from product experience perspective in line with the model of Triple Bottom lines (1. Environment: Reducing traditional buying and selling, 2. Economic: Improving consumer purchase decisions and value compatibility and 3. Social: -through social presence and interactivity), a virtue of sustainability performance in LS. LS falls perfectly into the modern trends of sustainable marketing, which states that sustainable marketing is the sum of modern marketing, Ethical-Ecofriendly marketing, and Relationship marketing (see Kemper et al. [28]).

Today, sustainability marketing is more of a long-term viewpoint of relationship marketing than the short-term transactional approach of modern marketing. It embodies the maintenance of sustainable relationships with people (customers), the natural and social environment (see Cook [5]).

2.2. Green advertising

Green advertising over the years focused on heavy industry goods and services such as energy and transportation. In recent times, however, there is a deliberate gradual

shift of emphasis on green advertising targeted at consumer/buyers, driving the rising need for environmental and sustainability marketing in consumer markets (see Leonidou et al. [32]). Research notes the predisposition in green advertisements to stress the issues relating to the consumption of goods, rather than production, recycling problems, product emission levels, and after-product life solutions (see Peattie and Belz [44]). There are direct and indirect educational contents in many green advertisements that help all stakeholders to realize and understand the nature and need for environmental issues. Some of these come as images and slogans showcasing the company's green profile, while others come in the form of new marketing, products, processing, and advertisings that improves efficiency, profitability and reduces carbon footprints (see Belz and Peattie [2]). Advertising has been at the forefront of sustainability marketing since the first known environmental advertisement in the 1960s. The focus at the onset was to minimize anti-ecological practices by promoting environmental-friendly business approaches, and to inform customers, stakeholders, and regulators of the company's direction on green environment see Peattie and Belz [44]). However, advertising using mobile vans, print media, posters, and emails (advertising for green and not green advertising) are themselves not green and sustainable (see Obermiller et al. [43]). This is where e-commerce and, most specifically, live streaming consumer experience platforms come handy.

2.3. Live-streaming and sustainability marketing

Marketing-mix is a well-researched phenomenon where Product, Price, Place, and Promotion (the 4Ps) are vital variables marketers implement in every target market (see Vliet [60]). Sustainability marketing researches have, however, criticized the 4Ps for neglecting consumers and sustainable consumption and lifestyles and exaggerating product and production-related concepts (see Belz and Peattie [2]). In recent times, it is essential to gather data on consumer behaviors to include socially responsible and collective purchase decisions, avoiding products and services that are not environmentally sustainable. It is also important to take marketing research away from topics related to individual purchasing and deal with purchase from a broader and a lifestyle in a consumer community where individual consumers depend and rely on each other in making purchase decisions. Because LS is environmentally efficient and promotes real-time social interaction, the rising adoption it is receiving in B2C and C2C marketing is not surprising. This supports the view that consumers will opt for socio-environmental sustainable options among identical products and services (see Kardash [27]). It is noted that e-commerce saves energy, storage, and reduces the price. Online consumers use less fuel by not driving to stores thereby emitting less pollution to achieve the SDG goal for 2030 .ecommerce reduces the need for warehouse space by individual retail stores, with less use of energy, cut down intermediaries involved in the supply and distribution chain resulting in cost reduction to consumers (see Qureshi [47]). In recent times and with particular reference to the Chinese e-commerce practices, goods are delivered in bulk to the consumers in the same geographical location. Consumers can team-buy, and package reuse may attract reduced postage costs. Thus, green e-commerce in current

times involves forward-thinking activities beyond green product consumption (see Shaina [51]).

The concept of price and willingness-to-pay is central to sustainability marketing. In our studies, we factored in "price" in determining hether or not consumers are willing to purchase from a more sustainable source. It is on record that sustainable products such as green energy, organic food are viewed as luxuries because they are priced higher than conventional products. However, LS, in particular, maintains similar pricing and cost of products as listed in traditional e-commerce platforms but with an added advantage of shared live-interaction and social presence. In support, consumers are unwilling to accept unrealistically low prices for products subsidized as a result of environmental destruction and human suffering (see Belz and Peattie [2]).

Advertising and communications are arguably the most apparent forms of marketing. Different forms of advertising, such as posters, billboards, and emails (Junk mail), generate waste and are contrary to sustainability-oriented advertising (see Belz and Peattie [2]) LS presents a dimension devoid of such wastes. Sales staffs known in LS as anchors or cewebrities are vital components of marketing. Cewebrities play a significant role in sustainability marketing communication. However, research is more skewed towards industrial markets than consumer marketers in terms of sustainability marketing communication (see Belz and Peattie [2]).

A key characteristic of LS, which is missing in traditional advertising and e-commerce, is interactivity. In a related study, Leonidou et al. [32] noted the importance played by online and mobile phone-based communication on marketing communication. Online and mobile phone marketing is also known as technology-mediated marketing (TMM). Companies can leverage TMM to show their environmental protection agenda.

