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TABLE OF CONTENTS

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CUSTOMER PERCEPTION AND PREFERENCE ON PRODUCT PACKAGING

Sheng Chung Lo
Department of Travel Management
Hsing Wu University, Taiwan, R.O.C.

Jane Tung
Department of Marketing and Distribution Management
Hsing Wu University, Taiwan, R.O.C.

*Kai-Ping Huang
Department of Business Administration
Fu Jen Catholic University, Taiwan, R.O.C.
*Corresponding author: 129741@mail.fju.edu.tw

Abstract

The significance of product packaging as a medium for communicating crucial product information is evident. Buyers base major purchasing decisions on the basis of their perceptions of the underlying product, which are primarily shaped by several features of the packaging. The physical appearance of the package affects consumers' attitudes concerning a product and may even prompt consumption. Research shows that that packaging features, such as font, colors, size, completeness, shape, the use of metaphors, packaging imperfections, and so forth, affect the perceptions and preferences of consumers.

There is a tendency for buyers to form opinions of various products, such as food, depending on their understanding of the different designs and graphics on the packaging that capture their attention. These perceptions have a significant on consumer buying behavior at the purchasing point. In addition, packaging helps firms in making positioning decisions because buyers associate aspects such as color and logo position with class and power. Numerous studies posit that packaging is currently a five-minute advertising technique due to its considerable power to sway users. These findings present both opportunities and threats for both the management and marketing professionals. While they may

take advantage of aspects that promote positioning and consumption, other aspects, such as customer knowledge and ambiguity of vectors used in packages may negatively impact on an organization. This paper outlines a review of the literature on various studies conducted on the effect of packaging on perceptions and preferences.

Keywords: Customer perception, customer preference, product packaging, marketing

Introduction

The benefits of a product to the consumers are well communicated through the packaging method. Research shows that consumers judge the values of the product based on the uniqueness of the packaging and are eager to experiment products that are well packaged. The packaging also builds a strong relationship between consumers and the brand. Another aspect is that most manufacturers place their logos on the top of the product packaging, which is mostly above the image of the product. This is to ensure that as consumers read the brand name, they are able to see the logo of the company that manufactured the product. This has an effect on consumer perception on the value of the company's products and can be a good of marketing the other products produced by the company.

Companies spend close to 40% of the selling price of a product in ensuring that it has a good packaging (Argo & White, 2012; Gómez et al., 2015). A significantly large amount is spent on building a design that is used to communicate about the organization and build a brand identity. In a research conducted by Proctor and Gamble consumers spend a few seconds on the shop shelves evaluating the products based on the packaging before they purchase it. Proctor and Gamble further reveal that it spends enough resources in ensuring that the products are packaged in such a way that they influence the buying habits of consumers and they can be tempted to purchase the company products almost instantly. Studies show that there is a need for effective communication on the brand since the market for good is saturated.

Manufacturers and consumers claim that they are faced with challenges when it comes to communication of the products and ensuring that the packaging of products remains appealing. Well, packaged products are able to maintain the brand power and such products are the leading in the market for similar products. This paper seeks to evaluate the relationship between packaging, perception and consumer buying habits.

Literature Review

Product Packaging and Customer Perception

Consumers have different perceptions on the value of the products based

on the packaging. In a study reviewed by Aday and Yener (2014) in Turkey, the factors that influence consumer behavior of the youth were highlighted. A study consisted of 324 participants who were required to answer a questionnaire of 31 questions. An analysis of the responses revealed that consumers are highly attracted by products that are packaged in glass material due to their transparent and healthy nature. On the other hand plastic and paperboard packaging were preferred since they are easy to use and the packaging can be reused. Consumers also checked the information the label but they claimed that it was not easy to understand. Other things that they looked at were the manufacture date, the date of expiry and ingredients. During the study, it was also noted that female consumers focused on the fat content of food products while the male consumers were concerned with the protein content.

Ampuero and Vila (2006) investigated the role of packaging on customers' perceptions so as to design packaging that achieves the preferred product positioning. Positioning is a relative and subjective concept that only exists in consumers' minds with regards to the readily available products. Defining a positioning strategy is critical to the success and growth of an organization. Packaging plays a central role in forming perceptions about a product, and ultimately it's positioning, by transmitting distinct tangible codes (Merwe et al., 2013). The position reflects an organization's need to realize a particular position in the minds of buyers. According to Ampuero and Vila (2006), a product's positioning induces its marketing mix, including pricing policy, promotion, place, and products. With the increase in the number of competing products, packaging provides a form of identity and differentiation, which are particularly important in an increasingly competitive market.

The authors assert that packaging may be a product characteristic or property or an extrinsic attribute that is related to the product but is not part of the tangible product itself. The management conducts market research concerning the graphic and structural design, as well the optimum size of the packaging in order to determine the positioning strategy. Being the first thing that buyers see before making purchasing decisions, packaging plays a central role in influencing consumers. It informs customers of the potential value to be derived from consuming a particular product. After conducting a study on the effects of packaging on consumer perceptions of a product, Ampuero and Vila (2006) found that goods meant for the upper classes, highly priced and aesthetically refined and elegant need dark and cold colors for their packaging. On the other hand, easily accessible goods directed towards price sensitive consumers make use of light-colored packaging, mainly white. The study also found patriotic products and those that are safe and guaranteed to be associated with red. The authors also found strong relationships between packaging typographies, such as font

styles and sizes, graphic forms, and packaging illustrations.

Ilyuk and Block (2016) concurred with the views of Ampuero and Vila (2006), that product packaging plays a noteworthy role in forming consumers' perception of the efficacy of a product. The authors argue that efficacy-related perceptions have a direct impact on product adherence, particularly in pharmaceutical and food and beverage industries. Additionally, consumers' perception and actual experiences of products are skewed by factors that have little to do with the product's real efficacy. Subsequently, packaging has profound effects on numerous consumer responses, such as product inferences, choice, attention, brand impressions, willingness to pay, purchase intentions, and consumption. Theoretical frameworks support the notion that a product's packaging size is directly related to its consumption quantity for various reasons. Firstly, the increase in available resources may compel people to consume more as per their consumption quotas. Secondly, consumers perceive large products to be less expensive than small ones, which reduce the replacement costs. Finally, products with larger packages are inferred to have lower costs per unit.

Ilyuk and Block (2016) pointed another interesting dimension to the debate. They argue that products that come in a single-serving package create a sense of completion and closure that is more psychological, the perception that an experience is complete, which then induces a sense of product efficacy. This view is considerably similar to that of Ampuero and Vila (2006), in that perceptions and experiences of efficacy are exceedingly malleable and are habitually affected by the marketer, product, and consumer-related issues that have very little to do with the actual efficacy.

According to Jerzyk (2016), packaging has become a contemporary tool for integrated marketing and the most influential promotional tools at the point of sale. It helps consumers to evade the communication noise from numerous promotions and products on display in the shop. By displaying different combinations of product elements, such as the price, quality, contents, and size, packaging helps in making a product noticeable as well communicating the potential advantages. Subsequently, consumers form a notion concerning a product depending on their evaluation of the information portrayed by the package. For instance, an eco-friendly package is assumed to emphasize a product's naturalness and respect to the principles of sustainability.

After conducting a survey, Jerzyk (2016) found that sustainable packaging was not a primary determinant in purchasing decisions. These findings assert the shrewd role of packaging in the formation of consumer choices. Consumers also expressed concerns that they would be swayed to purchasing a different product of they trusted and had confidence in the messages displayed on the packaging, such as the economical use

of packaging materials, recycling, and customers' health and safety. The authors concluded that people buy goods whose packaging reflects their personal characters and beliefs, such as environmental protection, health, and safety, as opposed to marketing messages.

Ordabayeva and Chandon (2013) outlined the results of three laboratory experiments into the ways in which consumers predict changes in product dimensions. The authors argue that buyers often underestimate the changes in product sizes, particularly if such changes occur in multiple dimensions and directions. These miscalculations occur because individuals combine these changes incorrectly and not because they do not notice the changes. Surprisingly, this error does not improve even after notifying customers of their visual biases, informing them of product dimensions, or altering the package's length and height. This research has considerable implications on consumers' preferences and buying behavior going by Ilyuk and Block's (2016) contention about consumer's perception and product sizes.

Sevilla and Kahn (2014) provided more evidence that individual perceptions and buying decisions are heavily influenced by faulty consumption norms or poor heuristic processing as stated by Ordabayeva and Chandon (2013). The authors argued that people use features of a product's or containers physical shape to draw conclusions concerning preferences and quantity to consume. Accordingly, people tend to overestimate the size of a product because their perceptions are anchored on the primary or most elongated dimensions and fail to adequately compensate for smaller secondary changes. However, Sevilla and Kahn (2014) argued that some sense of completeness in a product's shape can alter individuals' perceptions, choices, and consumption. In most instances, consumers assume that a complete unit may contain more contents than an incomplete one and fail to consider the actual sizes of the items (Celhay & Trinquecoste, 2015). The authors defined completeness as the appearance of a full unit of a product.

Sevilla and Kahn (2014) echoed Ilyuk's and Block's (2016) claims that people desire completeness and the feeling that an experience is finished, failure to which, they feel psychologically unresolved. In addition, research has found that individuals prefer phenomena that appear complete and denote prototypicality and unity. The authors posit that consumers perceive a completely shaped item to contain more quantity and are, therefore, inclined to buy it over an incompletely shaped product. However, in instances where they have to consume more than one unit, the consumption of incomplete items will be higher than that of complete products. The study found that with a constant product size, individuals consider complete products to have a higher quantity than incompletely shaped items. Consistent with previous studies on the numerosity heuristic, this research also found that consumers, to a great extent, rely on the number of units

into which a product is divided while ignoring other essential facets.

Sirieix et al. (2013) conducted a study to investigate the impact of product labels on consumers' perceptions. The research found that the availability of numerous labels for food products is not a necessary requirement for adding value for customers. Further, the study found that buyers of sustainable food products make rational decisions and will only buy them if they believe that the potential benefits exceed costs. In addition, consumers of food products make consumption decisions based on habits. This implies that the presence of a sustainable label may not necessary induce consumption merely due to its seemingly sustainable content, but because of its ease of availability. Sirieix et al. (2013) concluded that there is a need for some degree of fit, either between product labels or between a label and its brand. The article argues that some label combinations can augment their collective value while other blends can detract from the intended value, but propose further studies on this issue.

Strategic logo placement is also another aspect that can impact on consumers' perception of a product, as posted by Sundar and Noseworthy (2014). According to the research, buyers have a stronger inclination towards powerful brands whose logos are placed higher on the packaging than when it is placed lower. On the other hand, the authors argue that less powerful brands seem more attractive when the logo is placed in a low position. This shift in preference is attributed to a fluency effect in which buyers intuitively associate power with height because brands have distinct identities and emanate power. In products with low market command, the spatial placement of the product within an advertisement can reinforce its image as either a leader or a friend, thereby boosting its evaluations. Similarly, the placement of a product's image on the packaging favors only those items in which heaviness is a desirable feature. Sundar and Noseworthy (2014) confirmed the arguments proposed by Jerzyk (2016) that buyers make decisions concerning what they want to be as opposed to who they are at the moment, and will, therefore, not buy goods simply for what they can do, but also for their implied stand or meaning. Finally, the authors argue that the relationship between power and height may be dependent on the buyers' state of authority, which, in turn, depends on aspects such as premium pricing, lock-in contracts, and the lack of alternatives.

Product packaging remains a crucial means of communicating both brand and product benefits. While visual metaphors may be particularly effective in this context, the situations under which they perform best are not clearly understood (van Rampay & Veltkamp, 2014; van Rampay et al., 2012). By virtue of their figurativeness and artfulness, visual metaphors draw on imaginative procedures and induce imagery and are, therefore, more suited for making communi-

cation more effective, vivid, exciting, and imaginative.

van Rampay and Veltkamp (2014) investigated the impacts of the use of metaphors and explanatory information on perceptions of brand personality and consumer appreciation. The use of metaphors becomes more effective when the semantic distance between the source and target domains is small and vice versa. While metaphors may induce feelings of excitement when used in advertisements and packages, it may also make brands appear deceptive because these figures are literary fallacious and inconclusive because of the potential for multiple interpretations. Marketers, therefore, may have to include explanatory information on their packages to ensure that the intended message is delivered. The authors assert that the use of incomplete information is often more effective than clear information that explicitly explains the metaphor because it leaves room for consumer elaboration.

The study found that drawing attention to product packaging for products with ambiguous metaphors is effective at increasing consumer appreciation for individuals with low metaphor processing abilities while a visual packaging prompt increases brand excitement. The authors conclude that metaphors should leave room for elaboration and metaphor resolution by leaving room for consumer evaluation, drawing attention to the package, and using explanatory information.

Product Packaging And Consumer Buying Behavior

In the current competitive market, the most crucial thing is understanding consumer buying behavior. According to Aday & Yener (2014), one of the major factors that affect consumer-buying behavior besides quality and income are packaging. Product acceptability in the market is also dependent on the information shared on the packages. Important packaging elements include visual attributes such as color, logo, images, shape and design and their sole purpose is to influence consumer decision making. Informative elements include user instructions, labels, segmentation and cultural context. A study by Aday & Yener (2014) also pointed that expensive products should have dark packages that contain expanded roman bold writing whereas low priced and reasonably priced goods should have light-colored packaging. Additionally, companies use curves, horizontal lines and curves to illustrate products that are used by middle-class people since they are not selective. At any given time, color, graphics, and shape of packaging affect the decision-making process of consumers before they purchase products. In order to increase the retail market, packaging materials, color, logo, instructions and print fonts should be taken into consideration (White et al., 2016; Wilkins et al., 2016). In a study on consumer buying habits, the respondents said that labels that attract them are those that contain information such fat content, vitamins, minerals and calories since they do

not create confusion in the mind of users. This shows that consumer has a clear understanding of the health benefits of products based on the labels. Visual elements are therefore useful for the consumer final decision making (Aday & Yener, 2014).

In another research on the reasons why consumers eat more, Argo and White (2012) noted that there is a close connecting between the rising levels of obesity in the United States and product packaging. In an effort to reduce calories intake, companies were advised to reduce the size of packaging for snacks. However, the turnover of events was that people consumed more of the smaller packages since they are affordable. Another thing is that consumers believe that if they purchase the smaller packages, they will consume fewer calories as opposed to if the packaging is used. There is a higher possibility that consumers are likely to consume many smaller packages compared to a large package, which can result to higher sales in the small packages. Consumer dependency on smaller packages results to increased consumption since they do not rely on self-regulatory measures (Argo & White, 2012). The packaging acts as a control measure and people use it as a substitute for self-control. The results of this measure are that people are likely to consume multiple small packets of a product rather than when they are presented with one large packet. The assumption that taking small packets is effective in weight control than taking a large packet is only effective if an individual takes one small packet.

Manufacturers use this perception by packaging several small packets in one large box and this makes consumers eat many small packets and purchase more. According to studies by Argo and White (2012), manufacturers need to conduct further research to determine whether there is a connection between the packaging size and the location where the products are sold since consumers could be buying products due to their easy accessibility. Further research shows that smaller packages fail in their role for controlling obesity, which creates a burden on the economy due to the rising cases of obesity.

Research by Gómez et al. (2015) shows that packaging has technical and attributes to the passing of information from the manufacturers to consumers. The packaging also brings about loyalty since consumers associate it with a particular brand. Packaging is not only a way of knowing about a product or making it attractive but also defines its quality. The relevance of packaging has been created in self-service stalls since in most cases; consumers will always pick the best-packaged product. The role of packaging is also to ensure that there is product differentiation and makes it favorable in comparison to the competitors thus creating a brand identity (Gómez et al., 2015). Another important attribute is that packaging shows the value added on products especially if they require immediate consumption. The existence of a

brand is communicated through its packaging and attracts the attention of buyers.

Consumer decision-making process which consists of five stages that include identification of the problem, information searching, and evaluation of available alternatives final decision on the product to buy is influenced by packaging. Therefore, packaging can be viewed as a tool that is used to attract new customers and to retain the old ones. In sales and marketing, packaging can be viewed as a sales person who influences the buying habits of consumers though attractive colors and messages.

An important element to note about the packaging is that as much as it motivates purchases, it can discourage people from buying products. Packaging can also discourage consumers on brand loyalty. In most cases, customers will buy a product based on the information that they find on the packages since it creates satisfaction (Ilyuk & Block, 2016). However, if the benefits outlined in the package are not real, it can destroy brand loyalty. There are a number of studies on the influence of packaging on consumer buying habits such as packaging satisfaction model that is based attractive quality theory. The aim of the theory is to explain the relationship between quality and customer satisfaction and is currently applied widely. The theory further explains that further details on the products such as information location, codes and symbols are also important in creating brand loyalty (Ilyuk & Block, 2016). When taking into account the influence of packaging on different decision-making stages, it is important to take into account that most manufacturers focus on one attribute of packaging and is color and attractiveness the product. They forget that other aspects such as additional information about the products are also useful. From the managers' point of view, in order to ensure that packaging functions effectively, there have to be graphic and structural designs and the pack should be of optimum size. Therefore, there is no doubt that packaging is a core element in the decision making of the marketing mix. From the consumer's point of view, packaging plays an important role of attracting purchases since it the first thing they see before making buying decisions. According to research by Ilyuk & Block (2016) self-service in the current stalls has changed the nature of informing customers and has led to packaging becoming on the major methods of advertising.

There have been developments of new technologies in product packaging whereby companies are coming up with methods that are customer centered (Hakola, 2013). It is not enough for companies to come up with new methods but rather they should ensure that they understand whether the new technologies add value to them. The technologies sometimes become unsuccessful especially if the companies do not understand the value of such technologies. It is also important for the parties involved to understand the value of the new technologies before they implement them. In the current business environment, there have

been significant changes in consumer buying habit due to globalization, which has strengthened consumer bargaining power. Hakola (2013) also noted that there are times when the launches are unsuccessful especially when the companies are not client centered. Since packaging has a central position in the market, businesses should focus on value creation for their packaging methods. Therefore, marketing should put more focus on ensuring that there is value creation instead of value distribution. In the case of the business-to-business market, the crucial aspect of business management values and this can also be applied in consumer markets since it helps in retention of customers and building ensuring that there is a competitive advantage.

Printed on the product package, the brand name is an essential part of in the company's investment. It is important to know that no matter how good the company's products are, they cannot attract a large number of consumers if they do not have an appealing brand name (Laforet, 2011). Another thing is that when customers are purchasing products, they are more likely to choose those that are of popular brand names than those that they have never heard of. People have symbolic and physical associations with the brand names. Loforet (2011) also noted that Cadbury is well known for chocolates and the purple packaging is the image that is derived since the company was invented. This shows that brand names have a major effect on consumer buying habits since they are the first thing that they read on the package. This can mean that there is a cultural attachment to the brand name and consumer buying behavior. Study Laforet (2011) suggested that the brand is the first thing that can attract consumers to purchase products since in most cases they are presented with items that they had used before. In another research, the price of the product is also a factor that is connected to people's buying habits since in most cases it is printed on the product packaging. People will always look the price, packaging, quality and physical appearance of the brand. In the food categories, study shows that pack size is a major factor connected to buying habits. Another aspect about the brand name is that it leads to customer association with the products since when they see it on the packaging they relate it to the company. When the brand names are printed on the products, they attract customer response and influence their preferences when purchasing products. There is a wide connection between brand and quality since it is the image of the product, therefore, people can ignore buying products based on their past experiences with the brand name. According to Laforet (2011), a brand name can also have a negative impact since some consumer's associate products with corporate and in the cases where there is no association of the product and corporate, people tend to assume that, such products are of low quality and unreliable. Another thing is that when there is a good connection between the existing brand and the new products there is a likelihood that consumers would con-

sider buying them. When the brand name is not printed on the packaging, it is difficult for consumers to distinguish between individually branded products and the corporate.

Conclusion

Consumer perception and buying habits are heavily dependent on the packaging of the products. According to researching, the overall position of products is directly linked to the packaging, which can lead to the growth of an organization. Organization managers spend a considerable amount of time trying to figure out the kind of packaging that is suitable for the products. The reason for ensuring that products have the right kind of packaging is because the pack is the first thing that consumers before they make purchasing decisions. The contents of the products are mainly displayed on the packages whereby consumers get to know the qualities of products such as price, contents and the quality and through the information provided, consumers are able to know the benefits of the products. People also consider the physical appearances of the products whereby a factor like the shape of packaging can influence consumer perception. The logo of the product is also linked to consumer perception whereby consumers believe that powerful brands have attractive logos that those of low placed products.

Study on the consumption habits of consumers reveals that people who are conscious about their weight are likely to purchase products that are packaged in smaller quantities with the believe that such packaging will enable them to control their feeding behavior. People also believe that poor quality products are packaged in poor quality materials and likely to avoid buying such products. This shows that packaging can either encourage or discourage consumer buying the products. Manufacturers have currently invented new technologies in packaging that focus on consumers due to the growing completion that is attributed to by globalization. The brand name also influences consumer-buying habits since consumers associate the value of the product with the brand name, which is mostly printed on the packages. From the studies, it is evident that there is a great connection between packaging, perception and consumer buying habits.

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EXPLORING HOW HOTEL GUESTS CHOOSE SELF-SERVICE TECHNOLOGIES OVER SERVICE STAFF

Chieh-Heng Ko
Dept. of Hospitality Management, Da Yeh University, Taiwan, R.O.C.
Email: chko@mail.dyu.edu.tw

Abstract

Recent years have seen increased attention being given to the self-service technologies (SSTs) applied in the hospitality industry. However, hospitality managers still hesitate to apply SSTs because human interaction is a valued experience in service encounters. The aim of this study is to explore how hotel guests choose SSTs over service staff. Data were gathered from a sample of hotel guests in Taiwan during a period of 6 months in 2016. The results indicated that desire for human interaction plays a significant role in the service process. Managers facing a SSTs deployment decision need to understand that some customers desire interaction with the service provider. In addition, desire for human interaction often is a critical reason for loyalty to a hospitality company.

Keywords: Self-service technologies (SSTs), Hospitality industry, Human interaction

Introduction

The past decade has witnessed growing progress in the self-service technologies (SSTs) applied in the hospitality industry, such as self-service systems in dining facilities, hotel self check-in, and automated hotel check-out (Riebeck, Stark, Modsching, & Kawalek, 2008; Stockdale, 2007). The benefit of applying SSTs can reduce labor cost (Chang & Yang, 2008), create differentiation and improve operational efficiency (Carline, 2007). However, due to the fact that human interaction is a valued experience in service encounters, even SSTs are recognized as a convenient technology for hospitality firms, hospitality managers still hesitate to apply SSTs because they are not sure if guests accept this new technology.

Therefore, the aim of this study is to address some important questions re-

garding to SSTs, and to explore how hotel guests choose SSTs over service staff.

Literature Review

In the context of the consumer's adoption and use of SSTs, completing a service transaction fast or avoiding service congestion serve as a general extrinsic motivator leading the consumer to choosing SSTs instead of a service staff (Meuter et al., 2003). Consumers' beliefs in the ease of use and usefulness of the focal technology for enhancing the performance of an intended task facilitate or reinforce choice of SSTs over the service staff (Lu, Chou, & Ling, 2009). Other SST-related extrinsic motivations include self-esteem (Standing, McManus, Standing, & Karjuluoto, 2008), a reliable transaction and satisfaction (Chang & Yang, 2008), process control and autonomy (Oyedele & Simpson, 2007), and social acceptance (Curran et al., 2003). For tourism, a descriptive study assesses user acceptance of electronic tourist guides based on two dimensions: social habit and practical acceptability (Riebeck et al., 2008). The practical acceptability includes usability, utility, cost, support, reliability, and compatibility—all extrinsic motivators.

Consumers may adopt new technologies for intrinsic reasons. For example, employees adopt new technologies when they expect to enjoy the new system (Curran et al., 2003). The playfulness of the web-based technology is a significant intrinsic reason for people to utilize web-based technologies (Moon & Kim, 2001). Similarly, fun is an intrinsic motivation relevant to technology adoption (Chang & Yang, 2008; Rangarajan et al., 2007). When people fulfill their intrinsic motivations during the performance of an activity, they tend to reach a state of flow.

Facing two different options–SSTs vs. service staff–to achieve the same task goal, consumer preference likely hinges on the strength of extrinsic or intrinsic motivations each option promises to satisfy. For example, in hotel check-in service, the SST kiosk does not allow an ideal opportunity for the guest to satisfy technology-oriented intrinsic needs due to the expected presence of social and system pressures (e.g., other guests are waiting in line behind). Choosing the front desk offers an opportunity to interact with a service staff. Guests choosing the kiosk may be motivated more by extrinsic desires such as speedy check-in, while those guests electing the service desk satisfy intrinsic desires for interaction with the staff. When guests face these contrasting choices, one type of desires likely suppresses or countervails the other desire because the two options are countervailing.

This study utilized Technology Adoption Model (TAM) developed by Davis (1989) as theoretical background to explore how hotel guests choose SSTs over service staff., because TAM is regarded as one of the most influential research models in explaining the users' IT usage or acceptance behavior in various

contexts (Bruner & Kumar, 2005). In addition to TAM, the proposed model includes desire for privacy, autonomy, and effectiveness as motivations commonly related to the choice of either SSTs or the service staff for a transaction. Fig. 1 summarizes the hypothesized relationships and their directions. Based on attitude theory (Ajzen, 2002), intention to use SSTs is defined as an individual's readiness to engage in a behavior. SST intention is operationalized as the likelihood of choosing to use

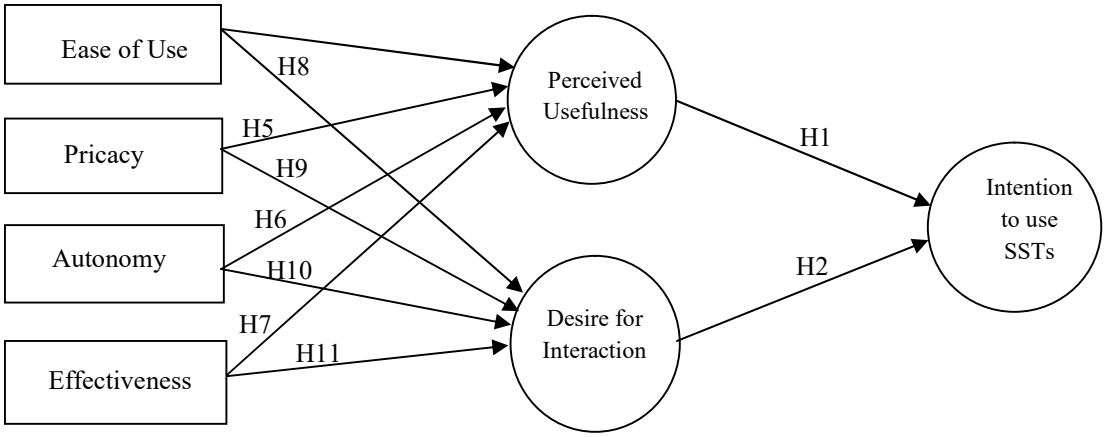

Figure 1. The conceptual model

SSTs instead of the service staff for a service transaction. Meuter et al. (2005) conceptualizes that both extrinsic and intrinsic motivations are direct predictors of trying SSTs. TAM and related studies provide evidence for perceived usefulness as a direct antecedent of intention to use SSTs (Lu et al., 2009). In a sense, perceived usefulness is a required condition to form an intention to use SSTs in lieu of the service staff (Meuter et al., 2005). An ineffective SST triggers a search for an alternative method of transaction if available. Accordingly, perceived SST usefulness increases the likeliness of use, especially in the presence of an alternative service transaction method such as staffed counters. The following hypothesis is proposed:

H1. Intention to choose and use SSTs relates positively to perceived usefulness of SSTs.

Desire for interaction is defined as a need to retain personal contact with others (e.g., service staff) during a service encounter (Curran & Meuter, 2005). Human interaction is a valued experience in service encounters and thus guests actively seek to maximize the experience whenever possible. Although researchers report mixed findings, desire for interaction plays either a direct or

indirect predictor of intention to use SSTs (Meuter et al., 2005). In a retail setting, customers with a greater need for interpersonal contact tend to avoid machines, while other people purposefully avoid interacting with personnel to demonstrate independence (Anselmsson, 2001). Therefore, greater desire for interpersonal interaction likely decreases customer willingness to use SSTs. The following hypothesis is proposed:

H2. Intention to choose to use SSTs relates negatively to desire for interaction with the service staff.

Following Davis (1989), perceived usefulness is the degree to which the guest believes that using SSTs enhances his or her service transaction. In a situation where SSTs and service staff are available as competing check-in methods, elicited motivations likely affect the guest's choice. When one option is chosen against another, the guest exerts mental efforts to justify his or her choice and, furthermore, criticizes the rejected choice in order to avoid any potential inner conflict Therefore, motivations associated with using SSTs or service staff likely counteract each other through such choice-justification efforts. We propose the following hypothesis:

H3. Perceived usefulness of SSTs relates negatively to desire for interaction with the service staff.

TAM specifies ease of use as a precondition for usefulness perceptions (Davis, 1989; Porter & Donthu, 2006) and other studies support that ease of use predicts perceived usefulness (Lanseng & Andreassen, 2007; Lu et al., 2009). Guests also will perceive the machine difficult to use for an intended task as not useful. Thus, we propose the following hypothesis:

H4. Perceived usefulness of SSTs relates positively to perceived ease of use of SSTs.

In some service transactions (e.g., banking and hotel registration), data security and privacy of personal information are an important issue. Surveys show that 59–68% of consumers chose SST kiosks to protect their privacy when registering at hotels (Smith & Rowinski, 2007). Consumer security and privacy are also an important concern in consumer research and public policy studies, especially when technology is involved in transactions (Phelps, D'Souza, & Nowak, 2001; Sheehan & Hoy, 2000). Phelps et al. (2001) show consumers' purchase behavior relates negatively to the degree of privacy concerns required in online transactions. Therefore, desire for privacy motivates travelers to use SSTs more than to transact with service staff. The following hypothesis is proposed:

H5. Perceived usefulness of SSTs relates positively to the desire for privacy.

The guest's desire for autonomy or independence in a service transaction process affects his or her choice of SSTs against service staffs. Autonomy ex-

presses desire for self-control or independence in a variety of situations and often translates as perceived control (Oyedele & Simpson, 2007). Generally, autonomous individuals are self-motivated to perform activities to achieve desired goals and they select SSTs over service providers to prevent undermining self-determination, and to avoid the social interaction required in service provider-controlled transactions (Oyedele & Simpson, 2007). Thus, we propose the following hypothesis:

H6. Perceived usefulness of SSTs relates positively to desire for autonomy.

The consumer's service method choice focuses on the method's effectiveness in achieving the transaction goals to maximize satisfaction (Parasuraman, Zeithaml, & Malhortra, 2005). Previous research confirms the importance of anticipated satisfaction for consumer choice (Shiv & Huber, 2000). The present study conceptualizes the desire for effectiveness as the tourist's need to achieve high transaction-specific satisfaction in the process and as a result of a chosen service delivery method where different options exist. Service industry SSTs are relatively new, requiring a high level of self-efficacy not readily available to the majority of guests (Oyedele & Simpson, 2007). Therefore, even a useful SST may not be perceived as an effective transaction method, especially when they are compared to service staffs. The following hypothesis is proposed:

H7. Perceived usefulness of SSTs relates negatively to the desire for effectiveness.

As desire for interaction is hypothesized as a countervailing construct in this study, the construct will have the relationships that are opposite to those perceived usefulness has in general. For example, high perceived ease of use of SSTs should suppress the tourist's desire for interaction with service staffs, leading to the choice of SSTs. Likewise, a strong desire for privacy may discourage the tourist from choosing service staff for human interaction. Autonomous guests may withdraw from social interactions and avoid service staffs to preserve their sense of control when feasible, thereby choosing SSTs more often than service staffs. In contrast, service staffs are viewed as a way of more effectively satisfying transaction-specific goals and outcomes. The following hypotheses examine these contrasting rationales.

H8. Desire for interaction relates negatively to perceived ease of use of SSTs.

H9. Desire for interaction relates negatively to desire for privacy.

H10. Desire for interaction relates negatively to desire for autonomy.

H11. Desire for interaction relates positively to desire for effectiveness.

Methodology

A set of question items were developed to measure each construct (see Table 1). The measures of perceived ease of use and perceived usefulness were consistent with those used in previous studies (Davis, 1989; Davis et al., 1989), while the measures of other constructs were developed to fit the study situations. Except for the measures of the intention to use SSTs construct, all the other construct measures were operationalized on the Likert scale with 1 = strongly disagree and 5 = strongly agree. One of the two measures for intention to use SSTs was operationalized on a 7-point likelihood scale (1 = very unlikely, 7 = very likely), while the other on an 11-point probability scale ranged from 0 to 100% in ten percent intervals.

Data were gathered from a sample of hotel guests in Taiwan during a period of 6 months in 2016. A number of 868 respondents completed the survey. After removing the records containing heavily missing values, a total of 721 responses remained in the analysis.

Results

Using the raw data as input and analyzing the variance-covariance matrix, confirmatory factor analysis for the expected factor structure results in a good fit after dropping three of the 26 original measurement items: χ^2(d.f.=209)=907.5, CFI=.99, TLI=.99, and RMSEA=.047. Table 1 summarizes the results. The three items were dropped due to a sizable cross loading, a weak loading by the reverse-coded item, and a large modification index value suggesting two correlated errors. All factor loadings are large and significant, and most measurement errors are relatively small.

Most proposed relationships appear tenable; see Table 2. The relationship between perceived usefulness and intention to use SSTs is significant and strong as expected in H1. Desire for interaction has a significant, negative effect on intention to use SSTs, lending support for H2. The relationship between desire for interaction and perceived usefulness also is significant and negative, supporting H3. H4 cannot be rejected as posited by the TAM because the relationship between perceived ease of use and perceived usefulness is significant, positive, and strong. Perceived ease of use exhibits a significant, negative effect on desire for interaction, providing evidence for H8.

Desire for privacy's effect on perceived usefulness is significant and positive, but the effect on desire for interac

tion is not significant. Therefore, H5 cannot be rejected, whereas H9 is rejected. Both H6 and H10 cannot be rejected because the effect of desire for autonomy on both perceived usefulness and desire for interaction is significant, each in the expected direction. Finally, the data do not support for H7 as the effect of desire for effectiveness on perceived usefulness is not significant.

Table 1. The Measurement Model Results

Measures	Mean	SD	Load-ing	Error
Intention to ue SSR (α=.95; ρ=.94; AVE=.88)				
Likely to choose the self service kiosk	4.85	2.00	0.94	.12
Probability to check in through the SST	60.16	31.24	0.94	.12
Desire for interaction (α= .87; ρ= .87; AVE= .69)				
Like interacting with front desk staff	3.45	1.03	0.84	.30
Enjoy working with the staff to address my needs	3.66	0.95	0.88	.23
Guest service based on human interaction	3.56	1.00	0.77	.41
Desire as much human interaction as possible	3.37	1.07	–	–
Usefulness (α= .92; ρ= .92; AVE= .74)				
SST would be useful in completing my check in	3.60	0.99	0.88	.23
SST would improve my check-in transactions	3.25	1.02	0.81	.34
SST would be convenient	3.69	1.04	0.87	.24
SST would be useful in meeting my travel needs	3.43	1.04	0.87	.24
Ease of use (α= .88; ρ= .88; AVE= .72)				
SST requires little work	3.52	0.99	0.75	.44
Easy to get SST to do what I want it to do	3.42	0.99	0.88	.23
SST easy to accomplish what I want in check-in	3.51	0.99	0.91	.17
SST would be compli-cated to use	3.40	1.01		

Privacy (α= .97; ρ= .97; AVE= .87)				
Want secure credit card transactions	4.44	0.91	0.90	.19
Want transaction records to remain confidential	4.50	0.88	0.95	.09
Want safe and secure transaction	4.51	0.88	0.96	.07
Am conscious about information security	4.45	0.88	0.92	.15
Autonomy (α= .85; ρ= .86; AVE= .67)				
Want to handle my needs on my own	3.14	1.07	0.86	.26
Want to be autonomous in taking care of my matters	3.30	0.97	0.87	.24
Want to avoid problems by doing on my own	3.46	0.99	0.71	.50
Want to make my own choices and decisions	3.87	0.87	–	–
Effectiveness (α= .95; ρ= .95; AVE= .82)				
Check-in to provide all info to my needs	4.18	0.87	0.86	.26
Expect completely satisfactory check-in experience	4.25	0.86	0.92	.15
Check-in organized in customer's best interest	4.32	0.85	0.94	.11
Check-in process free of errors	4.34	0.86	0.89	.21

Desire for effectiveness, however, shows a significant, positive effect on desire for interaction, lending support for H11.