2.4. Social Presence and Green Communication

Social Presence (SP) Theory stems from rather diverse lines of research (see Cui et al. [7]). Most researchers accept and adopt SP as the extent of the salience of the other person in an interaction and the consequent salience of the interpersonal relationships known as the concept of "intimacy;" and the concept of "immediacy" (see Cui et al. [7]). Several years later, a three-level to social presence theory as; the perceptual level of awareness of copresence with others, social presence typified by the subjective judgment which elaborates the psycho-behavioral accessibility of others, and the mutual social presence or the inter-subjective social presence that illuminates the dynamic interactions between participants was proposed (see Biocca et al. [4]). SP has commonly been referred to as the degree to which two people interacting through a technological medium, feel as if they are together. Theoretically defined as the feeling of "being with another in a mediated environment" (Hu et al. [20]). We referred to social presence as the "moment-to-moment awareness of copresence of a mediated body and the sense of accessibility of the other being's psychological, emotional, experience, beliefs, and intentional states" (see Biocca et al. [4]).

In many computer-mediated interactions, actors have the feeling of being together while interacting with other people on a second screen or, in many cases, the host. In

this circumstance, green-principles, culture, and attitudes are shared and adopted by the community of consumers for a sustainable lifestyle. As a result, users turn to get very involved in such a mediated environment as though the other person is physically present. Communicating green-based behaviors and activities to stakeholders and consumers, is a function of sustainability marketing, whether through planned sustainability activities or corporate social responsibility reports (see Nikolaeva and Bicho [40]). Social presence is two dimensional - as a sense and as a means, also known as the absent-availability and present-availability, respectively. The former involves surrogate for face-to-face communication. Absent availability requires physical colocation in space and time, while the latter refers to a person's perceptions and feelings of being with others (see Nowak and Biocca [41]). In this study, we adopted the former as a primary component of SP. Thus, "the sense of being together in a mediated perception of an environment." In the presence of proper leverage, SP can help online communications to replicate offline communications successfully.

The primary obligation of every business is to make a profit. The profit comes from purchases. This assumption holds if consumers identify value for the product, including the concept of greenness. Social presence is one of the essential concepts in computer-mediated communications (see Nowak and Biocca [41]). A study by Etemad-Sajadi [12] indicated that online real-time interactivity significantly increases the patronage intention (see Etemad-Sajadi [12]). In this study, we explore the combined path of (see Liu and Li [33], Hu et al. [20] and Nowak and Biocca [41]) into a single model to improve the understanding of the LS phenomenon as a means of sustainability marketing that improves profitability.

2.5. Social presence and sustainability purchase decision

Green consumers purchase decisions, and behavior is a primary concern of recent research. Green-lifestyle is noted to be more expensive compared to traditional lifestyle. Green purchases come in the form of green products purchasing, support for green companies, sustainable consumption practices adoption, and the possibility of spending more on green products and lifestyle (see Albayrak et al. [1]). Social Presence is one of the essential concepts in computer-mediated communications. Social presence is a widely recognized factor that influences consumer behavior in marketing and shopping. Consumers are mostly influenced by their social interactions with others when making purchase decisions (see Godes et al.[16]). It is, therefore, more accessible for consumers to interact and share experiences on sustainability and green lifestyles to engage in everyday green-purchasing practices (see Albayrak et al. [1]). Platforms that dominate marketplace-based e-commerce like Amazon and Taobao have successfully added social applications with contents to help people to connect with whom and where they usually buy. Building from the term social commerce as first coined by Yahoo in 2005 to define online places where people can share experiences, find goods and services, get advice from one another and then purchase. SP is vital in the leading factors to customers' decision to buy or not to buy (see Marsden [36]).

The evolution of technology brought along the capacity of direct and interactive communication. This evolution has provided consumers with a strong feeling of being together or being connected with the online streamers. Through the lens of mediated communication, social presence is defined as fans meeting cewebrities/streamers and learning about their daily life, and positive personal and social behaviors of other consumers (see Stever [53]). Through this interaction, fans might feel as if those cewebrities/consumers are socially present in their life. The "presence" of these individuals in customers' lives influences customers' decisions on healthy lifestyles and what to or not to buy as much as products and services are compatible with the values held by consumers (see Marsden [36]). Existing studies have argued that social presence significantly affects the individuals' intention towards purchasing social commerce (see Hassan et al. [17]). Studying social presence through the lens of self-determination theory (SDT). (see Gao et al. [14]) argues that presence influences consumers' psychological needs and satisfaction significantly. They added that beyond the psychological needs, social presents cause a positive attitudinal and behavioral change, towards online shopping markets. Thus, the following is hypothesized:

Hypothesis 1. Social presence has positive effects on sustainability purchase decisions.

2.6. Value compatibility

One earliest known use of compatibility was by (see Rogers [49]), who defined value compatibility as the level to which using innovation is seen as "consistent with the current sociocultural values, past and present experiences, beliefs, and needs of potential consumer" (see Rogers [49]) pp. 126-127. This definition uses the existence of two types of compatibility (normative or cognitive). This refers to what people feel or think about innovation. Next is practical or operational compatibility, linking compatibility with what people do. The latter part of the definition, which refers to compatibility as the needs of potential consumers, comes as an aspect of relative advantage, especially when innovation cannot be perceived as of advantage if it does not meet the needs of users' (see Moore and Benbasat [39]).