Conclusions

The data provide clear evidence to support the proposed model of technology adoption in service settings where both SSTs and service providers are available for transactions. The model incorporates some salient concerns of

Table 2: Results of the structural models

Hypothesized path	Indirect effect (mediation) model	Direct effect (fully recursive) model
Usefulness →intention to use SST (H1)	.75(.05)**	.81(.17)**
Desire for interaction →intention to use SST (H2)	−.15(.04)**	−.16(.05)**
Desire for interaction →usefulness (H3)	−.08(.03)**	−.07(.02)**
Ease of use →usefulness (H4)	.83(.03)**	.83(.04)**
Ease of use →desire for interaction (H8)	−.19(.04)**	−.19(.04)**
Privacy →usefulness (H5)	.06(.03)*	.06(.03)*
Privacy →desire for interaction (H9)	.06(.04)^{ns}	.06(.04)^{ns}
Autonomy →usefulness (H6)	.06(.03)	.06(.03)
Autonomy →desire for interaction (H10)	.06(.04)^{ns}	.06(.04)^{ns}
Effectiveness →usefulness (H7)	.04(.03)^{ns}	.03(.03)^{ns}
Effectiveness →desire for interaction (H11)	.57(.05)**	.57(.05)**
Direct effects tested		
Ease of use →intention to use SST	–	−.05(.19)^{ns}
Privacy →intention to use SST	–	−.03(.07)^{ns}
Autonomy →intention to use SST	–	−.03(.06)^{ns}
Effectiveness →intention to use SST	–	.04(.09)^{ns}

Entries are standardized estimates (standard errors).
*= p< .05; **= p < .01; ^{ns} = p> .05.

customers in relevant service transaction situations. The model also newly conceptualizes desire for interaction and perceived usefulness as key mediating variables. Overall, the model seems tenable as evidenced in the measurement model's integrity, solid fit across validation samples, and converging results pointing to the roles of perceived usefulness and desire for interaction as key mediators.

The significant role of desire for interaction as a mediating construct in the proposed model is particularly notable. Most previous studies conceptualize desire for interaction as one of several independent variables to directly predict intention to use SSTs, SST trial, or SST-related attitudes (e.g., Curran & Meuter, 2005; Meuter et al., 2005). This study, however, models desire for interaction as an intrinsic need or goal influenced by other innate or transaction-related desires, such as desires for privacy, autonomy, and effectiveness. These desires are satisfied by the customer's choice of a service provider as a transaction method.

The proposed model suggests that the guests may indeed desire interacting with the service staff and actively seek such opportunities during service encounters. This rather emotional need or motivation is not well explained in TAM. TAM focuses mainly on the features of the target SST system such as perceived ease of use and perceived usefulness. Managers facing a SST deployment decision need to understand that some customers desire interaction with the service provider and that such desire may vary in strength dependent upon transaction situations. In addition, desire for human interaction often is a critical reason for loyalty to a company. Thus, the variable requires careful consideration.

This study also offers an important message to designers of SSTs. Considering the hotel guest's non-technology related concerns and motivations (e.g., autonomy, privacy, and effectiveness) will help produce more useful SSTs and address the system buyer's concerns about service quality/image and customer relations. The model and data suggest that guest's non-technology desires may counteract deployment of SSTs in service operations. SST designers need to make conscious efforts to address both managers' and customers' concerns in their system design.

Technology enables companies to provide an autonomous, private, and effective service, but such operational innovations may not satisfy the guest's emotional side of transaction goals. A hybrid service system design may be the best way to address business and customer needs. The service system design must coordinate both SSTs and staff as intricate players of service deliveries—achieving the customer's transaction needs and goals. Of course, fully functioning SSTs likely requires fewer service staff, thereby satisfying the company's investment motives.

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A STUDY ON SOUVENIR PURCHASE BEHAVIOR OF SPORTS TOURISTS

Hsiu-Chin Huang
Dep. of Tourism, Leisure, and Entertainment Management,
Tatung Institute of Technology, Taiwan R.O.C.

Tsung-Liang Lin
Dep. of Tourism, Leisure, and Entertainment Management,
Tatung Institute of Technology, Taiwan R.O.C.

*Chia-Ming Chang
Dep. of Physical Education, Health & Recreation,
National Chiayi University, Taiwan R.O.C.
*corresponding author: gr5166@yahoo.com.tw

Chun Chen
Dep. of Physical Education, Health & Recreation,
National Chiayi University, Taiwan R.O.C.

Abstract

The present study explored souvenir purchase behavior of sports tourists who participated in Kinghoya running race. Questionnaires were distributed to subjects at the Feng Tien

Gong Temple square who were selected through convenience sampling. A total of 310 questionnaires out of 400 were collected for research analysis, with a return rate of 77.5%. Study findings reported that brand awareness and price promotion, respectively, had a positive impact on sports tourists' willingness to purchase and their impulse trait. Moreover, their impulse trait had a positive impact on willingness to purchase. The mediating effect of impulse trait on the relationship between brand awareness and willingness to buy was not significant. However, partial mediating effect of impulse trait on the relationship between price promotion and willingness to purchase was found to exist. This study laid the groundwork for future research of sports tourists' souvenir purchase behavior.

KEYWORDS: souvenir, brand awareness, price promotion, impulse trait, willingness to purchase

Introduction

Modern sport is a highly organized industry today that generates revenues worldwide, and modern sport and tourism together create a whole new industry that can offer a fantastic range of unforgettable leisure experiences (Chiu and Lee 2006). Hinch and Higham (2001) indicated that sports tourism refers to trips individuals specifically take to participate in a sporting event. Sports tourism offers tourists a great opportunity for sightseeing and enjoyment in sports, and certainly boosts local economies and sports industry (Liao 2003). From a marketing perspective, Huang (2014) believed that a well-rounded marketing plan in sports tourism not only fulfills tourists' needs but also creates different sources of revenues in local areas.

Starting from 2010, Feng Tien Gong Temple located in Chiayi County, Taiwan organizes Kinghoya running race every year to celebrate the anniversary of the General the Heaven Tiger. In fact locals wish for the greatest blessing and wealth this time of the year because the name of the General has a connota-

tion of being rich (Feng Tien Gong Temple 2013). The Feng Tien Gong Temple understands the aspiration of local people and thus organizes the running race annually. In 2014 more than 10,000 people registered for this race and they could either run 10k for challenge or 3k for blessing. During the race participants are welcomed to go to the temple and join any traditional games. As sport meets culture, sporting event is more than a competition and has fun elements to offer to the participants (Lee 2010). Hall and Weiler (1992) classified festivals into business, sports, culture, harvest festival, religion, worship, and some special events. According to Huang (2006), sports tourism has become the mainstream in the tourism industry. Sporting events not only promotes sustainable development for the local area but raises the profile of the country. More importantly, sporting events typically generates big revenue to host economy.

Nogawa, Yamaguchi, and Hagi (1996) divided sports tourists into three categories: event participants, event spectators, and sport lovers. Event participants travel to participate in an organized athletic or non-athletic sporting event. Event spectators primarily travel to watch organized sporting events. Sports lovers simply like to participate in sports tourism. Needless to say, spending of sports tourists is a source of local economy during the race. Liu and Yeh (2002) reported that on average every single tourist (not including local residents) spent NT$ 1,355.41 in 2002 National Intercollegiate Athletic Games. Earlier, an average tourist spent NT$2,230.0 per day in 1997 Taiwan Athletics, NT$2725.23 in 1998, and NT$1160.03 in 2001. Expenditure covers costs on food, accommodation, travel, shopping, entertainment and more. In 2002 National Intercollegiate Athletic Games alone, spending was projected to reach NT$17 million dollars. The market potential of sports tourism is definitely worth exploring and developing.

This research, as the result, attempts to understand purchase behavior of sports tourists, who participate in Kinghoya running race. It is hoped that research findings can help local government and event managers to develop

a marketing plan to maximize economic profit.

Research Model

This section presents the relationship between research variables.

Brand awareness and willingness to purchase

Brand awareness refers to the likelihood that consumers recognize the existence of a company's products or service, and the extent to which a brand is correctly associated with a particular product (Lin et al. 2009). Macdonald and Sharp (2000) reported that brand awareness can some hesitant consumers to make up their mind. Previous studies also suggested that brand awareness influences consumers' attitude and perception, and increases their willingness to buy (Loet al. 2012).

Research evidence revealed that university students are more likely to buy sporting goods with high brand awareness (Hus et al. 2013). The brand awareness of online magazine has positive impacts on consumers' willingness to buy the magazine (Ho and Chien 2011). Based on early research findings, the present study hypothesizes that brand awareness can have positive impacts on willingness of sports tourists to purchase souvenirs.

Brand awareness and impulse purchase

Brand awareness is the core value of the business that has influence on consumers' perception of the product quality. Consumers prefer products with brand awareness because they tend to believe these products are safe, reliable, and risk-free. In other words, brand awareness also strengthens consumers' perception of products and increases their willingness to purchase (Ho and Chien 2011).

Weun, Jones, and Bentty (1998) stated that impulse buyers purchase for instant pleasure, and do not think twice before their purchase. According to previous study, in the U.S. 57.4% of buyers make unplanned purchases in drug retailers. 85% of buyers purchase confectionary, 75% of buyers purchase

oral care products, and 70% of buyers purchase makeup products. In fact all these purchases are made unintentionally. A survey conducted with Japanese consumers revealed a similar finding. 11% of purchases in supermarkets are planned ahead, while 89% of purchases are just made on site (Solomon 2001). The current study, therefore, proposes that brand awareness can have positive impacts on impulse purchases by sports tourists

Price promotion and willingness to purchase

Campbell and Diamond (1990) indicated that price promotion enhances consumers' perception of product value, so that they can quickly identify products and services a specific company launches. Price promotion is used to motivate people to spend more when there is a special occasion, such as Christmas, year-end sales, and clearance. Businesses offer a better and more competitive price for their products and services, or increase product quantity at the same price level to boost their sales (Raghubir and Corfman 1999).

However, as suggested by Hardesty and Bearden (2003), long-term exposure to promotions can sabotage big business names. Long-term price promotion can somehow create a message that such pricing strategy is associated with low quality products or services. Furthermore, empirical research showed that limited-edition products and limited time deals can have influences on consumers' willingness to buy (Pan 2009). When consumers believe that quality of gift is consistent with that of the main product, they are more likely to make purchase (Lin and Chen 2006). Based on previous research results, this study hypothesizes that price promotion can have a positive impact on sports tourists' willingness to buy souvenirs.

Price promotion and impulse purchase

Price promotion involves reducing the price of a product or service temporarily, or offering more products or other added value at the same price level. Customers are expected to assume the dis-

count price is lower than regular price and purchase more (Chandon et al. 2000). Earlier studies indicated that some rational consumers strive to reduce their expenses and tend to make purchases when the price of a product or service goes down (Xia et al. 2010).

In fact, emotions and feelings play a decisive role in purchasing, triggered by seeing the product or being exposed to a well-crafted promotional message. Such consumers who buy for instant gratification are impulse purchaser or impulse (Mowen, 1990). Rook and Fisher (1995) stated that impulse buyers purchase out of free will, and yet without deliberation. Price Promotion is obviously one of the reasons consumers make impulse purchases (Lin et al. 2005). This study therefore develops a hypothesis that price promotion can have positive impacts on sports tourists' impulse purchases.

Impulse purchase and willingness to purchase

Rook (1987) suggested that people who make impulse purchases have high impulse buying tendency. People with impulse buying tendency are driven to make purchases by their own impulse trait, and tend to quickly respond to price promotion, and make purchases without deliberation (Hung et al. 2008). Literature showed that when impulse buyers are spurred to purchase in some circumstances, they buy without hesitation and without deliberation (Weun et al. 1998). This research consequently formulates a hypothesis that sports tourists' impulse trait can have positive impacts on their willingness to buy.

Figure 1. shows the research model which comprises of five hypotheses.

Methodology

Participants

Subjects were sports tourists who participated in annual Kinghoya running race in Chiayi County, Taiwan. Subjects were selected through convenience sampling. Questionnaires were distributed to subjects at the Feng Tien Gong Temple square because the starting line and the finish line were set nearby the square. Furthermore, souve-

nirs that represent the local culture are sold around the temple. In order to encourage sports tourists to help with the research, an incentive was given. Subjects were asked to thoroughly understand the purpose of the research and they filled out the questionnaires voluntarily. A total of 400 questionnaires were distributed and 310 were collected, with valid return rate of 77.5%.

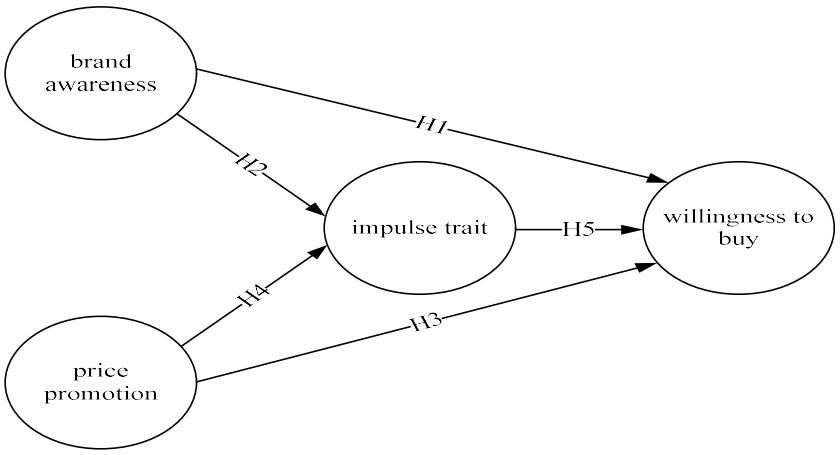

Figure 1. Research model on sports tourists buying souvenirs.

Instrument

The instrument selected for this study was a questionnaire which included five sections: (A) demographic description, (B) brand awareness, (C) price promotion, (D) impulse trait, and (E) willingness to buy. Each section was presented individually as following.

Demographic description

This data included sex, age, marital status, education, monthly income, purpose of buying souvenirs, and average spending for each trip.

Brand awareness

The scale used to test individual's brand awareness in this study was modified from Rossiter and Percy (1987). The Brand Awareness Scale consisted of six dimensions: (a) I insist

on buying souvenirs of specific brand, (b) I choose to buy particular souvenirs advertised by celebrities, (c) I choose to buy souvenirs to remember my travel memory, (d) I think of a particular brand when buying souvenirs, (e) I buy souvenirs for their brand awareness, and (f) I buy highly recommended souvenirs. A 5-point Likert scale was used to measure brand awareness where responses ranged from strongly disagree (1) to strongly agree (5). High scores on the brand awareness scale indicate a positive brand awareness of the brand in the question and a low score indicates a negative brand awareness of the brand in the question.

Price promotion

The Price promotion Scale was modified from Kotler and Armstrong (2011) and Alford and Biswas (2002), and comprised of five dimensions: (a) I buy souvenirs because free food is offered, (b) I buy souvenirs due to discounts, (c) I buy souvenirs if they are time-limited offers, (d) I buy souvenirs because giveaways are offered, and (e) I buy souvenirs if they are package deals. A 5-point Likert scale was used to measure subjects' perception of price promotion, with 1 equaling strongly disagree and 5 equaling strongly agree. High scores indicate that subjects have high level of perception of price promotion, while a low score indicates subjects have low level of perception of price promotion.

Impulse trait

This study used Consumer Impulsiveness Scale originally developed by Rook and Fisher (1995), and Chen and Lin (2012). The scale used to measure subjects' impulse traits included six dimensions: (a) I can't help buying things, (b) I buy things because I want to, (c) I don't think much before I buy things, (d) my rule of thumb is "buy first, think later" , (e) I usually buy things at the first sight; and (f) sometimes I make impulse purchases. A 5-point Likert scale was used to measure subjects' impulse trait where responses ranged from strongly disagree (1) to strongly agree (5). A high score indicates a high-impulse buying tendency,

and low scores indicate a low-impulse buying tendency.

Willingness to buy

The Willingness to Buy Souvenir Scale used in this study was modified from Grewal, Krishnan, Baker, and Borin (1998) and Alford and Biswas (2002). The scale included five dimensions: (a) I am interested in buying souvenirs, (b) I buy souvenirs when I participate in sporting events, (c) I may buy souvenirs, (d) Buying souvenirs is important to me; and (e) It means a lot to buy souvenirs. A 5-point Likert scale was used to measure subjects' willingess to buy souvenirs where responses ranged from strongly disagree (1) to strongly agree (5).A high score indicates that subjects have stronger willingness to purchase souvenirs, and low scores indicate their weaker willingness to make purchases.

Results

Demographic Description

Participants were 185 male and 125 female. 151 (48.7%) subjects were between 31-45 years old, and only 5 (1.6%) were over 61 years old. There were 116 (37.5%) subjects who received college or undergraduate degree, and 9 (2.9%) subjects had junior high school diploma. In addition to age and education, 116 (37.5%) were married and 194 (62.5%) were not. There were 204 (65.8%) subjects whose household income was NTD20,001-50,000, and only 5 subjects made more than NTD80,001 every month. In terms of souvenir purchase, 27 (8.7%) subjects bought souvenirs for their own use, 27 (8.7%) subjects bought souvenirs as gifts, 142 (45.8%) subjects bought souvenirs for either themselves or friends; and 114 (36.8%) subjects never purchased any souvenirs.

Data Analysis

This study was tested on reliability and validity using partial least squares, and the statistical software program WarpPLS 5.0 developed by Kock (2015) was applied. Item reliability, convergent validity and discriminant validity were assessed (Hulland 1999).

Item reliability

If both values of composite reliability and Cronbach's α are greater than .70, the research model is considered acceptable.

Convergent validity

Factor loading values were measured on four scales. The factor loading value of the Brand Awareness Scale was between .691 and .818, and the value of the Price Promotion Scale ranged from .589 to .877. The factor loading value of the Impulse Trait Scale ranged from .712 to .869, while the value of the Willingness to Buy Scale was between .791 and .870. All factor loading values derived from each measurement was greater than .50, suggesting a good convergent validity according to Hair, Black, Babin, and Anderson (2010).

Table 1. Reliability of each scale

Latent variable	Composite reliability	Cronbach's α alpha
Brand awareness	.880	.836
Price promotion	.891	.845
Impulse trait	.897	.861
Willingness to buy	.925	.899

Discriminant validity

According to Chin (1998), discriminant validity is assessed by comparing the average variances extracted (AVE) with the square of the correlations among the latent variables. The fact that the square root of the AVE is equal to or greater than .50 means the measurement model has demonstrated a very good convergent validity. As shown in Table 2, square root of the AVE of latent variables was between .742 and .844, which obviously was higher than .50. Besides, AVE of each latent variable was higher than correlation coefficients in the same column and row of the

Table 2. Latent variable correlations

Latent variable	Brand awareness	Price promotion	Impulse trait	Willingness to buy
Brand awareness	.742	.401	.214	.342
Price promotion	.401	.791	.313	.370
Impulse trait	.214	.313	.771	.410
Willingness to buy	.342	.370	.410	.844

Note: Value on the diagonal line is the square roots of AVE.

same construct. It is evident that the measurement model has demonstrated a very good convergent validity.

Hypotheses Tests

All hypotheses were tested and the results were as following.

H1: Brand awareness had a positive impact on sports tourists' willingness to buy souvenirs ($\beta 1 = .18$, $p<.05$).

H2: Brand awareness had a positive impact on sports tourists' impulse trait ($\beta 2 = .14$, $p<.05$).**H3:** Price promotion had a positive impact on sports tourists' willingness to buy souvenirs ($\beta 3 = .25$, $p<.05$).

H4: Price promotion had a positive impact on sports tourists' impulse trait ($\beta 4 = .27$, $p<.05$).

H5: Sports tourists' impulse trait had a positive impact on their willingness to buy souvenirs ($\beta 5 = .31$, $p<.05$).

H6: Brand awareness had a direct positive impact on impulse trait, which in turn had an impact on willingness to buy.

Further analysis showed that the impact of impulse trait on willingness to buy was not significant ($\beta 6 = .04$, $p>.05$). This suggested that the mediating effect of impulse trait on the relationship between brand awareness and willingness to buy was not demonstrated.

H7: Price promotion had an impact on impulse trait, which in turn had an impact on willingness to purchase.

Further analysis indicated that the impact of impulse trait on the relationship between price promotion and willingness to buy was significant ($\beta 6 = .08$, $p<.05$). This also indicated that mediating effect of impulse trait was found to exist. According to Baron and Kenny (1986), complete mediation occurs when the mediating effect between independent variable and dependent variable drops to zero. However, partial mediation occurs if the mediating effect decreases and yet still reaches the statistical significance. As shown in Table 3, the impact of price promotion on willingness to buy was found to be significant ($\beta = .41$, $p<.05$). However, as the significance level drops ($\beta 3 = .25$, $p<.05$), the impulse trait was found to have partial mediating effect. The Figure 1 shows the research model which comprises of five hypotheses.

Explanatory Power of Research Model

Explanatory power refers to the ability to generate testable predictions of the research model. It is the percentage of the variance of the endogenous explained by all exogenous. High value indicates a better predictability. As shown in Table 1, brand awareness and price promotion explained 12% of the overall variance of willingness to buy. Brand awareness, price promotion, and impulse trait altogether explained 30% of the overall variance of willingness to buy.

Discussion and Recommendations

Discussion

This study examined souvenir purchase behavior of sports tourists who participated in Kingyoha road race, and concluded that brand awareness had a direct positive impact on sports tourists' willingness to buy souvenirs. However, the mediating effect of impulse trait on the relationship between brand awareness and willingness to buy did not reach a statistical significance. In consistent with early studies (Lo et al. 2012; Ho and Chien 2011), consumers tend to think of some specific business names with high brand awareness. For example, they go to McDonald's for hamburgers and KFC for

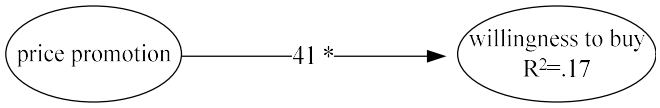

Figure 2. Impact of price promotion on willingness to buy

fried chicken. These successful business empires are well known for their chain stores all over the world, and choosing them is usually associated with low risk and easy decision-making process.

Moreover, brand awareness is what consumers have in mind when their motivation to purchase a specific product or service is not strong enough, or when product information is not disclosed and accessible (Macdonald and Sharp 2000). Therefore, it is suggested that sporting event organizer formulates a strong promotion plan of local souvenirs and builds up the brand awareness step by step. Positive online reviews are not to be overlooked because many consumers take great advantage of mobile devices and the Internet connection searching for optimal tourist destinations and souvenirs. In fact consumers rely on online reviews to make their buying decisions, and a list of highly recommended business can be quickly shared in the online community and generate business opportunities at the same time. Word-of-mouth advertising should definitely be a key emphasis in the online marketing strategy for souvenir business (Chang et al. 2015).

Study findings also reported that price promotion had a direct positive impact on sports tourists' willingness to purchase souvenir. Also the mediating effect of impulse trait had an impact on their willingness to buy. Literature evidence showed that consumers are encouraged to purchase by price promotion when they are buying household essentials. Household products marketed with price promotion attract consumers because consumers get instant gratification when they pull out their wallets and make a purchase. Price promotion, such as discount offers or

giveaways, increases consumers' desire for the product and service and maximizes their impulse buying behavior (Chandon et al. 2000; Raghubir and Corfman 1999; Solomon 2001).

The running race was held nearby the Feng Tien Gong Temple, which is one of the oldest Matsu Temples. The Feng Tien Gong Temple was declared a Class 3 historic site, and there were many small business selling traditional architectural decorations and local cuisine around the temple. As Chinese people are known for their hospitality and reciprocation, they use souvenirs to express their enthusiasm. According to Chen, Chen, and Liu (2013), souvenirs have to be small, portable, relatively inexpensive, and can represent local culture. As suggested by Swanson and Horridge (2006), some souvenir product attributes are important to tourists: portability, display characteristics, and uniqueness, which are usually demonstrated on handmade crafts, limited - edition products, and some innovative products. By traveling to sporting events, sports tourists experience many different cultures, taste local food, and bring home with souvenirs that can either help them remember the trip or be given to friends. Furthermore, it cannot be emphasized enough that price promotion increases tourists' willingness to make a purchase.

According to Kotler (2000) sales promotion can be done in many different ways: free samples, coupons, rebates, lottery, extended guarantee, joint promotion, cross promotion, and price discount (buy five get one free). Souvenir businesses are encouraged to use some of the effective sales promotion when marketing their products and services.

Data were collected by means of a questionnaire. A total of 310 valid questionnaires were returned. 63.2% of research subjects claimed to have purchased souvenirs, and 46% of them bought souvenirs either for personal use or for gifts. From a business perspective, sports tourists' purchase behavior is worth more understanding. When a city has developed its culture and has its own unique characteristics, managing sporting events is a good way to enhance and celebrate local character and distinctive-

ness, and also a great opportunity to promote local souvenir businesses and boost local economy.

Additionally the city is identified through local souvenirs and artifacts and leaves a positive impression on tourists (Chen et al. 2013). When souvenir package represents the local flavor and creative character and can be distinguished from regular commodity, it strengthens city's image and rejuvenates local businesses (Huang and Yao 2000).

It is recommended that future research explores sports tourists' souvenir purchase behavior in an international sporting event and analyzes its potential economic performance and benefit. Researchers may also incorporate tourists' preference of souvenirs and product features into the research model and analyze the potential impact on tourists' willingness to make a purchase. In this case, a well-substantiated theory may be established.

Acknowledgement

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EXPLORING THE RELATIONSHIP OF DIFFERENT COMPONENTS OF BRAND EQUITY IN HOTEL INDUSTRY THROUGH SOCIAL NETWORKING SITES

Chieh-Heng Ko
Dept. of Hospitality Management, Da Yeh University, Taiwan, R.O.C.
Email: chko@mail.dyu.edu.tw

Abstract

Recent years have seen increased attention being given to social networking sites. There is also much previous research regarding to the impact of branding. However, research which has empirically documented the conceptual framework of the customer-based brand equity through the perspective of the social networking site is scant. Therefore, the aim of this study attempts to use social networking site such as Tripadvisor as a measuring tool to explore the relationship of different components of brand equity in hotel industry. The Webcrawler was used to retrieve hotel reviews relating to the 10 most popular hotel brands, totally containing 1,921 reviews based on a total of 232 hotels. Data was analyzed through two-step approach of structural equation model. The results indicated that brand awareness is the central element of all relationships between the dimensions of brand equity, and social networking sites have become a critical factor in the context of hotel marketing, hotels need to consider actively the social networking sites and try to build customer loyalty.

Keywords: Social networking sites, Brand equity, Hotel

Introduction

Social networking sites play an important role for consumers in the exchange of lodging experiences. Social networking site containing user generated comments and reviews can affect the creation of the brand, providing hotels with greater effectiveness in the communication process for their goods and services, as well as with greater awareness in brand loyalty, perceived quality and brand associations (Wang et al., 2011; Xiang & Gretzel, 2010). Additionally, electronic word-of-mouth has been shown to be a powerful influence on whether or not to select a brand (Casaló, Flavián, & Guinalíu, 2010). It also affects the creation and development of relationships, removing barriers between hotels and their customers, suppliers and other agents. There is much previous research regarding to the impact of branding. However, little is known about the conceptual framework and working methods of different components of the customer-based brand equity through the perspective of the social networking site. Therefore, this study used social networking site such as Tripadvisor as a measuring tool to explore the relationship of different components of brand equity.

Literature Review

For consumers, lodging services are much more multidimensional than other goods or services (Pike, 2005). It is necessary to deepen the dimensions comprising brand equity from the perspective of tourism, and the relationships that occur between them (Boo et al., 2009; Wang et al., 2011). The customer's choice of a brand depends on the perceived balance between the price of a product and its usefulness (Lassar, Mittal, & Sharma, 1995). Aaker (1996) points out that brand equity can be measured by asking customers if the brand offers good value for the money paid, or if there is reason to buy one brand instead of competition.

The literature also indicates that the perceived value of a brand is positively associated with future behaviors, such as purchase or search intentions (Oh, 2000), and the willingness to buy (Tsai, 2005; Wang et al., 2011). Furthermore, there is also a positive relationship between perceived value and loyalty (Kwun & Oh, 2004), where the customer's perceived value plays an important role in building customer loyalty (Oliver, 1997; Zeithaml, 1988). Therefore, we propose the following hypothesis:

H1. Brand value has a positive impact on a hotel's brand loyalty.

Brand quality is one of the key dimensions of brand equity (Keller, 2003). In a customer-based brand equity model, Keller (2003) identified seven dimensions of quality: performance; features; conformation quality; reliability; durability; serviceability; and style and design.

In the field of lodging, it appears that perceived quality determines brand

value of hotel (Deslandes, 2003), and in turn has a positive effect on brand loyalty (Boo et al., 2009; Cretu & Brodie, 2007). Thus, we propose the following hypotheses:

H2. Brand quality has a positive impact on a hotel's brand value.

H3. Brand quality has a positive impact on a hotel's brand loyalty.

Hotel marketing should be primarily aimed at increasing visibility by creating a unique and differentiated brand (Fesenmaier, 2007). Brand awareness is "the ability for a buyer to recognize or recall that a brand is a member of a certain product category" (Aaker, 1996) and consists of both brand recognition and recall (Keller, 2003).

In the tourism sector, brand awareness is a catalyst of the brand effects on the consumer behavior (Kim & Kim, 2005; Lee & Back, 2008). Brand awareness is one of the most important factors for retrieval of information about the brand (Keller, 2003), and is considered as a first and necessary, but not sufficient, step leading to trial and repeat purchase (Konecnik & Gartner, 2007). However, brand awareness is an important antecedent of customer value (Kwun & Oh, 2004) and contributes to the financial performance of hotels (Kim & Kim, 2005). Thus, we propose the following hypothesis:

H4. Brand awareness has a positive impact on a hotel's brand value.

Effectiveness measurement of the brand in tourism is mainly based on the image (Prebensen, 2007). Brand image can be viewed from the standpoint of social and self-image of the brand personality (Grace & O'Cass, 2005) because it has also been considered an element of brand personality (Hosany, Ekinci, & Uysal, 2006). Brand image has been significantly related to cus-tomers' self-concepts (Solomon, 1999). On the other hand, the image has been linked to issues such as the service offered by the brand (Kim & Kim, 2005), which is the approach taken in this study.

From the consumer's perspective, there is evidence that brand image may influence customer choice and the perceptions of customer value (Maklan, Stan, & Knox, 1997). In addition, brand image may also have an influence on consumer loyalty (Cretu & Brodie, 2007). Therefore, we propose the following hypotheses:

H5. Brand image has a positive impact on a hotel's brand value.

H6. Brand image has a positive impact on a hotel's brand loyalty.

Taking into account the hypotheses suggested in the paper, the initial model (model 1) we propose is shown in Figure 1.

Methodology

The Tripadvisor site provides a large variety of user-generated content.

For the purposes of our experiment we have utilized information contained therein about hotels, reviews and people. In order to extract the relevant information from the Tripadvisor site, we constructed and implemented an algorithm in order to extract a sufficient volume of review and related information. This program (a Webcrawler) is implemented in Java and was used to download automatically data which matched the criteria we specified. We used the Webcrawler to retrieve hotel reviews relating to the 10 most popular hotel brands in each of the 10 most popular destinations. These reviews were then collected and stored in Excel format. The Tripadvisor dataset constructed in this manner consists of 1,921 reviews (review text, review ratings and a number of additional fields) based on a total of 232 hotels (hotel name, number of stars, etc.).

Taking into account the data obtained in this process and the market share of each hotel chain, items that measure the 5 dimensions forming the brand equity are explained: (1) brand value: value (1 to 5), (2) brand quality: rooms, location, cleanliness and sleep quality (1 to 5), (3) brand image: service (1 to 5), (4) brand loyalty: recommendation (1 yes and 0 not recommended) and overall loyalty (1 to 5), and (5) brand awareness: market share of the chain.

We applied the two-step approach of structural equation model developed by Anderson and Gerbing (1988). First, the quality of the measurement scales is deter-mined with a confirmatory factor analysis. Secondly, the causal model is analyzed (based on latent variables), to test the hypotheses we have proposed.

Results

We analyzed the model 1 proposed in Figure 1, however the EQS output indicated that the output was not trusted as the iterative process had not converged. Following the proposals of Boo et al. (2009) an alter-native model (model 2) was proposed, which considered the following relationships: brand awareness → brand experience (measured by brand quality and brand image) → brand value and brand loyalty, and brand value determined by brand loyalty; the result was the same as in the previous case. Accordingly, we propose an alternative model in which the sequence of relations was: brand awareness → brand quality → brand image → brand value → brand loyalty, obtaining the same results as in previous models.

Since brand awareness was a totally objective variable (not based on perceptions) introduced in the model, we considered the possibility that it was the central variable of a third alternative model, in which brand awareness (measured by market share of hotel chains) is deter-mined by brand quality and brand image. In this sense, many successful companies with an inferior brand image merge and acquire companies with a superior brand image in order to increase their market share (Lee, Lee, & Wu, 2011; Nguyen & Kleiner, 2003). Brand awareness in turn determines the brand

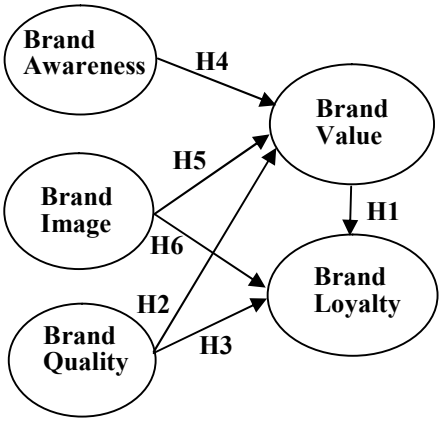

Figure 1. Preliminary model

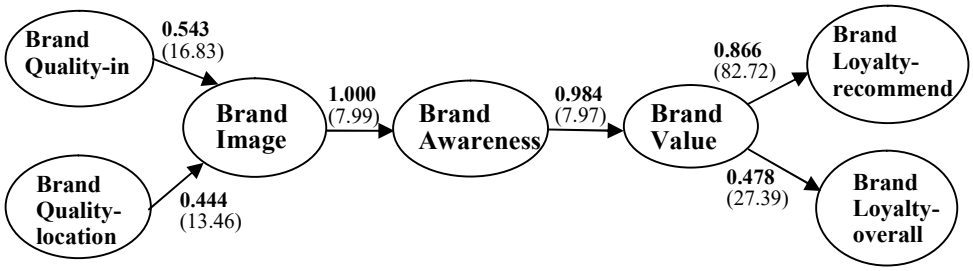

Figure 2. Model 3. Satorra-Bentler scaled chi-square=22.0722; df=20; p=0.33660; GFI=0.989; AGFI=0.975; RMSEA=0.050. *Parameters in bold and in brackets are the t values that determine the significance of the parameter.

Table 1: Fulfillment of the hypotheses

Hip.	Relationships	Alternative model 3	Total effect (t value)	Fulfillment
H1	Brand value→brand loyalty	Value→overall loyalty	0.478(27.39)	√
		Value→recommend	0.866(82.72)	
H2	Brand quality→brand value	Quality in→value	0.535(16.14)	Indirectly through the image and awareness
		Location→value	0.437(13.16)	
H3	Brand quality→brand loyalty	Quality in→overall loyalty	0.265(13.80)	Indirectly through the image and awareness and value
		Location→overall loyalty	0.209(12.13)	
		Quality in→recommend	0.463(15.96)	
		Location→recommend	0.379(13.22)	
H4	Brand awareness→brand value	Awareness→value	0.984(7.97)	√
H5	Brand image→brand value	Image→value	0.984(84.88)	Indirectly through awareness
H6	Brand image→brand loyalty	Image→overall loyalty	0.471(7.99)	Indirectly through awareness and value
		Image→recommend	0.852(75.85)	

value, and brand value influences brand loyalty (Figure 2). In this case the model fit is adequate (model 3). The effects of the variables included in the model are discussed below. First, the interior quality and location determine the brand image (0.543 and0.444, respectively). The image influences brand awareness (1.000). Brand awareness determines the value (0.984). And finally, the value affects the recommendations (0.866) and to a lesser extent, global loyalty (0.478).

In short, we obtain a model consistent with the proposals of several authors (Kim & Kim, 2005; Lee & Back, 2008) in which awareness is considered as the central element of the effects of the brand in the customer behavior.

Table 1 shows the degree of fulfillment of the hypotheses; we see that hypotheses 1 and 4 are fulfilled through the direct effects of brand value on loyalty and of awareness on value. The other hypotheses are also fulfilled taking into account the total effects (direct and indirect), as these total effects are significant for all relationships raised in the theoretical model.

Conclusions

In this paper, we have analyzed the different components of brand equity in relations to hotels. We have used social networking site, Tripadvisor, as our source. Our contention is that online reviews have more credibility than review forms, completed at the hotel. Not only do we have access to a far larger number of reviews, but we have a greater degree of confidence in their contents, as the reviews reflect the opinions of the customers considered at leisure. These reviews are not always taken into account by hotel management (O'Connor, 2010).

This study provides detailed information on how hotel managers can take advantage of information made available through social networking sites. This will achieve a better understanding of the motivations for guests to use this type of media, to read reviews of hotels in which they are considering staying, and to produce reviews of hotels in which they have stayed. It is noted that there is a clear linkage between the 5 dimensions of brand equity (value, awareness, quality, image and loyalty). Although the initial theoretical model proposed does not fit properly, in this study, in line with previous studies (Kim & Kim, 2005; Lee & Back, 2008), we find that brand awareness (measured by the market share of hotel chains) is the central element of all relationships between the dimensions of brand equity. The sequence of relationships established in the validated model (model 3) was found to be as follows: brand quality → brand image → brand awareness → brand value → brand loyalty.

Although in this paper, we have considered five dimensions of brand equity, in future work we will be expanding these to incorporate an analysis of the writing style of reviewers, in order to elicit a deeper analysis of their opinions and personality traits.

Implications

Consumers have changed the way they consume and how to plan their trips (Erdem & Cobanoglu, 2010; Kim & Hardin, 2010; O'Connor, 2010). Whereas previously people planned their trips in advance through intermediaries, they are now leaving decisions to the last minute.