Lu & Su [35] reveal a positive impact of compatible belief on consumers' m-shopping use intention: if m-shopping fits the way they like to live and work (suggesting a lifestyle that embraces the use of smartphones, receiving or processing information anytime and anywhere), compatibility belief will positively affect the consumers' engagement with m-shopping leading to purchase behavior (Lu & Su, 2009). Similar results are presented in some studies implying that the idea of compatibility "is an interlink concept that affects m-shopping or w-shopping intention, whereby a higher degree of consistency with user's value, belief, and previous experience of a product will lead to higher degrees on influencing the consumers' intention towards m-shopping adoption (see Wong et al. [63]).

More specifically, Kleijnen et al. [30] point out that consumers' service compatibility belief affects their perception of m-channel value. More recently, consumers' compatibility perceptions express to have a positive effect on their attitude toward m-advertising and, indirectly, on re-engaging in m-purchasing (see Jiménez and San-Martín [25]). This

is why compatibility acts as an epistemic factor in determining a positive attitude since it combines parts of consumers' perception, curiosity, knowledge, experience, intentions, and coexistence within the considered technological environment. Consumers' value perception is manifold and affects customer loyalty in various ways (see Sweeney and Soutar [56]). From the perspective of online education, (see Tu and McIsaac [58]) proposed that an increasing level of presence in an online class accords learners to redefined the values of the contents. Social presence is established in literature to explain the quality of the learning experience and the values accrued from it after that (see Weidlich and Bastiaens [62]). A related study proposed that in a B2C e-Services context, social presence influences e-Loyalty, and perceived usefulness, trust, and enjoyment if the product is compatible with consumers' values. We, therefore, proposed that:

Hypothesis 2. Social presence has positive effects on value compatibility.

Kleijnen et al. [30] point out that consumers' service compatibility belief affects their perception and expected to have a positive effect on their attitude towards purchasing (see Jiménez and San-Martín [25]). This is why compatibility acts as an epistemic factor in determining a positive attitude since it combines parts of consumers' perception, curiosity, knowledge, experience, intentions, and coexistence within the considered technological environment. When consumers interact and share common values towards a healthier life, they are likely to direct discussions on sustainability efforts in advertisements, product packaging, and disposals that are compatible with their wellbeing (see Kumar and Christodoulopoulou [31]). We, therefore, proposed that:

Hypothesis 3. Value compatibility has positive effects on sustainability purchase decisions.

Hypothesis 4. Value compatibility positively mediates the effect of social presence on sustainability purchase decisions.

2.7. Interactivity and Sustainability Purchase decisions

Websites are the virtual personalities of every business. As a social clue, interactivity was explained by users' perception of connection, which is an essential issue for companies (see Wang et al. [61]). Whereas many companies rely on avatars to mimic the interaction as a human customer service representative, LS relies on the direct human-human interaction in a computer (smartphone) mediated environment. Three dimensions of interactivity are identified. a) active control (user's ability to voluntarily participate in an instrumentally influence a communication), b) two-way communication (the ability for reciprocal communication between the company and the user), and c) synchronicity (the degree to which users' input into communication and the response they receive from the conversation are simultaneous) were specified (see Liu and Shrum [34]). Synchronicity can be considered as the "real-time" interactivity, which happens in an environment such as the Taobao LS chat. When participants experience an online inspiring, involving, and fun co-creation experience, that promotes their collective wellbeing, they participate

more intensely. A study by (see Etemad-Sajadi [12]) shows that online real-time interactivity referred to in this study as "green communication" significantly increases patronage intention (see Etemad-Sajadi [12]). We, therefore, propose the following:

Hypothesis 5. Interactivity has positive effects on sustainability purchase decisions

The effects of interactivity in online marketing have well been documented in the literature. Several studies provide evidence that online interactivity significantly mitigates perceived risk, improves trust, realigns customers' values, and raises intentions to purchase (see Su and Liang [54] and van Noort et al. [59]) (Suntornpithug & Khamalah, 2010). Interactivity could lead to a flow experience, which affects consumers to perceive values to promote purchase intention (van Noort et al., 2012) see Etemad-Sajadi [12]). In online marketing, vendors tailor advertising and interactions to have a rational or emotional impact on consumers. It is argued that the higher the level of consistency with the user's value, belief, and previous experience of a product is communicated, the higher the consumers' intention towards the purchase (see Wong et al. [53]; Wu and Wang [54]). While evidence supports the directly affects interactivity has on consumers value compatibility, it with worth noting that the outcome of this relation is product purchase intention (see Etemad-Sajadi [12] and Mollen and Wilson [38]). We based on these established pieces of evidence to propose that;

Hypothesis 6. Interactivity has positive effects on consumers' value compatibility.

Hypothesis 7. Value compatibility positively mediates the effect of interactivity on sustainability purchase decisions.