To respond adequately to these changes, companies that offer tourist products and especially hotels, need to better understand the dynamics of the technology in order to offer better and promote their businesses and destinations to travelers seeking information or schedule their trips using the Internet (Erdem & Cobanoglu, 2010; O'Connor, 2010). With changes in the Internet that allow easy and simple means of content generation, consumers are gaining more power over what and how information is distributed and used on the Internet. Forums such as Tripadvisor can increase the relevant knowledge about destinations and tourist accommodations and therefore have become a critical factor in the context of hotel marketing and specifically in the management of the brand and the achievement of future loyalty behaviors. To succeed in the future, ho-

tels need to consider actively the social networking sites and user generated content and try to exploit these advances to increase its turnover and try to build customer loyalty.

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SOLAR ENERGY FROM THE SAHARA SUN TO POWER EUROPE: THE DESERTEC PROJECT

J. Ndumbe Anyu
Professor of Public Administration and Public Policy
School of Business and Public Administration
University of the District of Columbia
Washington, DC USA
jndumbe@udc.edu

Abstract

This essay examines Concentrating Solar Power (CSP), which is a technology that is used to harness and covert solar energy to produce electricity, and its future use. CSP has the potential to be used to provide energy to a large portion of the world's population. Additionally, the paper discusses The Desertec project and how it intends to covert solar energy from the Sahara Desert to power Europe. The project envisages producing 15 percent of Europe's electricity by converting solar energy from the Sahara desert by 2050. This project could be the starting point of a much needed energy revolution.

Key Words: Concentration Solar Power, Solar and Desertec project

Introduction

The amount of energy the sun pours on the earth surface is more than what the world needs. Solar energy is inexhaustible and has remained untapped to meet human energy needs unit now. Prospects for harnessing solar energy have been changing over the years as growing energy costs and its associated costs have forced countries to look for alternate sources of energy. Solar energy is the source of choice for many nations because it is inexhaustible, plenty and has fewer disadvantages. Rising global population coupled with an even rapidly growing demand for energy causing major pollution problems and changing climatic patterns that are placing the world in a dangerous situation. The ef-

fects of global warming (including more frequent and severe storms and droughts) are having devastating consequences on various parts of the globe. Consequently, the need for the discovery and development of new technologies that would convert renewable sources of energy to help mitigate the effects of climate change becomes inevitable. World-wide increased awareness of the perils that the use of fossil fuels presents to humanity along with falling prices of renewable sources of energy, brings hope to address the problem a change in energy consumption patterns. This paper discusses Concentrating Solar Power (CSP), which is a technology that is used to harness and covert solar energy to produce electricity, and how it is to be used in the near future. CSP has the potential to be used to provide energy to a large portion of the world's population. The paper will also examine The Desertec project and how it intends to covert solar energy from the Sahara Desert to power Europe. The project envisages producing 15 percent of Europe's electricity by converting solar energy from the Sahara desert by 2050. This project could be the starting point of a much needed energy revolution.

The Energy Dilemma

Some would argue that global energy consumption is rapidly reaching unsustainable levels and if left unchecked would be catastrophic to the globe. There is some truth to this observation considering that the world's energy consumption is growing at a geometric rate while conventional sources of energy are growing at an arithmetic rate. If this trend goes unabated then energy consumption and its associated externalities pose a devastating danger to the human race. Increased global demand of and consumption of energy over the last 150 years has resulted in severe ecological imbalances thus resulting in rising atmospheric temperature (Roberts, 2008).

The United States Census Bureau, estimates that world population is expected to reach 9 billion by the year 2045 (US Census Bureau). Such a high increase in population would translate to a more drastic increasing demand for energy, 2009 consumption patterns are sustained. Estimates from the Energy Information Administration (EIA) show that the world's energy consumption will rise from 508 quadrillion British Thermal Units (BTU) in 2010, to 678 quadrillion BTU in 2030 (Energy Information Administration, 2009). According to the EIA, world energy consumption is expected to increase by 44 percent by the year 2030 (Energy Information Administration, 2009). This escalating demand for energy has already created a significant amount of stress for both, the environment and the relations between nations. Global warming, a phenomenon created by the excessive accumulation in the atmosphere of man created greenhouse gases (GHG) is expected to raise global temperature by the year 2100 between 1.4 to 5.8°C according to the Intergovernmental Panel on Climate Change (IPCC). (www.ipcc.ch). These

projections have a high probability of becoming a reality if current energy consumption patterns are sustained.
To cope with these unsettling state of affairs humanity must resort to ingenuity - - utilize of natural sources of energy including the sun and the wind - - to complement fossil fuel that are posing serious environmental threats and climatic changes. Newer technologies have given birth to exploration of new methods of tapping energy from renewable sources. Wind farms are now a reality in different parts of the world, and energy from the sun is captured by photovoltaic power stations in many countries including Portugal and Japan is a fact of life. According to the EIA, renewable sources of energy are expected to be the fastest growing energy types in the next 20 years according to the EIA (Energy Information Administration, 2009). Yet, all the progress that has been already made is not nearly enough to provide a long lasting solution to the energy related ailments afflicting. The rate at which humanity is changing its energy consumption patterns is still alarmingly slow. The EIA projects that coal and natural gas usage would contribute about 64 percent of the world's electricity supply by 2030. Such a high percentage translates to an increase for coal and natural gas exploration and usage in the electricity market when measured using 2009 market share (Energy Information Administration).

The transition from fossil fuel to renewable sources is so slow should not come as a surprise, since it took more than half a century for the world to change from wood dependency to coal dependency, and another half a century to transition from coal to oil dependency (Aitkin, 2003). However, it is important to highlight that the world has evolve from what it was 100 or even 50 years ago; technology is evolving at increasingly faster rates as the world marches deep into the twenty first century. In fact, the technology capable of providing the world with electricity produced from renewable sources of energy already exists.

If we could be obtaining most of our energy from renewable sources, what is the rationale for relying on hydrocarbons? The answers to this question would include aversion to change that is endemic to many cultures and societies, fear of the unknown, denial of reality, the high cost associated with the harnessing of renewable energy, and lower cost of producing energy from fossil materials. In addition, the powerful vested interests that exist in the production and commercialization of highly profitable fossil fuels is resistant to change. Oil and gas companies together with their powerful lobbying exert unbearable powerful influence on governments around the world. For example, in the US, the Congress, legislation to limit CO2 emissions has not been ratified. The document presented by Senators John Kerry (D-Mass.), Lindsey Graham (R-S.C.) and Joe Lieberman (I-Conn.) aims to reduce CO2 emissions by 17 percent below 2005 levels in the near future, and by 80 percent by 2050. How-

ever, in order to obtain the 60 votes in the Senate that are needed to avoid a filibuster, decisive concessions are expected to be made, amongst which are the new incentives for offshore oil drilling (Bravender, 2009).

Fortunately, the times are changing. Today people all over the world, and especially in developed countries, are aware that a major change in the way we obtain everyday energy is an urgent matter. Furthermore, the cost to produce energy for renewable sources is falling as investments advance along the experience curve. Over time, more projects to produce energy from the sun or wind would generate diminishing costs for those industries. A World Bank report, "The Potential for Low-Cost Concentrating Solar Power Systems," expects future costs of renewable energy production to approach the costs of conventional fossil power (Price & el, 1999). Investors are conscious of this new trend and are responding accordingly. Only a few decades ago supplying an important amount of the world's energy needs using renewable sources of energy seemed impossible. Today, however, that occurrence has the potential to become a reality.

Of all the possible alternatives to produce energy from renewable sources, one has experienced an extraordinary leap in the past few years. Massive projects are on the pipeline or already functional. This new technology, which captures the sun's energy and transforms it into electricity, could cover 7 percent of the world's energy needs by the year 2030 and one quarter by 2050 according to Greenpeace (Richter & el., 2009). The term for this technology is Concentrating Solar Power (CSP) and according to Joseph Romm, a senior fellow at the Center for American Progress who was named by Time Magazine as one of the "Heroes of the environment in 2009," CSP is the technology that could save humanity (Romm, 2008).

Concentrating Solar Power (CSP)

For centuries people have been using different devices to concentrate sunlight to produce energy. As far as seven centuries before Christ, magnifying glasses were used to make fire, and ancient Greek soldiers are believed to have used the sun's reflection in their bronze shields to set fire to Roman ships. Closer to our time, sixteenth century Swiss scientist, Horace de Saussure built the world's first solar collector, which was later used to cook food (United States Department of Energy). The technology to harness the power of the sun has significantly evolved since those early practices. CSP is the technology that has the largest potential to be used to produce an extensive percentage of the world's electricity in the coming decades.

CSP technologies use mirrors to reflect sunlight into receivers that collect energy and transform it into heat. That heat is, in turn, used to produce electricity using either a gas turbine or a Stirling engine (Richter & el. al., (2009). One important characteristic of CSP tech-

nologies is that they permit to store the heat captured during the day to transform it into electricity during the night. There are different possible systems devised to use CSP. The four main systems are: parabolic trough; solar tower; parabolic dish; and Linear Fresnel reflector. Even though these four systems work under the same principle, which is to concentrate sunlight in order to produce heat and to use that heat to make electricity, they have distinct characteristics.

Parabolic trough-shaped mirror reflectors work by concentrating sunlight on thermally efficient receiver tubes placed in the trough's focal line. Those tubes contain a thermal transfer unit that is heated to approximately 400°C by the sun's concentrated rays. The heated fluid is then pumped through a series of heat exchangers to produce steam, which in turn produces electricity using a steam turbine generator. Parabolic troughs have been commercially used for a hundred years. The first systems were installed in Egypt in 1912 with the purpose to generate steam for pumps used to deliver water for irrigation. Today the output of existing parabolic trough plants is over 500 Megawatts (MW) of electrical capacity. This type of CSP system can be used as a part of a hybrid operation called Integrated Solar Combined Cycle (ISCC), where the steam generated by solar energy is fed into a thermal plant that also uses fossil-fuel generated steam, commonly from natural gas. These kinds of plants are functioning in Algeria, Egypt and Morocco (Richter & el. al., 2009).

The solar tower system uses a vast amount of large mirrors with sun-tracking motion, resembling a sunflower field, to redirect sunlight to a central receiver mounted at the top of a tower. The concentrated sunlight is absorbed at the tower by a central receiver that turns collected sunlight into thermal energy, which is used to feed the electricity producing turbine. Solar tower systems have only recently been installed for commercial purposes, although very successful tests have been run since the 1980's. The largest solar power plant to date is located in Spain and it yields 11 MW of electrical capacity which is enough to provide electricity for almost 5,500 homes. The developer, Abengoa has constructed a similar plant next to the first one, which is twice as large and could more than double the existing electricity producing capacity. In the US, Brightsource Energy is planning to install a 400 MW solar tower plant in the Nevada desert, which would represent a huge step forward in the commercialization of this type of renewable energy (Richter & el. al., 2009).

In the case of the parabolic dish system, the parabolic dish-shaped mirrors concentrate sunlight on a receiver located at the focal point of the dish. The concentrated sunlight is absorbed into a receiver to heat fluid or gas at approximately 750°C. By means of a Stirling engine or micro turbine, the heated gas or liquid is used to produce electricity. Parabolic dishes are individual units that could have an enormous electricity generating capacity by combining large

quantities of dishes. There are a few large scale projects planned to start production in the near future. Amongst them, Parabolic Dish Systems have a power purchase agreement to install over 20,000 units in California's Mojave Desert (Richter & el. al., 2009).

Linear Fresnel reflectors use a group of nearly-flat reflectors to concentrate solar radiation onto elevated inverted linear receivers. Water flowing through these receivers is heated and converted into steam to power turbines to generate electricity. The Australian company, Ausra is planning to add to its existing Linear Fresnel plants one that could have the capacity to yield 177 MW of electricity in Carrizo Plains, west of Bakersfield (Richter & el. al., 2009).

The Future of CSP

Making predictions or forecasts on events that will take place decades into the future can be extremely complicated. This fact is especially true when the forecasts involve human behavior and scientific analysis. There are a number of variables that have to be taken into account and, moreover, different scenarios for the analysis of the same variables have to be considered (Webster & el. al., 2009). The Concentrating Solar Power Global Outlook 2009 establishes three different scenarios to evaluate the possible progression of the usage of CSP technology. The three scenarios study the potential of CSP development taking into consideration technical and economic factors. The time frame for the study is presented in a two stage range: first, until the year 2020 and afterwards the scenarios cover the decades until 2050. The reference scenario, which predicts the lowest increase in CSP growth, is based on the projections made in the 2007 World Energy Outlook report by the International Energy Agency (IEA). It is based on policies already in place but it considers the possibility of electricity and gas market reform, and a more liberalized policy for inter-country energy trade. This scenario assumes a growth rate of 7 percent for 2011. By 2015 the expected growth rate is merely 1 percent, and this rate is expected to remain constant until the year 2040, after which no significant growth for CSP is expected. Under this scenario the expected participation in global electricity supply by CSP is extremely low. By the year 2020 CSP would supply between 0.12-0.14 percent of the world's electricity production, and by 2050 world electricity produced from CSP would amount to a meager 0.2 percent. (Richter & el. al., 2009).

To the contrary, a moderate scenario considers not only existing policies, but also all policy measures to support renewable energy which are either under way or planned around the world. It also assumes that countries would successfully reach the targets set for the development and implementation of renewable or CSP technologies. For countries to reach those goals, an increased investor confidence in the sector is assumed as well. Growth rates under the moderate scenario are expected to be significantly

higher than under the reference model. CSP growth rate is expected to start at 17 percent in 2011 and then jump to 27 percent in the period from 2015 to 2020, and in the following years it would steadily fall to reach 7 percent in 2030, 2 percent in 2040 and finally 1 percent in 2050. Following this scenario, CSP would satisfy 1.1 to 1.2 percent of the world's electricity demand by 2020 and between 8.5 to 11.8 percent by 2050 (Richter & el. al., 2009).

The advanced scenario is the most optimistic of the three; it evaluates CSP growth under conditions that would be optimal for that industry. Under this scenario, it is assumed that all of the industry's recommendations are translated into CSP promoting policies, and are carried out accordingly. It also assumes the creation of a large enough grid capacity to cope with the expanding supply of electricity from CSP plants. Under the advanced scenario the assumed growth rate starts at 24 percent in 2010, falls to 19 percent by 2015, then to 7 percent by 2030 and 5 percent by 2040. Subsequently, the growth rate will level out at around 3 percent annual increase. With these levels of growth, CSP could meet 1.5-1.7 percent of global electricity demand in 2020 and between 18.3-25.69 percent by 2050. Under ideal conditions, CSP could cover one quarter of the world's electricity demand in less than 50 years (Richter & el. al., 2009).

These three scenarios portray distinct futures for CSP. The fact that world leaders failed to produce a binding treaty at the recent Climate Conference in Copenhagen could be an indication that achieving the conditions to develop the advanced scenario for the future of CSP, could be a far-fetched reality. However, the Copenhagen meetings produced an accord that represents a significant step towards an elaboration of a binding treaty for the future Climate Conferences. Even if the advanced scenario is discarded, the world is still capable of producing a treaty that could help promote the results expected under the moderate scenario.

Auspiciously, nations and private investors do not have to stand on the sidelines until all of the world's leaders finally produce a binding treaty on climate change. Renewable energy is already the fastest growing sector in the energy industry. Countries and private investors have noticed that there is much to be gained by expanding this energy sector. Several large scale projects are either underway or latent, waiting for the day to finally set their foundations. In the US, for example, BrightSource Energy and Pacific Gas & Electric will combine to produce up to 900MW of electricity from a CSP plant in the Mojave Desert in the year 2011 (www.brightsourceenergy.com). Abengoa has an 11MW CSP plant functioning in Seville, Spain and it could increase its yields to 300MW (Shukman, 2007). There is an immense project to produce electricity from CSP plants in the Middle East (ME) and North Africa (NA) regions called Desertec. This project could serve as an example of what needs to be

done to positively change the energy status quo.

The Desertec project

On 30 October 2009 a consortium of German companies (including energy utilities giants E.ON and RWE, the engineering firm Siemens, the finance house Deutsche Bank and the insurance company Munich Re) and the Desertec Foundation signed the articles of association for the Desertec industrial initiative (DII). This document represents an important step forward towards the realization of the Desertec project. The project envisages producing clean and cost efficient energy to power Europe, Middle East and North Africa (EU-MENA) regions. To achieve this goal the development would be based on economic cooperation between the countries in these three regions (www.desertec.org/concept/studies).

The DII has to establish a framework for investments to supply the EU-MENA region with power obtained from solar and wind energy sources. Ultimately, the aim of the project is to provide the MENA region with a considerable part of its energy needs and to satisfy 15 percent of Europe's electricity demand by 2050 (http://www.desertec.org/en/press/press-releases/091030-01-formation-dii-gmbh).

Given the scope of the project, which has been compared with the Apollo space program that landed Neil Armstrong and Buzz Aldrin on the moon, the investments needed to execute it, are as impressive. Its estimated total cost would be about €400 billion. Of this amount, €350 billion would be used to construct the CSP plants and the remaining €50 billion would be used to create the widespread electricity grid network to transport electricity from North Africa to Europe (Kleinschmidt, 2009).

The Desertec project has many advantages that certainly make it a worthwhile undertaking. First the project's enormous potential to reduce aggregate CO2 emissions levels make it extremely appealing for both policy makers and the general public. According to the Concentrating Solar Power Global Outlook 2009, if the moderate scenario is achieved, CO2 savings would be 148 million tones of CO2 annually in 2020, rising to 2.1 billion tones in 2050. The CO2 savings under the moderate scenario would be comparable to 8 percent of today's global CO2 emissions and Desertec would be a major contributor to that goal (Richter & el. al., 2009).

Second, the project has already secured the backing and support from several key stakeholders, including Angela Merkel, the German chancellor, Jose Manuel Barroso, the former president of the European Commission, and Prince Hassan bin Talal of Jordan. It also has the support of the twelve companies that signed the articles of association as well as of a number of North African countries. Furthermore, solar energy is increasingly viewed by leaders of the region as an efficient alternative to fossil

fuels. Saudi Arabia's oil minister, Ali Al-Naimi, said in September of 2009 that the country's intentions are to export as much solar energy in the future as it exports oil in the present (Alsharif, 2009).

As discussed above, this project requires a huge start-up investment to become functional. However, maintenance costs are not expected to be high; the life span of a conventional CSP plant is on average more than 40 years, and mirrors can be rotated to protective positions in case of storms or other natural threats (www.desertec.org/en/concept). Moreover, in the case of Desertec, one of the project's major strengths is that solar energy -- the resource used to produce electricity does not run out. The developers will never run out of raw materials. In other words the "well has dried up" as it is often happens with fossil fuel retrieving schemes. The sun will always shine on those areas and therefore, there would be no need to relocate in order to find the precious goods. The sun's energy will always be there. Gerhard Knies, the coordinator of the Trans-Mediterranean Renewable Energy Corporation, has stated this fact in a very simple, yet highly compelling way, saying that, "within 6 hours deserts receive more energy from the sun than humankind consumes within a year." (www.desertec.org/en/news).

Implementing the Desertec project would have numerous benefits not only for the Europe and MENA regions but also for the world. These benefits represent a huge strength of this energy project. It would be very difficult for anybody to oppose the project once the expected benefits are included in the equation.

The MENA region would benefit from this project in various ways. Countries in the region abundantly exploit oil and gas resources to produce energy. However, these resources are finite and they will eventually come to their demise. It would be an intelligent long term economic strategy for MENA countries to diversify their energy exploitations and start transferring some economic resources from fossil fuel commercialization to the CSP industry. By doing so the countries would be able to take advantage of a limitless source of income while at the same time benefitting from technological advancements.

The MENA region suffers from extensive poverty and unemployment. In 2008, the International Labour Organization (ILO) published a paper that placed MENA amongst the regions with highest rates of unemployment (Messkoub, 2008). In 2003 unemployment rates averaged nearly 15 percent and to make matters worse the highest incidence in unemployment was found among the young adults group (aged 15-25). The Desertec project could help alleviate this affliction. The CSP Global Outlook 2009 report expects, considering the reference scenario, that for every MW of new capacity, the annual market for CSP would create 10 jobs through manufacture, component supply, solar farm develop-

ment, installation and indirect employment. This level of employment would slightly decrease as higher efficiency is achieved, but would still be high at 8 jobs per MW (Richter & el. al., 2009). If the CSP industry follows the moderate scenario of evolution, the amount of jobs created could be nearly 2 million, a significant fraction of which would be in MENA (Richter & el. al., 2009). Another important factor to consider is that by the year 2050 MENA is expected to have the same power and drinking water requirements as Europe. This challenge could also be addressed by implementing the Desertec project. A 250 MW collector field (CSP plants in MENA are expected, at full capacity, to produce 470,000 MW by the year 2050) located near the sea shore to use saltwater for the cooling units, could produce 100,000 m3 of drinking water every day using the process of water desalination (www.desertec.org). That is more than 4 million liters of drinking water produced per hour.

Climate change is expected to have dire consequences for the whole world, and unfair as it is, the developing world's contribution to the increased atmospheric temperatures is minimal, but they are expected to suffer the most. Needless to say, MENA is not an exception. The World Bank expects the region to severely suffer the consequences of climate change.

Temperatures will rise up to 2 degrees in the next 15-20 years and over 4 degrees by the end of the century. Higher temperatures accompanied by less precipitation have already increased the frequency of droughts, from one event every 10 years at the beginning of the 20th century to five or six events each decade (http://beta.world bank.org). Rising sea levels could also have devastating effects for ports and coastal cities. For such reasons it is of the utmost importance that the Desertec project is implemented to help mitigate these effects by enabling European and MENA consumers to make a switch in their energy consumption patterns.

Europe could also enormously benefit from the implementation of the Desertec project. The benefits of having an atmosphere with acceptable levels of CO2 have already been mentioned in this paper, and this view is shared by 97 percent of climate scientists (Doran & el. al., 2009). Desertec's positive impact on the climate change would not be limited to its own capabilities. This project could be a beacon for other endeavors to take place around the world. It could have the effect of inserting the world into a virtuous cycle of eco-friendly energy production patterns. Stopping climate change would be a colossal benefit on its own.

Europe has been a leader for years on matters regarding climate change prevention. The European CO2 emissions targets are amongst the most ambitious. The EU agreed under the Kyoto protocol to cut down CO2 emissions by 8 percent below 1990 levels by 2012 (www.pewclimate.org). Moreover, the

IPCC expects the EU to cut its emissions by 30% below 1990 levels by 2020 and that level should be reduced even further by 2050 (Hohne & el. al. , 2008). Through providing 15 percent of Europe's electricity by 2050, The Desertec project could certainly help Europe achieve its emissions targets.

Additionally, energy independence is matter of strategic priority to several European leaders because it will reduce Europe's dependency on Russian gas. For countries to deeply depend upon another to receive the energy needed to function normally proves to be dangerous. Almost 25 percent of the EU's gas supplies come from Russia, and around 80 percent of that is delivered through Ukraine. This arrangement of gas supply has already brought Europe serious problems when last year, in the coldest months of winter, Russian decided to cut off Europe's supplies of gas that run through Ukraine's pipelines. The decision by the Russian authorities was based o the belief that Ukraine was stealing vast amounts of gas aimed at European customers while it was transported through pipelines on Ukrainian territory (Walt, 2009). Regardless of the reasons that triggered this particular incident, heavy dependence on Russian energy could weaken European countries' bargaining position on every diplomatic issue that might arise between Europe and Russia.

The Desertec project could be an attractive alternative for Russian gas. Even if the eastern gas is replaced by yet other foreign providers such as MENA countries, the difference lays in the fact that the electricity from CSP in MENA would be produced by a number of different countries through an extensive and interconnected grid and thus, the likelihood of occurrence of unexpected interruptions of energy supply services would be dramatically reduced.
Yet, the project has also some weaknesses. It is based on a multinational alliance between the public and private sectors of a wide array of nations. Reaching an extensive web of agreements could turn out to be extremely challenging. Without this alliance, the project could not be developed, or at least it could not be utilized at its full potential. Furthermore, on top of the agreements which have to be reached and maintained, the project requires extraordinary amounts of investment to become functional. The investment would come from private companies as well as governments. The world has recently experienced that even mammoths of the private sector can fail and thus, endangering each and every one of their investments.

Conclusion

When in 1949 Gunnar Jahn, the chairman of the Nobel Committee, introduced Sir John Boyd Orr who was awarded the Nobel Peace Prize for his scientific research on nutrition, he said, "…however great his scientific contributions may have been, they alone would not have earned him the Peace Prize, for scientific discoveries cannot, in them-

selves, create peace. It is only when they are employed to promote cooperation between nations that they become a valuable factor in the cause of peace" (Jahn, 1949). That statement is an accurate representation of the spirit behind the Desertec project. This project would bring together, through scientific development in the form of CSP, a wide variety of Nations that might otherwise not have many things in common.

Skeptics are concerned about the location of the CSP plants. They believe that the MENA region is not stable enough to entrust it with such a grand portion of Europe's energy. What they fail to see is that a stable MENA could be achieved through economic and social development. Desertec is a project that would bring energy and jobs to the region. It could also create millions of liters of drinking water each day in an extremely arid area. Furthermore, the project could help mitigate the devastating effects that global warming is expected to have on MENA and elsewhere. Desertec could act as a fraternizing bridge between the rich Europe and the poor Middle East and Northern Africa. This project has the potential to benefit countries on multiple levels and one can only hope that soon Desertec will become a reality.

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INTERNET OF THINGS DRIVES SUPPLY CHAIN INNOVATION: A RESEARCH FRAMEWORK

Bo Li*
Operations and Supply Chain Management
Department of Management
College of Business and Economics
California State University, Los Angeles, USA
*Corresponding author: bli39@calstatela.edu

Yulong Li
School of Management
Simmons College, USA

Abstract

Similar to the way the Internet connects all computers, the Internet of Things (IoT) connects most products, machines, and people together. This concept has been realized recently through new technologies in sensor devices, data storage and analysis equipment, and decision-making tools. As the IoT has gained popularity in recent years, the potential to use it in supply chain management (SCM), especially supply chain innovation (SCI), has become much greater. While most companies and supply chains have already achieved excellent success using traditional supply chain and operations methods, such as lean production and total quality control, SCI has become critical for an organization to access new opportunities of disruptive improvement to maintain its competitive advantages in the dynamic IoT-enabled business eco-system.

Responding to recent calls from both academia and industry, this paper investigates the concepts of IoT, SCM and SCI, explores IoT's impact on each aspect of SCM, and develops a research framework to demonstrate how IoT could support SCI, which offers supply chain members a new stage where they can further improve their overall perform-

ance. This study provides the theoretical foundation, and identifies the research and practical opportunities, for academic scholars and industrial decision makers in the IoT and SCI fields.

Key Words: Internet of Things, Supply Chain Management, Supply Chain Innovation, New Technology Management, Research Framework

Introduction

The Internet of Things (IoT) has transformed our lives before being implemented in the field of supply chain management. IoT is leading to a more "connected life", through wearable fitness devices, connected household appliances, and smart phones and watches. IoT connects everyday items, like heart monitoring sports shirts, sleep monitors, and smart refrigerators to networked devices such as computers and smartphones, so that these devices are able to "talk" to each other, and users can manage their lives through computers or smart phones. For instance, IoT connects smart phones with light bulbs, garage doors, and even toilets. Smart fabrics use the built-in sensors to monitor human health and communicate with healthcare providers in real time (Burkett & Steutermann, 2014). Smart cars are another example, in that they provide entertainment, safety, and self-driving functions using IoT technologies such as big data and machine learning. Cars can collect data from travelers, real-time traffic, and Wi-Fi hotspots, and even tell users when an engine may go to break down, and needs to be maintained or replaced (Lever, 2015).

In the age of the IoT, physical assets are equipped with sensors, and linked in an information sharing system to facilitate communication and collaboration through data analysis and decision-making tools. By 2020, the IoT is expected to extend to about 26 billion network-connected devices, enabling the monitoring of nearly every machine and human activity, from how many steps we walk every day to the way machines run every second (Rivera & Goasduff, 2014). Cisco predicts the IoT boosts global corporate profits by twenty-one percent and its market is to be $19 trillion dollars (Kharif, 2014). The supply chains that respond and adjust to this fast IoT growth will achieve greater benefits and more competitive advantages in the new business environment. Thus, management needs to revise and make new plans to develop and update their existing systems and practices of most business functions, such as designing, sourcing, operations, transportation, customer relationships, marketing, human resource, accounting, and finance.

Although there is great potential for IoT in SCM, the real business value of

IoT in the supply chain has not yet been fully recognized or thoroughly addressed (Borgia, 2014; CERP-IoT, 2009; Deloitte, 2015; Qiu, Luo, Xu, Zhong, & Huang, 2015; Yang, Yang, & Plotnick, 2013; Zhou, Chong, & Ngai, 2015). According to a recent survey by Accenture to large global companies with more than 1,000 senior managers, most companies (about 90%) still have difficulty understanding how the IoT can benefit their supply chains (Accenture, 2014).

By linking machines, products, people, and supply chain members, the IoT provides a new environment for supply chain managers (Banker, 2014; DeGroote & Marx, 2013; Eddy, 2014). It enables process integration and information communication, allows machine-enabled decision-making, and fosters more efficient and effective supply chain management. In this entirely new business and technology environment, supply chain managers need to innovate their traditional SCM practices and strategies.

Supply chain innovation (SCI) is the mindset and practice of creatively exploring and leveraging the opportunities existing in SCM for creating competitive advantages (Arlbjorn, de Haas, & Munksgaard, 2011; Hyll & Pippel, 2016; Prahalad & Krishnan, 2008). Many researchers and practitioners see SCI as the next stage of innovation and a new power to develop and improve the current SCM paradigm. Innovation is viewed as the product of a supply chain network, rather than of a firm (Freeman & Soete, 1997; Luzzini & Ronchi, 2011), because innovation comes from interaction and collaboration with other organizations and supply chain members (Edquist, 2001; Maskell, Pedersen, Petersen, & Dick-Nielsen, 2007). Recognizing the important value of SCI, the American Council of Supply Chain Management Professionals grants the Supply Chain Innovation Award to the industry winners annually, such as Cisco, Hewlett-Packard, and Intel (Arlbjorn et al., 2011). Although both industry and academia have fully realized the importance of SCI, further research into the "know-how" of SCI is still missing (Caniato, Caridi, & Moretto, 2013).

Responding to the above research gap and practical calls, we have developed this study through the following research and practical focuses:
1. Exploring the IoT application opportunities in the SCM and SCI fields.
2. Investigating the determinants of SCI.
3. Illustrating the logic and relationships between IoT, SCI, and SC performance.
4. Developing a research framework as the foundation for future research.

We organize this study in the following order: Section 2 provides the introduction and formal definitions of IoT by integrating the understandings of IoT in both academia and industry, and introduces the current development and applications of IoT. In Section 3, we propose a research framework to illustrate the relationship between IoT, SCI,

and SC performance. The conclusion and future research opportunities are discussed in Section 4.

The Internet of Things and its Current Development

Definition of the Internet of Things (IoT)

The IoT is also known as machine-to-machine (M2M), Industrial 4.0 or Industrial Internet of Things (IIoT). The term "Internet of Things" was first introduced by Kevin Ashton and other researchers at the Auto-ID center at Massachusetts Institute of Technology (MIT) in the late 1990s (Borgia, 2014). These pioneers had the vision of a smart world where the Internet and physical objects were connected, and defined the IoT as "an intelligent infrastructure linking objects, information and people through the computer networks, and where the RFID technology found the basis for its realization" (Brock, 2001, p. 5). The IoT became more interesting to researchers and practitioners when the International Telecommunication Union published a report to describe the significance of the IoT that "a new dimension has been added to the world of information and communication technologies: from anytime, anyplace connectivity for anyone, we will now have connectivity for anything. Connection will multiply and create an entirely new dynamic network of networks – an Internet of Things" (ITU, 2005, p. 2). Beyond the above four 'A's, CERP-IoT added any path/ network and any service, and defined IoT as "a dynamic global network infrastructure with self-capabilities based on standard and interoperable communication protocols where physical and virtual "things" have identities, physical attributes, and virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network" (CERP-IoT, 2009, p. 6; IERC, 2016, p. 1).

More recently, Gartner Research provided a definition of IoT as "the network of physical objects accessed through the Internet that contain embedded technology to sense or interact with their internal states or the external environment" (Rivera & Goasduff, 2014, p. 1). Zhou et al. (2015) saw the IoT as a world where objects are connected, monitored, and optimized through wired, wireless, or hybrid systems.

Burkett and Steutermann (2014) identified three main parts of the IoT: (1) the things, which generate data through embedded sensors; (2) the networks that connect the things and store the datasets; and (3) the systems that process and analyze the data to support or make the decisions. In Table 1, we summarize the different definitions of the IoT from the major sources.

IoT and Big Data Analysis

Big data analysis plays one of the most critical roles in the IoT framework. The growth of IoT technologies, including sensors, data collection and connection with cloud datasets, data analysis

Table 1. The summary of IoT Definitions

Articles	Definition
European Research Cluster on the Internet of Things (CERP-IoT, 2009, p. 6) (IERC, 2016, p. 1)	"A dynamic global network infrastructure with self-configuring capabilities based on standard and interoperable communication protocols where physical and virtual "things" have identities, physical attributes, and virtual personalities and use intelligent interfaces, and are seamlessly integrated into the information network."
(Brock, 2001, p. 5)	"An intelligent infrastructure linking objects, information and people through the computer networks, and where the RFID technology found the basis for its realization."
International Telecommunication Union (ITU, 2005, p. 2).	"A new dimension has been added to the world of information and communication technologies: from anytime, anyplace connectivity for anyone, we will now have connectivity for anything. Connection will multiply and create an entirely new dynamic network of networks – an Internet of Things"
Gartner Research (Rivera & Goasduff, 2014).	"The network of physical objects accessed through the Internet that contain embedded technology to sense or interact with their internal states or the external environment"
(Zhou et al., 2015)	IoT refers to a world where objects are connected, monitored, and optimized through wired, wireless, or hybrid systems
(Burkett & Steutermann, 2014)	Three main parts of the IoT: (1) the things, (2) the networks, and (3) the systems.

and decision-making tools, has enabled companies to access increasingly massive amounts of data and equip them with more powerful analytical tools to support their strategic and tactical decisions (SAS, 2015).

Simply bringing the IoT data together is not enough for decision-making. The IoT data needs an analytical platform to identify the hidden patterns, predict future trends, forecast sales, usage and costs, and analyze data streams in real time, in order to take the business

insights and optimize management decisions. One of the most popular IoT analysis and decision-making tools is machine learning, where based on algorithms, machines can automatically learn from data, build models, and provide the optimized solutions (Carbonneau, Laframboise, & Vahidov, 2008; Pyle & Jose, 2015). IBM's Watson, and Google's Nest Labs, have demonstrated self-learning and automated decision-making systems, which are applicable to many sectors such as advanced science and home energy management (Burkett & Steutermann, 2014).The IoT is essentially a platform that integrates several technologies, including big data analysis. The IoT stack contains: (1) IoT data that is collected from factory automation assets such as sensors in equipment, radio-frequency identification (RFID), and cameras; (2) Connectivity technologies such as the Internet, Wi-Fi, and M2M, which transfer all the data to a cloud; (3) The cloud, which provides a computing and storage environment for the data; (4) Decision-making systems such as big data analytics and machine learning, which analyze the data, provide insights and make decisions. (5) Results which are available to end users through user apps such as Enterprise Resource Planning (ERP), wearable gargets, and other mobile devices (Guo, Ngai, Yang, & Liang, 2015; O'Marah & Manenti, 2015).

Big Data analysis is thus a key area of IoT, acting like a human brain which collects and stores the data, analyzes and transfers the information, and supports or makes the decisions.

Current IoT Evolvement in the Developed and Emerging Markets

The IoT creates game-changing opportunities and supports SCM from many perspectives, such as sourcing, production, and distribution. The potential for using the IoT in supply chains is huge. It is said that optimizing asset usage and operations could contribute $1 trillion in opportunities annually within industrial industries (Hitmar, 2014).

In the developed economy, a number of leading global companies have begun the journey towards adopting the IoT. Beyond fighter jets production, Lockheed Martin predicts customer needs of IoT based supply chain services, and enhances its IoT services capacity and capability through investment in space and satellite technology, which serves as the primary domain for greater global connectivity of data from land, sea or the air (Lockheed-Martin, 2015). Coca-Cola's Freestyle beverage machine allows customers to customize the flavor of their drinks, and records and stores customer choices data to the cloud for future product design (Lindner, 2014). Coca-Cola has reported the significant market gains from these connected vending machines (Woods, 2015). The teams in the US National Basketball Association use IoT technologies to screen players. GE has made hundreds of millions of dollars from optimizing their engine

performance, anticipating breakdowns, and streamlining maintenance based on real-time data feed from the sensors monitoring air pressure, humidity, temperature, and other status of machines and productions (Pyle & Jose, 2015). Cisco has developed the VMES platform (Virtual Manufacturing Execution System) to provide real-time visibility and better orchestration by connecting and gathering real-time data through their supply chains (O'Marah & Manenti, 2015). Developed economies have already felt the great impact from the IoT, given the potential for large cost savings and high adoption rates.

Similarly, the developing economies also generate an estimated thirty-eight percent overall value from the IoT, and still growing rapidly. The developing economies will be the prime adopters of the IoT, as they are mostly manufacturing-intensive economies and have fewer legacy technologies and equipment to replace (Bughin, Chui, & Manyika, 2015). For example, many factories in China have begun to use IoT technologies and have reaped benefits in many aspects of their supply chains. Since 2012 the "Auto-ID" lab at Fudan University in Shanghai has used an agricultural IoT project to improve food quality in China (Junyu & Hao, 2013). Li Keqiang, the current Premier of China, has proposed the concept of "Internet+" referring to the application and integration of Internet technologies and traditional industries, in order to improve efficiency and reduce costs (State-Council-of-China, 2016). The key industrial sectors that Li emphasized include manufacturing, finance, logistics, agriculture, energy, finance, and public services (Xinhua, 2016).