2.8. Visual appeal

Appearance is vital to the success of consumer-facing. The appearance of a product carries both performance and emotional information to users and helps define the product-person relationship. Visual appeal is, therefore, a vital tool in communicating green and sustainability marketing (see Crilly et al. [6]). Visual appeal refers to the aesthetic properties of a product and can be categorized into rational and emotional appeals. "Rational" appeal also referred to us informative or logical appeal, as advertisers use them to represent rationalities for purchasing an advertised product (see Crilly et al. [6]). Advertising messages with a rational appeal stress fact, product characteristics, and tangible benefits that consumers would derive for choosing to use the advertised product in their visual displays. Rational appeals, however, emphasize the quality, efficiency, the value, or the performance of the advertised product. Due to their informative character, advertisers use rational appeals if they intend to persuade potential consumers that the product is of higher quality and environmentally sound than those from their competitors. The use of rational appeals in advertising is not appropriate for certain products, especially for those that are not that different from the products of their competitors. The selling point for such products is their emotional appeals. The current study adopts the later. Emotional elements are much more emphasized in LS, which

is significant to users' enjoyment and loyalty and sustainable living (see Cyr et al. [8]). Specifically, visual appeal is operationalized in the current study as the extent to which images of products (mostly on the websites) are perceived as satisfying, appropriate and fit to user expectations, and interest Using visual appeals, advertisers wish to create specific emotional associations in the consumer's mind towards the product, replacing a unique selling proposition with a unique emotional proposition. Visual appeals target social, cultural, environmental, and psychological needs of consumers. In this way, they are trying to cause positive or negative emotions that could result in purchasing (Erci et al.[11]). Advertisers use visuals of real-life outcomes and instantaneous effects of products to appeal to consumers' emotions in LS. In B2C and C2C LS, beyond the products, the hosts also use the spread of sustainable buying and consuming behavior, including product reuse and disposal (see Samar and Samreen [50]). This led to the hypothesis that;

Hypothesis 8. When moderated by visual appeal, social presence has a positive relationship on value compatibility.

Hypothesis 9. When moderated by visual appeal, interactivity has a positive relationship on value compatibility.

2.9. The conceptual framework

It is crucial to recognize the growing interest in sustainable marketing through systematically embedding sustainability strategies from new product development into consumption. In this study, we built a conceptual framework shown in Figure 1 that connects the attributes of social presence and interactivity to explain consumers' sustainability purchase decisions. We also introduced a new variable (value compatibility) mediating social presence and interactivity, an explanation of sustainability purchase decisions. It is necessary to pay attention to purchase and profit-making in sustainability marketing
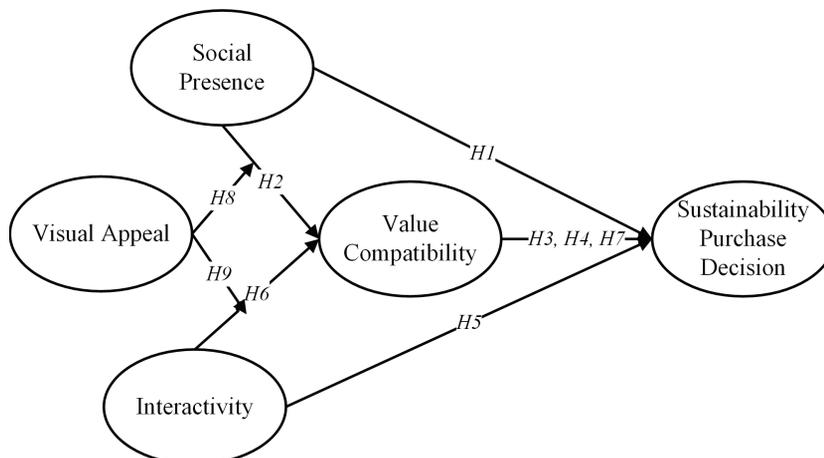

Figure 1: Research Framework.

because businesses will be more willing to adopt and sustain sustainability concepts if they can remain profitable, competitive, and remain in business.