The Research Framework of IoT and SC Innovation

IoT with Sourcing Innovation

While many companies rely on their supply base to support their innovation, the way to manage the suppliers innovatively became a critical question for every supply chain manager. Purchasing innovation includes many elements, such as purchasing the most advanced products (Hoffmann & Broekhuizen, 2010), developing and collaborating with innovative suppliers (Schiele, 2006), and innovatively managing the suppliers and the purchasing department (Luzzini & Ronchi, 2011).

As the IoT shortens the distance between suppliers and manufacturers, it also provides a solid foundation on which supply chains can optimize total inventory levels and lower the total costs for both suppliers and focal companies through data analysis and real-time decision making, in pricing strategies and inventory fulfillment (Fan, Tao, Deng, & Li, 2015; Reaidy, Gunasekaran, & Spalanzani, 2015; Thiesse & Buckel, 2015). The IoT changes the boundary between companies and enables organizations to build a trustworthy and profitable supply chain relationship. For ex-

ample, Wurth USA, an auto-parts supplier, implements IoT to monitor their inventory level, control purchasing quality, and make their inventory replenishment decisions (Bughin et al., 2015). It is noted that the IoT benefits collaborative and information-sharing supply relationships, which enable and encourage purchasing innovations. Thus, we propose the hypothesis:

H1a: The IoT will positively affect sourcing innovation.

IoT with Operations Innovation

The IoT is creating a new operation environment where each physical asset is individually identified with an ID, intelligently connected into a network, and digitally visible to the whole supply chain at a by-unit level and in real time. In this new IoT operations environment, people and machines work together, materials and information flow visibly in real time, and supply chain managers and strategic decision makers orchestrate the entire supply chain.

The IoT assists shop-floor workers by providing smart wearable gadgets, such as glasses, watches, and other portable, connected accessories. These gadgets merge relevant and real-time information, offer optimized solutions, and bring the workers what they need when they need it. A worker attending a machine can use the real-time data and instruction information to obtain assistance and make decisions. For example, a device installed on safety glasses can scan the barcode, display instructional video and audio, and help discover and resolve workflow issues (Hitmar, 2014). Human-robot teamwork has been initiated in many IoT operations environments. Amazon Robotics (formerly Kiva Systems) makes robots that can "listen to" worker instructions, automatically select products, and bring them to the workers, rather than the workers walking a long distance or carrying heavy products (Kim, 2015).

The IoT also supports operations planning, through offering opportunities to predict demands, production outcomes and failure rates, and to guide machinery maintenance. Analysis of the sensor data collected from an IoT operational network could sense machinery status, predict output variation, alert management to unusual signals, or even automatically make adjustments to respond. For example, with about 60,000 vehicles and high costs from breakdowns and accidents, the United Parcel Service, Inc. (UPS) traditionally has to replace all key vehicle parts every two to three years, even when many of them are still in good conditions. Now UPS has sensors on each vehicle that monitor every part and flag those that need to be repaired or changed. By using this IoT system, UPS reduces unplanned downtime and saves millions of dollars (Hessman, 2014). According the above analysis, we propose the following hypothesis:

H1b: The IoT will positively affect operations innovation.

IoT with Logistics Innovation

The IoT leads different aspects of innovation in logistics, such as innovations in warehousing, distribution, and transport between all supply chain stages. The IoT platform in third party logistics (3PL) shares and analyzes the data, matches demand and supply, improves the quality standard and information transparence of transportation, and eventually integrates and optimizes the logistics system. The IoT enables those 3PL and other companies to innovatively improve the flexibility, integration, agility, and responsiveness of their logistics processes (Reaidy et al., 2015; Zhong et al., 2015). For example, a logistics company attaches tracking devices to their containers not only to follow their movements, but also to monitor the temperatures and condition of goods inside the containers, which is the most important and challenging aspect of cold supply chains such as food, drink and healthcare shipments (Ho, Lin, & Chiang, 2009; Lawson, 2016). The IoT also enables the creation and fast development of Fourth-Party Logistics (4PL) companies, which monitor and share real time physical status and logistics information with all partners, and then quickly develop efficient and effective optimal solutions based on the unique situation of each individual case (Huang, Cui, Yang, & Wang, 2013; Liu, Zhang, Zhu, & Rao, 2014; Vivaldini & Pires, 2013).

New auto IoT technologies implemented on vehicles are another important application of the IoT in logistics field. Automakers and tech giants are in partnership to make driverless cars and trucks. Google, Apple, and Microsoft are competing to create a vehicle operating system with which they can develop apps to integrate vehicles with smartphones, databases in the cloud, and other IoT services. Microsoft maintains long-standing partnerships with Ford, Fiat, Nissan, and Kia, and has built the "Windows Embedded Automotive 7" system that delivers in-car experiences (Microsoft, 2016). Apple has developed the "CarPlay" system to connect its smart phones and watches to automotive electronics systems (Apple, 2016). Recently, Google has worked with General Motors, Audi, Honda, and Hyundai to bring the "Android Auto" system to vehicles (Android, 2016). Mazda partnered with OpenCar, a US software firm, to launch "Mazda Connect" System, a browser-based system providing a much wider range of applications beyond Android and Apple (OpenCar, 2015). Those new IoT technologies are leading the innovation in transportation and logistics industry and providing the new customer experience and innovative business environment to consumers and supply chain members (Griffith, 2014; Kirk, 2015; Lever, 2014).

We propose the following hypothesis.

H1c: The IoT will positively affect logistics innovation.

IoT Designing Innovations

While traditional supply chain management starts from sourcing or purchasing, the most recent research literature emphasizes the important role of design in SCM (Lambert, 2014; Simchi-Levi, Simchi-Levi, & Kaminsky, 2008). New product/ service development depends on collaboration among all members of supply chains including consumers, rather than only the focal company (Bottani & Montanari, 2010; Caniato et al., 2013; Kilian, Sarrazin, & Yeon, 2015). IoT technologies support design innovation by efficiently collaborating the mobile and distributed resources, including engineers, manufacturers, machines, and customers in real-time, in designing products and services. We analyze this statement from the following three perspectives.

First, the IoT provides a more comprehensive and real-time channel for the voice of customers (VOC). The VOC is key to new product/ service design, but customers usually speak in "code", which is hard to fully understand. Co-creation with customers has become a best practice in many new product/ service designing processes. Collecting and understanding the VOC plays an important role in the whole design process, including initial ideas, planning, prototypes, mass production, and feedback and assessment after the launch of the new products (Jeppesen & Molin, 2003; Roberts, 2000). Traditionally, product managers, designers, and top executives have relied on interviews, surveys, and focus groups to collect and understand the VOC (Dewald & Truffer, 2011; Evans & Lindsay, 2012). In the age of the IoT, real-time information about suppliers, operations, and customers is available to analyze and support decision-making. Using the IoT data collected from the sensors built in to everything in the supply chain, the designers and decision makers are able to more innovatively identify new customer segments, create new designs, and update existing designs, to create more value for customers efficiently and effectively (Bughin et al., 2015; Porter & Heppelmann, 2014).

Second, the IoT also provides powerful tools for designing innovation. Linking 3-D printers with other machines and databases, the IoT allows supply chain leaders and designers to quickly respond to the market trends, deliver products on demand, and test the market at much less time and cost (Eddy, 2014). The IoT technology also could connect the local computer aided design (CAD) software into the machine-to-machine world, where design teams that are geographically dispersed are able to collaborate by sharing the real-time and graphics-intensive information globally (Burkett & Steutermann, 2014).

Third, the IoT provides the possibility and platform for new strategies and models to create new values. Supply chains need to offer their customers a solution package, including products, service, and overall experience, rather than a tangible product only (Craighead, Blackhurst, Rungtusanatham, & Handfield, 2007; Kastalli & Van Looy, 2013; Tether, 2005). The IoT allows traditional manufacturing supply chains to design and provide service products to their customers, beyond their manufactured products (Burkett & Steutermann, 2014; Porter & Heppelmann, 2014). As the IoT tracks when and how physical assets are actually used, supply chain designers are able to offer their services for use. For instance, automobile companies can begin to sell their IoT services, such as 4G and driverless functions enabled by geolocation devices and sensors (Bughin et al., 2015; Lever, 2014). The newly designed service not only increases the revenue of the traditional manufacturing companies, but also increases their customer loyalty and maintains their sustainable competitive advantages.

According to the above analysis, we propose the following hypothesis:

H1d: The IoT drives design innovation forward.

Supply Chain Innovation

In the dynamic and competitive business world, innovation plays a critical role in every organization (Damanpour, 1991; Porter & Millar, 1985; Subramanian & Nilakanta, 1996). Although the supply chain management literature has discussed the term and recognized the importance of supply chain innovation (SCI), there are relatively few academic studies of the content and determinants of supply chain innovation (Arlbjorn et al., 2011; Mazzola, Bruccoleri, & Perrone, 2015).

Arlbjorn et al. (2011) conducted a systematic literature review, and defined SCI as "a change (incremental or radical) within the supply chain network, supply chain technology, or supply chain processes (or combinations of these) that can take place in a company function, within a company, in an industry or in a supply chain in order to enhance new value creation for the stakeholder." (Arlbjorn et al., 2011, p. 8). According to this definition, they classified the main elements of SCI as supply chain business processes, supply chain network structures, and supply chain technology. More recently, Tan, Zhan, Ji, Ye, and Chang (2015) pointed out the importance of big data analysis in supply chain innovation and proposed an analytic infrastructure framework using big data to support supply chain management decision making. Lee, Lee, and Schniederjans (2011) studied the relationship between supply chain innovation and organization performance in the healthcare industry, and Caniato et al. (2013) focused on supply chain innovation in the fashion industry.

In extending the above research, we view supply chain innovation (SCI) as a creative and innovative way to design the supply chain network, organize the supply chain members, and develop new business models for current supply chains. Innovation in organizations needs collaboration and integration between different components, based on information sharing and strategic decision-makings. Innovations in different sections of supply chains will provide supply chains with more creative and profitable opportunities in a new and broader view. We propose the hypotheses as follows:

H2a: Sourcing innovation positively affects supply chain innovation.

H2b: Operations innovation positively affects supply chain innovation.

H2c: Logistics innovation positively affects supply chain innovation.

H2d: Designing innovation positively affects supply chain innovation.

Supply Chain Innovation and Supply Chain Performance

Innovation is one of the most powerful tools with which companies can maintain their competitive advantages and improve organizational performance. SCI provides creative solutions which supply chain decision-makers can use to deal with uncertainties in the dynamic and competitive business environment (R. Hartono & Sheng, 2016; Porter & Millar, 1985). Researchers have found that SCI provides opportunities to increase supply chain efficiency (Fisher, 1997; S. Hartono & Sobari, 2016), improve product and service quality (Flynn & Flynn, 2005; Lin, 2008; Tejaningrum, 2016), encourage supplier cooperation (Lambert, 2014; Shin, Collier, & Wilson, 2000), create more effective customer value (Arlbjorn et al., 2011; Potts et al., 2008), increase sustainable market shares (Demirel & Mazzucato, 2012; Oh, Cho, & Kim, 2015), and support an organization's social responsibility (Borup, Brown, Konrad, & Van Lente, 2006; Huggins, Johnston, & Thompson, 2012; Seyfang & Longhurst, 2016), in both large corporations and small and medium enterprises .

While traditional lean and JIT practices have played important roles in improving supply chain performance, SCI offers a new stage of improvement through different perspectives and methodologies. SCI thus has a positive relationship with supply chain performance. The following hypothesis is proposed:

H3: Supply chain innovation positively affects the business performance of the supply chain.

Summarizing the above analysis, we propose our research framework in Figure 1. This framework serves as a conceptual model to illustrate the logics

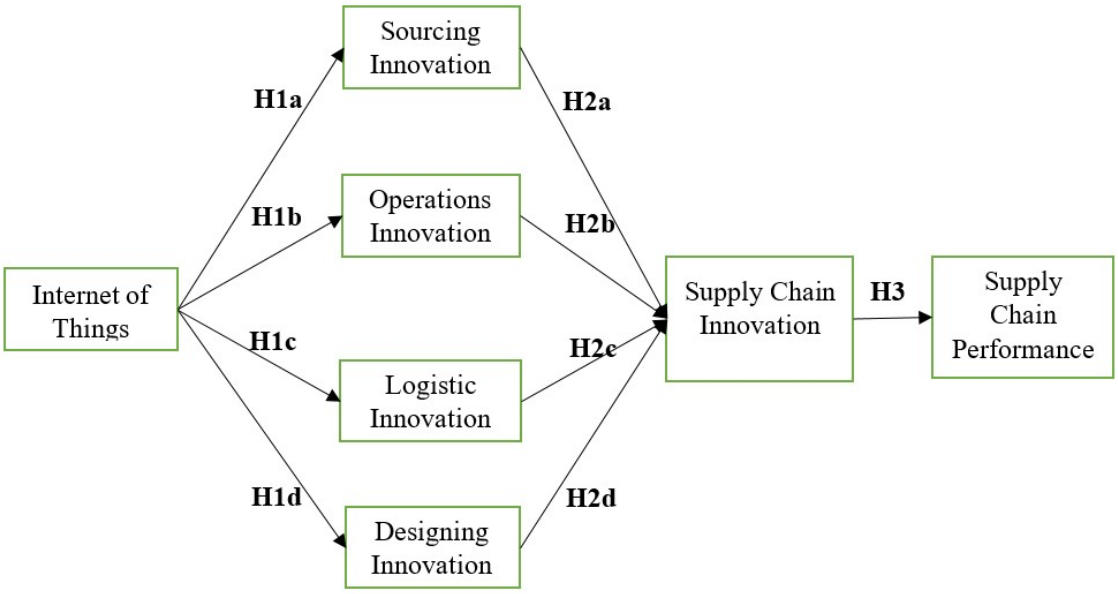

Figure 1. The Research Framework

and relationships between the IoT, SC innovation, and SC performance.

Further Discussion

Responding to these current trends of new business and operational environments, this research explored the definition and current development of IoT, discussed its impact and application to SCI, and proposed a research framework to illustrate the relationship between IoT, SCI, and SC performance. The Internet of Things (IoT) is leading supply chain innovation (SCI) and supply chain management (SCM) into a connected world with the sophisticated integration of data, resources, activities, and processes across departments and supply chain members. This research exploring that the new business and technology environment, supported and encouraged by IoT, enables supply chain managers to creatively solve existing and potential problems, develop more strategic and tactical plans to support supply chain innovation, and continuously improve supply chain performances through innovative SCM strategies and practices.

Beyond this research framework, which serves as a foundation for future research, we also identified several fu-

ture research opportunities as follows. The first is the IoT ecosystem and implementation issues. The key to achieve the benefits of IoT is information sharing and integration, however, due to the financial barriers and conflicts of interest between different companies, the implementation of IoT at the supply chain level is much more challenging. Large companies that have enough market power and strong financial supports could thus initialize IoT adoption, followed by their vendors, and eventually the whole supply chain and its related supply chains. They could establish an IoT ecosystem, providing opportunities to fully achieve the benefits of the IoT for SCI and SCM performance.

A second research opportunity is in cyber security and supply chain risk management. While we enjoy the benefits of the IoT and smart technologies, we have to address the increased privacy and cyber security issues. Future research could study at least two following issues. On the one hand, as a system with more devices becomes more complex to manage, the IoT technology could bring potential risk into supply chains. On the other hand, we can view the IoT as a powerful tool to improve supply chain security if the supply chain mangers can organize and use the IoT well. For example, the IoT can secure supply chains by pro-actively screening the potential risk using real-time data, and quickly respond to those risks using the connected and automated networks.

The final research opportunity is to study the effects of the IoT on different types of innovation. For example, by modifying the innovation typology proposed by Francis and Bessant (2005), researchers can investigate the relationship between the IoT and SCI from four different perspectives: SC product innovation, SC process innovation, SC position innovation, and SC paradigm innovation.

Overall, the existing and future issues of the IoT, SCI, and SCM performances leave many opportunities for the managers and researchers in relevant fields. This explorative study and proposed framework could serve as a foundation supporting future research for improving SCI and SCM performances in this dynamic IoT-enabled environment.

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MOTIVES/REASONS FOR TAKING BUSINESS INTERNSHIPS AND STUDENTS' PERSONALITY TRAITS

J. M. Moghaddam
Department of Management,
Craig School of Business, California State University, Fresno
johnm@csufresno.edu

Abstract

This study empirically evaluates the motives/reasons behind students' taking business internships and explores the relationships between such reasoning and the students' personality traits. The outcomes of this study suggest that the predominant reasons/motives for students' taking an internship are acquiring practical experience, building up resume, and learning new skills. On the other extreme, gaining academic credits and financial rewards do not play a significant role in their decision making process. Students' personality traits also have significant impacts on such decisions particularly with respect to the extent of their internal locus of control, need for achievement, and goal orientation.

Keywords: Internship, Motivating Factors, Personality Traits, Business Education, Practical Experience

Introduction

Internships have the potential to shape students' career paths. They can provide students with the required practical skills and real-life experiences that are vital in securing a suitable, competitive career. The outcomes of a survey conducted by Gault et al. (2010) indicate that undergraduates with internship experience have significantly more full-time opportunities. In view of that, to fulfill the prospective employer's requirements, business schools have been using internships as a means of preparing students for their future careers. The effectiveness of intern-

ships may, however, be linked to the extent of holding interns accountable for the outcomes of their assignments. To achieve accountability for meaningful work, Reding et al. (2013) suggest that "companies should give interns responsibilities comparable to those of entry-level staff personnel and compensate them accordingly." However, Hargert's (2009) study found that students place a great value on the internship experience, particularly when the internship has a direct connection to their ultimate career goals. He further states that: "The value of the internship will be maximized if educators can provide the appropriate structure and integrate the experience with the academic background of the student." Such integration can be achieved through incorporation of internship into curriculum as academic credits.

In line with the recent trends, California State University, Fresno, in general, and the Craig School of Business (CSB), in particular, have been placing an increasing level of emphasis on student internship programs. The Craig School Internship Program prides itself of not merely being a source of providing students with temporary jobs. "Unlike a part time job, a student receives academic credit upon completion of an Internship. Also, the Internship (designed by the student and employer) provides the student with a progressive learning and growth experience, rather than a repetitive activity which is usually associated with a part time job" (Craig School of Business, 2016). Soliciting views of CSB students who participated in the school's internship program, this study empirically evaluates what motivated them to take a business internship and explores the relationships between such motives and their personality traits.