3. Materials and Methods

3.1. Data description

We gathered a total of 498 datasets from Taobao (273) and JD (225) mobile LS platforms. Data were collected between the hours of 20:00 to 22:00 (+8GMT) noted as the prime time in January, April, and July covering Winter, Spring, and Summer. Taobao and JD are few adopters of LS for product experience that adopted LS. It is on record that more than 150 thousand live-broadcasters stream-live on Taobao (see iiMedia Research Group [22]). Half of the viewers are also said to be post-90s borns. An indication of the involvement of a youthful generation in green and sustainable lifestyles. The live broadcast industry is mainly maternal and child, beauty, food, sports, and fitness. More than 1,000 cewebrities have used Taobao LS to broadcast live shows and do e-commerce. Each night from 20:00 to 22:00 (primetime), is not only the most active time to watch the live broadcast but also the time when users are most willing to place
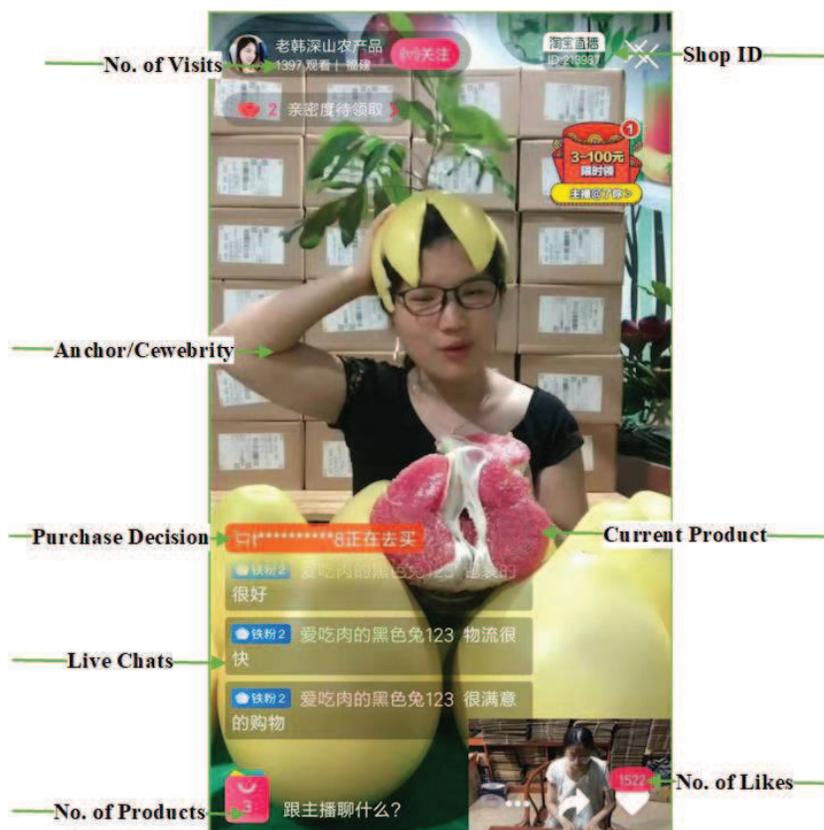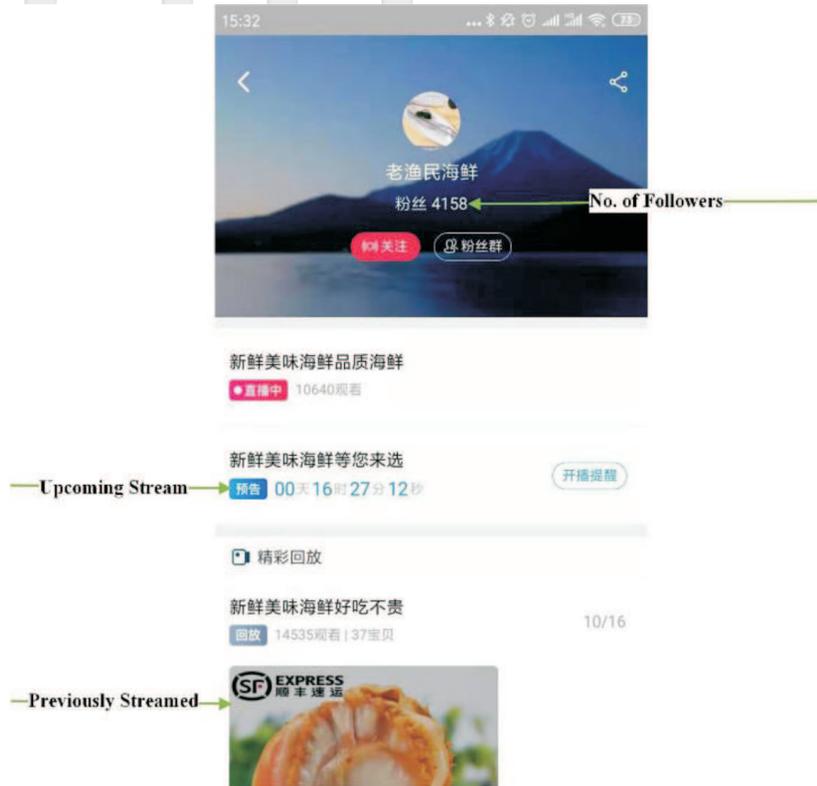

Figure 2: Customer Interactive Interface.

Figure 3: Stream-Record Interface.

an order. To validate our findings and for generalization, we further collected data from a similar B2C/C2C LS platform known as JingDong (JD) with the same time frame (prime time) following all the rules applied to the initial data gathered from Taobao LS platform. JingDong is the third largest B2C/C2C Internet Company worldwide and the leading B2C/C2C online retailer in China (see Globe Newswire [15], and Ji-Yue [24]).

The Taobao and JD LS currently run only as a mobile application and have two basic front-end interfaces. The customer interactive interface (CII) and the Stream-Record Interface (SRI). The CII shown in Figure 2 comprises the video streaming window, with the Cewebrity/streamer, Shop Name, Shop ID, Number of Visits, Viewer likes, Live Chats, Purchase decisions, Number of products, and a temporary display of current item's prize. The SRI in Figure 3 shows the number of followers, the upcoming streaming, and the previously recorded videos. Platform heterogeneity exists between the selected LS platforms (Taobao and JD) besides the display arrangements, JD has an additional feature (Virtual gifts), which was not considered in our work since it differs from the Taobao platform. We defined our product categories based on the pre-defined categorization of platforms.

3.2. Empirical models

We specified a linear regression to test the proposed hypothesis and the Sobel test to validate the mediating effect value compatibility. We proposed two models that test followers and purchase decisions as in equation 1 and 2:

$$
\begin{aligned}
\text{Log(NumberofFollows)}_{ij} =& \lambda_0 + \beta_1 \cdot \text{Log(Visits)}_i + \beta_2 \cdot \text{Log(Chats)}_{ij} \\
& + \beta_3 \cdot \text{Log(Visits)}_{ij} \times \text{Log(Likes)}_i \\
& + \beta_4 \cdot \text{Log(Chats)}_{ij} \times \text{Log(Likes)}_i + \beta_5 \cdot \sum_{j=1}^{2} x_j + \varepsilon_{ij} \quad (3.1)
\end{aligned}
$$

$$
\begin{aligned}
\text{Log(SustainabilityPurchaseDecision)}_{ij} =& \lambda_0 + \beta_1 \cdot \text{Log(Visits)}_i + \beta_2 \cdot \text{Log(Chats)}_{ij} \\
& + \beta_3 \cdot \text{Log(NumberofFollowers)}_{ij} \\
& + \beta_4 \cdot \sum_{j=1}^{2} x_j + \varepsilon_{ij} \quad (3.2)
\end{aligned}
$$

Where λ_0 and β_i are the models' coefficients, ε_{ij} represents the error term whiles x_j represents the control variables (Product category, products, and Time (t)). We defined two actors (the customer (i) and streamer/Cewebrity (j). The independent variable ($NumberofFollowers$)$_{ij}$ in equation (3.1) denotes the number of followers from user (i) that defined products from streamer (j) as compatible with their values, also referred to in this study as Value compatibility. In equation (3.2), the dependent variable (SustainabilityPurchaseDecision)$_{ij}$ denotes the number of users (i) who purchase or intend to purchase products from streamer (j) within study Time(t). To avoid data misrepresentations, the dependent variables in this study were specified in logarithmic form as the data were skewed, typical in continuous, and community behavior dataset (see Feng et al. [13]). The effects of Time (t) is, however, not included in the analysis since each observation was controlled within 60 minutes of data collection time (t). Thus, $t = 1$. All the hypotheses were tested using the "lm" function ("mlm" parameter) in the R language.

To test how social presence characteristics affect sustainability purchase decision (H1 and H4), we used two independent variables (NumberofFollowers)$_{ij}$ and Log(Visits)$_j$ in Time (t). (NumberofFollers)$_{ij}$ indicates the number of users who defined their values with the streamer and products or services from the streamer in equation (1). Whereas shares, retweets, and likes indicate that people find value in an individual post, a follower expresses interest in receiving constant updates. A follower indicates a higher level of engagement with the audience, giving it more value than other engagement metrics [3]).

Similarly, in investigating how the characteristics of interactivity affect sustainability purchase decisions (H5 and H7), we included two independent variables (Chats)$_{ij}$ as well as (NumberofFollers)$_{ij}$. The number of (Chats)$_{ij}$ indicates the live chat count as the interaction between the customer (i) and streamer/cewebrity (j) within Time (t). The mediating effect of visual appeal (H8 and H9), was computed by including the number

of (Likes)$_i$ in Time (t). Visual appeal was previously measured by subjective ratings (number of likes) and objective measurements, including eye-tracking (see Djamasbi et al. [10]). Eye-tracking, in particular, measures shoppers like and dislike for products. Consumers turn to "like" purchase and recommend products and websites that receive higher visual appeal rating. A similar study on the influences of visual appeal vs. usability indicates that visual appeal influences a website's first impressions. Mainly, users give high usability and interest ratings and like to sites with a high appeal (see Phillips and Chaparro [46]).

To smooth large values, we specified our variables in terms of logarithmic functions (see Feng et al. [13]). Since they were all none zero positive integers, we did not have to normalize these logarithms by adding one.

We equally included some control variables in our model as evidence from the literature. Specifically, we included (ProductCategory)$_j$ based on the pre-product categorization done by the Taobao e-commerce platform. The number of (Product)$_j$ available in the streaming catalog of each streamer or anchor (j). Data used in this study were collected between the hours of 20:00 to 22:00 local time (+8GMT) noted as the most active streaming period, known as the prime time.

4. Results

A total of 492 valid observations from Taobao LS was collected during the prime streaming period. As shown in Table 1, we report the descriptive statistics of the key variables including number of visits (Mean = 1121.97, SD = 29266.97), number of chats (Mean = 55.37, SD = 60.56), number of followers (Mean = 59.37, SD = 89.93), likes (Mean = 1609.60, SD = 2960.56), number of product category (Mean = 2.46, SD = 1.87), number of products (Mean = 43.54, SD = 29.32), number of purchase decisions (Mean = 27.02, SD = 29.28), all of which also suggest a significant variance in the variables used.

We specified a linear regression and conducted nine models to test the proposed hypothesis and a Sobel test to validate the mediating effect the mediators, namely value

Table 1: Descriptive statistics of the variables.

Variable	Description	Range	Mean	SD
Visits$_i$	The number of viewers in t	0-30409	1121.97	2926.97
Chats$_{ij}$	The number of live chats t	1-316	55.37	60.56
Number of followers$_{ij}$	The number of followers in t	0-855	59.37	89.93
Likes$_i$	The number of likes clicks in t	10-26273	1609.60	2960.56
SustainabilityPurc.Dec.$_{ij}$	The number of purchases in t	1-167	27.02	29.28
Product category$_j$	The product types	1-7	2.46	1.87
Products$_j$	The number of products	1-172	43.54	29.32

compatibility. As seen in Table 2, we first and foremost tested the influence of the control variables in model 1, including product category ($\beta = 0.067$, p not significant) and the number of products ($\beta = 0.453$, $p < 0.001$), on the dependent variables (followers), and only 6.1% variance is explained. In model 2, the number of visits ($\beta = 0.355$, $p < 0.001$) are put into the model, and 25.2% variance is explained, supporting H2. The number of chats ($\beta = 0.265$, $p < 0.001$) supported H6. The combined interaction of the number of chats ($\beta = 0.265$, $p < 0.001$) and the number of visits ($\beta = 0.285$, $p < 0.001$) in model 3, is also significant, which explain 27.0% variance which reinforces the supported of H6. In model 4, we add the interactive term of number-of-visits and number of likes ($\beta = 0.034$, $p < 0.001$), of which 29.4% variance are explained, and supported H8 and. However, when we add the interaction effects of number-of-chats and the number of likes ($\beta = 0.044$, p not significant) in model 5, significantly, no increment of variance was found and equally did not support H9. We also found no threats of multicollinearity between the variables (mean VIF = 1.441).

Table 2: Results of hypotheses testing.

Dependent variable: Log (Followers)	Model 1	Model 2	Model 3	Model 4	Model 5
Product category	0.067	-0.058	0.006	0.006	0.008
No. of products	0.453***	0.254**	0.247**	0.271***	0.272***
No. of visits		0.355***	0.285***	-0.006	0.162
No. of chats			0.265***	0.192*	-0.113
No. of visits*No. of likes				0.034***	0.009
No. of chats* No. of likes					0.044
Constant	1.629***	0.472	-0.114	0.396	0.463
R2	0.069	0.261	0.282	0.309	0.311
Adjusted R2	0.061	0.252	0.270	0.294	0.294
Results		H2 Supported	H6 Supported	H8 Supported	H9 Not Supported

Notes: The dependent variable is Log (Follower). $***p < 0.01$, $**p < 0.05$.

The rest of the hypotheses were tested in model 6 to model 9, as shown in Table 3. The impact of the control variables, including product category ($\beta = 0.061$, p not significant) and number-of-products ($\beta = 0.395$, $p < 0.001$) on the dependent variable (Sustainability purchase decision), are examined in model 6, and only 6.9% variance are explained. The number of visits ($\beta = 0.371$, $p < 0.001$), was entered in model 7, explained 38.2% variance, supporting H1. Similarly, the number of chats ($\beta = 0.254$, $p < 0.001$) in model 8, led to a 40.8% variance supporting H5 and H7. Finally, in model 9, a strong effect from number-of-follows ($\beta = 0.448$, $p < 0.001$) are verified, and supported H3 and H4, explaining 61.9% of the variance in the Sustainability purchase decision. No threat of multicollinearity between variables existed (mean VIF = 1.355). To further test the mediating effect, we conduct the Sobel test presented in Table 4.

Table 3: Results of hypotheses testing.

Dependent variable: Log(SustainabilityPurchaseDecision)$_{ij}$	Model 6	Model 7	Model 8	Model 8
Product category	0.061	-0.067	-0.005	0.006
Number of products	0.395***	0.193***	0.185***	0.072
Number of visits		0.371***	0.305***	0.177***
Number of chats			0.254***	0.134**
Number of followers				0.448***
Constant	1.283***	0.049	-0.511	-0.447
R2	0.077	0.389	0.418	0.627
Adjusted R2	0.069	0.382	0.408	0.619
Results		H1 Supported	H5 Supported	H3 Supported

Notes: The dependent variable is Log (Sustainability purchase decision) $***p < 0.01, **p < 0.05$.

To further test whether value compatibility plays a mediating role in the model, we conduct mediation analysis by adopting the Sobel test. We found a strongly and significantly mediating effect of value compatibility between social presence and Sustainability purchase decisions and also between interactivity and Sustainability purchase decisions. Meanwhile, a relatively weak yet significantly mediating effect of value compatibility existed between the interaction of social presence and visual appeal as well as between value compatibility and Sustainability purchase decision. Similarly, the interaction between interactivity and visual appeal, as well as between value compatibility and Sustainability purchase decision, is also verified. The results of mediating analysis offer more powerful supports for our hypotheses, as shown in Table 4.

Table 4: Mediating effect of value compatibility.

Mediation Path	Coefficient	SE	z-value	p
Social presence → Value compatibility → Sustainability purchase decision	0.176	0.025	6.908	< 0.001
Interactivity → Value compatibility → Sustainability purchase decision	0.318	0.054	5.849	< 0.001
Social presence*Visual Appeal → Value compatibility → Sustainability purchase decision	0.017	0.002	7.177	< 0.001
Interactivity*Visual Appeal → Value compatibility → Sustainability purchase decision	0.032	0.005	6.911	< 0.001

5. Discussion

We introduced a new set of social antecedent factors "value compatibility" into a model that explains consumers' willingness to engage in sustainability purchasing in online LS marketplaces. In general terms, we have established that the number of visits, likes, live chats, and the number of followers are all significant determinants of willingness to purchase. In line with Etemad-Sajadi [12] though he focused on avatars, we found out that humanizing websites through positive social relationships, increasing real-time interactivity (chats) and "green messages" with value addition to consumers can offer solutions to achieve increased sustainability purchase decisions thus, supported our H2 and H7 (see Etemad-Sajadi [12]). As indicated in Tables 3 and 6, the result emphasizes the role of followers (social presence) in improving the behavior of sustainability purchase decisions. The findings are in support of similar results, which implies that the idea of compatibility (H3 and H4) is a concept that leads to higher degrees in influencing the consumers' intention towards purchasing. Consumers' compatibility perceptions have a positive effect on their attitude toward shopping (see Jiménez and San-Martín [25] and Wong et al.[63]). Kleijnen et al. [30] point out that consumers' value compatibility belief affects their perception and an expected positive effect on their attitude towards purchasing (see Jiménez and San-Martín [25]).

Also, we drew inspiration from an existing study postulating that social presence is vital in the leading factors to customers' decision to buy or not to buy (see Marsden [36]). From Tables 4, and in support of H1 and H2, we used live activities from the Taobao and JD LS m-shopping pages to conclude that the higher the feeling of social presence is, the higher the chances of product purchase. The "presence" of other consumers and cewebrities in customers' lives influences customers' decisions on healthy lifestyles and what to or not to buy (see Marsden [36]). It is, therefore, important to emphasize the importance of the concept of "intimacy;" and "immediacy" in a computer-mediated environment.

The appearance of a product carries both performance and emotional information to users and helps define the product-person relationship. Visual appeal is, therefore, a vital tool in communicating green and sustainability marketing (see Crilly et al. [6]). We finally hypothesized that in the presence of visual appeal, social presence, and interactivity leads to VC, and that results in an increase in purchase decisions. It is established that items that are more visually salient (Visual appeal) lead to automatic attention. Similarly, some other studies proposed that when preferences were weak, consumers are more influenced by the visual features of the stimuli (Milosavljevic et al. [37]). They added that when brands were relatively similar, consumers ended up choosing items that were visually prominent at least 40% of the time, even when these choices were inconsistent with prior preferences supporting our H8 and H9.

Sustainability is a way of maximizing the general wellbeing of all within a level that puts less stress on the Earth's environmental resources and does not put the current and future generations at risk. Marketing is the core of solving issues of maximizing the wellbeing of people with appropriate resources. Because at the center of modern

market-based economics, marketing shapes the amount and type of resources organizations exploit, for what end and for whom (see Hurth et al. [21]).

The current research made critical theoretical contributions to the existing LS and sustainability literature. First, to the best of our knowledge, this is the first study to explore LS behavior as a form of sustainability marketing and linking this to profitability. We make initial but significant efforts in extending the social presence theory in studying LS and market sustainability in e-commerce devoid of the usual social and entertainment paradigms in which LS has been considered over the years.

We advance this knowledge base by empirically identify variables that explain how the characteristics of LS affect sustainability purchase decisions. This study provides useful knowledge for our initial understanding of the factors leading to buying intentions in the online marketplace and how the ambiguity of promoting sustainability marketing and the company's profitability is handled. Although the variables we identified in this study may not be exhaustive enough, they shed valuable insight into what motivates costumers engaging in green marketing to purchase and live a more sustainable lifestyle. Although the theories highlighted in this study have been widely applied in many areas of literature, it is entirely new to use these theories to investigate buying behavior in the LS marketplace in line with sustainability marketing.

Finally, previous studies argue that value compatibility belief will positively affect customers' engagement (see Wong et al. [63] and Wu and Wang [64]). In this study, we extended this line of research and revealed that value-compactivity could develop a positive attitude through the combination of perception, curiosity, knowledge, coexistence in a green-technology-mediated environment. This leads to loyalty (see Sweeney and Soutar [56]) and increases sustainability purchase decisions. Hence, the finding of this study provides one viable explanation that value compatibility beliefs lead to sustainability purchase decisions. We acknowledged that advertising is at the forefront of sustainability marketing by promoting environmentally friendly business approaches, and informing customers, stakeholders, and regulators of the company's direction on environment protection and consumer involvement in green-based marketing.

6. Conclusions

LS platforms have increasingly become a widely used marketing channel, not only reducing the human and vehicular traffic that patronizes brick and wall shops but by creating a community of people who share in and learn life-changing ways from other consumers and cewebrities. LS in B2C and C2C digital marketing will not only enhance green adverting and marketing but will create a community of consumers who share sustainable lifestyles and make sustainable purchase decisions that contribute to promoting global sustainability through social presence.

In sum, this study sheds implicit light on LS commerce research in sustainability marketing leading to sustainability purchase decisions. This is important to businesses in adopting sustainability concepts, knowing they can remain profitable, competitive, and remain in business.

Despite making the initial and significant contribution to the LS and market sustainability research, the data was from LS observations, thus limit our ability to study the psychological understanding of the buying decisions. Future studies should expand data collection to gathering information directly from users. Secondly, it is essential to consider variations in purchase on specific days and lags (weekend, holidays, festivities, like 11.11, Christmas, and Valentine) to make a more general conclusion. Besides Taobao and JD, other C2C, B2C, and B2B platforms adopting LS are worth studying. Even though the results of our work are consistent with the findings of several past research, we recommend that future studies increase the variety of sample platforms to improve the diversity of the sample.

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