Research Hypotheses

The outcomes of author's earlier studies suggest that overall students find internships to be an effective means of providing them with practical business education and preparing them for their future careers. Such perceptions and expectations were, however, stronger for those students who had not yet taken an internship than those who had taken or were currently taking one. Likewise, personality traits had more impact on perceptions/expectations of those students who had not yet taken an internship (Moghaddam, 2009, 2011, 2014). To complement these findings, this study compares and contrasts the extent to which achieving academic credits, gaining financial rewards, acquiring knowledge/skill, gaining practical experience, and achieving career goal were the motivating factors for those students who actually participated in a business internship program. Accordingly, this study hypothesizes that:

Hypothesis I: Students' desire to take a business internship goes far beyond

receiving academic credits and financial rewards.

Furthermore, students' personality traits may have an impact on their decisions in taking a business internship. Therefore, this study also explores the impacts of eight personality traits (locus of control, need for achievement, need for power, need for affiliation, risk-taking propensity, tolerance for ambiguity, goal orientation, and openness to experience) on shaping students' reasons/motives in taking business internships and hypothesizes that:

Hypothesis II: Students' personality traits have an impact on their deciding to take an internship.

Research Survey

This study is based on a portion of outcomes of a comprehensive, ongoing research survey which took place at the California State University, Fresno, for over four years. Students from twenty-two sections of the production/operations management course at the Craig School of Business participated in this survey. To maintain confidentiality and increase the research accuracy, the survey was placed on the course's secure website, did not require students to provide their names, and assured them that their responses will not affect their grades.

The survey was composed of three web-based questionnaires and conducted over the last three weeks of each semester. The first group of questions solicited students' demographic information and measured their personality traits. The second phase of the survey contained a wide variety internship-related questions. And the last questionnaire dealt with various aspects of the web-based portion of the production/operations management course. This study concentrated on the outcomes of portions of the first and second survey questionnaires.

Survey Participants

A total of 899 students constituted the survey group. Eight hundred (88.99%) of them completed the first and second survey questionnaires. To test the research hypotheses, these students were divided into two groups of those who had not yet taken an internship (n = 599) and those who had already taken one or were currently at the conclusion of their internship projects (n = 201). The findings of this study are based on the responses of the 201 students (the second group) who actually took part in the school's internship program.

The age of these students ranged from 20 to 53 years, with a mean age of 23.87 years and standard deviation of 3.919 years. They were made up of 92 male students (44.8%) and 109 female students (54.2%). They were representa-

tives of a cross-section of different business disciplines/options with an emphasis on fields of accounting, management, marketing, and finance. They were also representatives of a cross-section of different grade point averages with a majority of between 2.5 and 3.5. Majority of them were single (81.1%, n = 163) and had no children. Majority of them (45.3%, n = 91) were White/Caucasian, with 28.4% (n = 57) Hispanic/Latino, 15.4% (n = 31) Asian American, and the remaining 11% (n = 22) a combination of African American/Black, Native Hawaiian or other Pacific Islander, and American Indian or Alaska Native.

Students' Motives/Reasons for Taking an Internship

As indicated above, the second questionnaire dealt with various aspects of the school's internship program. This study concentrated on the outcomes of eight of the second questionnaire's questions/statements indicating the students' motives/reasons for taking a business internship. Using a seven-point ordinal scale ranging from strongly disagree to strongly agree, students were asked to indicate the extent to which each of these motives/reasons were an impetus for their taking an internship. Table 1 presents these motivating factors and their rankings, means, and standard deviations.

Table 1: Motives/Reasons for Taking Business Internships

I decided to take the internship because:	Rank	Mean	Std. Deviation
1. It was required by my degree program (option).	8	2.68	1.957
2. I took it as an elective course to meet my required number of units.	7	3.78	2.287
3. I wanted to gain practical experience.	1	6.39	.933
4. I wanted to build up my resume.	1	6.39	.824
5. I was hoping it would lead to a permanent position.	5	5.01	1.841
6. I wanted to make some money.	6	4.62	1.994
7. I wanted to learn new skills.	3	6.38	.740
8. I like new and challenging endeavors.	4	6.02	.982

Table 2: Correlations between Students' Motives/Reasons for Taking Business Internships

I decided to take the internship because:	Ranks	r & P	It was required by my degree program (option)	I took it as an elective course to meet my required number of units.	I wanted to gain practical experience.	I wanted to build up my resume.	I was hoping it would lead to a permanent position	I wanted to make some money.	I wanted to learn new skills.	I like new and challenging endeavors.
It was required by my degree program (option).	8	r								
		p								
I took it as an elective course to meet my required number of units.	7	r	.342**							
		p	.000							
I wanted to gain practical experience.	1	r	-.144*	-.166*						
		p	.042	.019						
I wanted to build up my resume.	1	r	.029	-.045	.542**					
		p	.687	.527	.000					
I was hoping it would lead to a permanent position.	5	r	-.046	.063	.338**	.218**				
		p	.514	.371	.000	.002				
I wanted to make some money.	6	r	-.020	-.111	.006	.073	.158*			
		p	.774	.118	.932	.305	.025			
I wanted to learn new skills.	3	r	-.107	-.169*	.614**	.559**	.280**	.076		
		p	.129	.017	.000	.000	.000	.282		
I like new and challenging endeavors.	4	r	-.022	-.080	.475**	.464**	.166*	.020	.634**	
		p	.759	.259	.000	.000	.019	.776	.000	

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Table 3: Paired Sample T-test of Students' Motives/Reasons for Taking Business Internships

Bottom-Three Ranked Motivating Factors	Top-Three Ranked Motivating Factors	Paired Differences			t	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean		
It was required by my degree program (option).	I wanted to gain practical experience.	-3.716	2.286	.161	-23.052	.000**
	I wanted to build up my resume.	-3.711	2.102	.148	-25.039	.000**
	I wanted to learn new skills.	-3.706	2.165	.153	-24.269	.000**
I took it as an elective course to meet my required number of units.	I wanted to gain practical experience.	-2.612	2.609	.184	-14.192	.000**
	I wanted to build up my resume.	-2.607	2.466	.174	-14.990	.000**
	I wanted to learn new skills.	-2.602	2.520	.178	-14.638	.000**
I wanted to make some money.	I wanted to gain practical experience.	-1.776	2.197	.155	-11.464	.000**
	I wanted to build up my resume.	-1.771	2.102	.148	-11.947	.000**
	I wanted to learn new skills.	-1.766	2.074	.146	-12.075	.000**

** Significance at the 0.01 level (2-tailed).

Table 4: Correlations between Personality Traits and the Reasons for Taking Business Internships

I decided to take the internship because:	Ranks	r & p	Personality Traits (Correlations / Significances)							
			Locos of Control	Need for Achievement	Need for power	Need for Affiliation	Risk-Taking Propensity	Tolerance for Ambiguity	Goal Orientation	Openness to Experience
It was required by my degree program (option).	8	r	.004	-.068	.088	.083	-.039	-.015	-.096	.101
		p	.959	.340	.215	.242	.578	.832	.175	.153
I took it as an elective course to meet my required number of units.	7	r	-.029	.004	.152*	.054	.081	-.048	-.006	.162*
		p	.688	.953	.031	.447	.251	.499	.929	.022
I wanted to gain practical experience.	1	r	.168*	.316**	-.035	.119	-.076	.074	.345**	.145*
		p	.017	.000	.622	.093	.285	.295	.000	.040
I wanted to build up my resume.	1	r	.110	.253**	.031	.130	-.081	.063	.397**	.102
		p	.118	.000	.658	.065	.251	.372	.000	.150
I was hoping it would lead to a permanent position.	5	r	.195**	.191**	-.029	.015	.024	-.053	.059	.055
		p	.006	.007	.688	.830	.737	.458	.402	.437
I wanted to make some money.	6	r	.008	-.117	-.182**	-.049	.038	-.164*	-.052	-.130
		p	.914	.097	.010	.489	.590	.020	.467	.067
I wanted to learn new skills.	3	r	.264**	.326**	.000	.139*	-.088	.161*	.437**	.136
		p	.000	.000	.999	.049	.212	.023	.000	.054
I like new and challenging endeavors.	4	r	.288**	.349**	.105	.193**	.101	.171*	.422**	.348**
		p	.000	.000	.139	.006	.154	.015	.000	.000

* Correlation is significant at the 0.05 level (2-tailed).
** Correlation is significant at the 0.01 level (2-tailed).

Gaining practical experience and building up resume received the highest rank (tied at first), which were very closely followed by the learning new skills. On the other extreme, students were least motivated by taking an internship as a required or elective course to meet their degree program requirements

(ranks 7 and 8). Making money was the next lowest motivating factor (rank 6). These rankings clearly reveal that students are far more motivated to participate in an internship program to improve their capabilities than just receiving academic credits and gaining financial rewards. Such findings were also complemented by the correlations between these variables. Table 2 presents the correlations (r) and two-tailed significance levels (p) between the eight motives/reasons. This study found several significant correlations between the eight motivating factors.

Motives for those *Hypothesis I*

Accordingly, these findings validated the study's first hypothesis that students' desire to take a business internship goes far beyond receiving academic credits and financial rewards. It is quite apparent that students are much more interested in gaining practical experience, building up their resumes, and learning new skills than merely securing academic credits and making money.

Relationships between Personality Traits and Motivating Factors for Taking a Business Internship

This study also examined the relationships between eight personality traits (locus of control, need for achievement, need for power, need for affiliation, risk-taking propensity, tolerance for ambiguity, goal orientation, and openness to experience) and students' motives/reasons for taking business internships. The survey's first questionnaire contained eight sets of questions which designed to measure the eight personality traits of respondents. The format of these questions were similar to those that were used by Lumpkin and Erdogan (1999). Table 4 presents the correlations (r) and two-tailed significance levels (p) between these personality traits and the eight motivating factors.

Locus of Control

According to the Rotter's (1966) hypothesis, individuals with an internal locus of control believe that they are in control of, and can induce, what happens in their lives; hence, they have a higher tendency to strive for achievement. On the contrary, those with an external locus of control attribute what happens to them to external factors (e.g., luck, fait, or other individuals or events) which adversely impact their desire to excel. Five of the Burger's (1986) ten-item scale (questions) provided the basis for measuring the students' extent of internal-external locus of control. These questions used a seven-point, Likert-type answer format ranging from strongly disagree to strongly agree. This study's alpha reliability coefficient for this personality trait was 0.501.

This study found significant correlations between the student's locus of

control personality trait and four of the motivating factors. That is, students with higher internal locus of control also liked new and challenging endeavors (p = .000) and took an internship to gain practical experience (p = .017), learn new skills (p = .000), and acquire a permanent position (p = .006). On the other hand, students' locus of control personality trait had no significant impact on their decisions in taking an internship to fulfil their degree program requirements, improve their resumes, or achieve financial benefits.

Needs for Achievement, Power, and Affiliation

David McClelland (1961) states that one's motivation primarily embodies his/her needs for achievement, power, and affiliation. The need for achievement entails one's desire/drive to excel and attain goals. The need for power encompasses one's desire to influence others' behaviors. And the need for affiliation incorporates one's sense of belonging and desire for interaction and interpersonal relationship. This study employed the Steers and Braunstein's (1976) fifteen questions (five questions for each of the three traits) to measure the extent of students' needs for achievement, power, and affiliation. Students were asked to indicate their level of agreement with these questions through a 7-point, Likert-type format. This study's alpha reliability coefficients were: 0.678 for need for achievement, 0.680 for need for power, and 0.572 for need for affiliation.

Out of the three personality traits, this study found significantly high correlations between the need for achievement and the top-five ranked motivating factors. These findings reveal that the high achievers desired new and challenging endeavors (r = .000) and took an internship to learn new skills (r = .000), gain practical experience (r = .000), built up their resumes (r = .000), and secure a permanent position (r = .007). On the other hand, these students' decisions to take an internship had no significant relationship with their achieving academic credits and gaining financial rewards. Students' needs for power and affiliation, however, had limited influence on their decisions. Taking an elective course (r = .031) was the more relevant motivating factor for students with a higher need for power. Conversely, there was a negative correlation (r = .010) between their need for power and financial gain. As for students with a higher need for affiliation, they were more motivated by their desires for new and challenging endeavors (r = .006) and learning new skills (r = .049).

Risk-Taking Propensity

Brockhaus (1980, p. 513) focuses on an entrepreneurial perspective to define the propensity for risk taking as "the perceived probability of receiving re-

wards associated with the success of a situation that is required by the individual before he will subject himself to the consequences associated with failure, the alternative situation providing less reward as well as less severe consequences than the proposed situation." This study employed five questions from the Jackson Personality Inventory to measure the risk-taking propensity (Jackson, 1976). Despite the fact that the Jackson's questions are in a true/false format, just as the above, the survey used a 7-point, Likert-style scale format to measure the extent of students' risk taking propensity. This study's alpha reliability coefficient for this personality trait was 0.659. Surprisingly, this study found no significant correlations between this personality trait and the eight motivation factors. Apparently, the extent of students' risk-taking propensity has no significant impact on their decisions in taking an internship.

Tolerance for Ambiguity

Budner (1962) asserts that those who can tolerate ambiguity are more inclined to feel secure and comfortable with vague, uncertain, and unstructured situations than those who are intolerant of ambiguous circumstances. The Budner's (1962) sixteen-item scale for three sources of ambiguity (novelty, complexity, and insolubility) were used to measure the extent of students' tolerance for ambiguity. They were asked to answer these questions through a 7-point, Likert-type response ranging from strongly disagree to strongly agree. This study's alpha reliability coefficient for the tolerance for ambiguity personality trait was 0.372. Given this variable's relatively low reliability coefficient, one should take caution while interpreting the related findings. Having said that, this study found significant positive and negative correlations between this personality trait and three of the seven motivation factors. Students who were more tolerant of ambiguity were also interested in new and challenging endeavors ($r = .015$) and wanted to acquire new skills ($r = .023$). On the other extreme, making money ($r = .020$) was not a motivating factor for these students in taking an internship.

Goal Orientation

The goal orientation personality trait is a linkage between performance orientation (seeking favorable/positive judgments from others through demonstration of one's competence) and learning orientation (development of competence by acquiring new skills and mastering new situations) (Dweck and Leggett, 1988). Combining the two categories of goal orientation, this study employed the Button et al.'s (1996) sixteen-item scale (eight questions for each category) to measure students' overall goal orientation personality trait. Just as the pervious personality traits, a 7-point

Likert-type response was used to measure this trait. This study's alpha reliability coefficient for the goal orientation trait was 0.848.

This study found highly significant positive correlations between this personality trait and four of the eight motivating factors. That is, the goal oriented students took an internship because they liked new and challenging endeavors (r = .000) and wanted to learn new skills (r = .000), gain practical experience (r = .000), and built up their resumes (r = .000).

Openness to Experience

Costa and McCrae (1992) describe the openness to experience trait as one's being imaginative, intellectually curious, willing to explore, open to new and abstract ideas, and tolerant of unconventional values. Ten of the forty-four questions from the widely accepted Big Five Inventory (John et al., 1991) were used to measure the students' extent of openness to experience. The Big Five Inventory's questions are in a 5-point scale format. However, for the sake of consistency, the survey used a 7-point, Likert-style scale to measure this trait. This study's alpha reliability coefficient for this personality trait was 0.783.

In comparison to the other personality traits and contrary to expectation, this study found significant correlations between the openness to experience trait and only three of the seven motivation factors. Students who were more open to new experience took an internship primarily because they liked new and challenging endeavors (r = .000) and, to a lesser extent, wanted to gain practical experience (r = .040) and meet their elective course requirements (r = .022).

Hypothesis II

Overall, the above findings confirmed this study's second hypothesis that students' personality traits have an impact on their deciding to take an internship. Such an impact, however, was more pronounced with regard to the extent of students' internal locus of control, need for achievements, and goal orientation traits.

Summary and Conclusion

This study compared and contrasted the motives/reasons behind students' taking business internships and examined the relationship between such reasoning and their personality traits. The study was based on a portion of a comprehensive, ongoing, three-part, web-based research survey. Over a four year period, students from twenty-two sections of the production/operations management course at California State University, Fresno, provided the frame for this survey.

This study found that desiring new and challenging endeavors, learning new skills, gaining practical experience, and building up resume were predominant reasons for students' taking business internships. On the other extreme, gaining academic credits and financial rewards did not play a significant role in their decision making process. Students' personality traits also had significant impacts on their decisions. Students with higher internal locus of control, need for achievements, and levels of goal orientation were to a larger extent motivated to take an internship due to their desire for new and challenging endeavors, gaining practical experience, and learning new skills.

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CASE STUDY ON ENTREPRENEURSHIP VALUE OF TAINAN PINEAPPLE PRODUCTS, TAIWAN - BASED ON TQM

Dr. Cheng-Hua Wang
Graduate School of Business and Operations Management
Chang Jung Christian University, Taiwan, R.O.C.

Shu-Fang Hsu
Department of Food and Beverage Management,
Far East University, Taiwan, R.O.C.
Graduate School of Business and Operations Management
Chang Jung Christian University, Taiwan, R.O.C.
h99582004@gmail.com

Abstract

Nutritious and healthy food is concerned for most consumers in Taiwan which makes the organic goods to become a hot topic. A farmer, Mr. Yu-fan Yang, hereinafter referred to as "producer", who plants organic pineapples at Guanmiao area, Tainan, Taiwan and produces the dried pineapple product. In this study, a case study with participant observation and semi-structured interviews through the concept of Total Quality Management (TQM), to discuss how the producer to control the product of pineapple and the related product, meanwhile, to create the added value of pineapple product. The producer sold the natural organic pineapple while processed the fresh pineapple without additives of and sell on the

Internet. Clearly, the producer created the entrepreneurial value from the first stage industry (production) to the third stage industry (sale).

Keywords: Organic Pineapple, Total Quality Management, Innovation, Entrepreneurship Value

Introduction

Consumers have begun to pay their attentions on food sources after food safety crisis occurred in Taiwan a couple of years ago. Since many agricultural producers strongly depended on pesticides which will bring the adverse effects on human health. Hence, "organic crop cultivation" issues were risen increasingly in Taiwan. Natural and organic products have gradually become the darling of the market.

In this study, pineapple is the main subject which contents about 85% water. Pineapple can be easily led to decay if it was contaminated by microbe. Pineapple dried fruit uses the fresh pineapple as raw material. The producer did add no any sugar or other additives to pineapple during the drying process which could make consumers feel at ease and keep the pineapple value. In this study, the producer tried to aim on: 1.how to use total quality management to the pineapple processed product; 2.with ambition to the industry innovation of pineapple; and 3. to produce the entrepreneurial value of processed pineapple product through total quality management, TQM.

Literature Review

Taiwan's Pineapple Industry

The process of product and marketing of Taiwan pineapple industry, usually, do the direct access via natural or use the artificial method on natural material to develop product. Then, change its form via manufacturing and increase its value. Finally, refers to the detail industries. Lin (2011) pointed out that the history studies of Taiwan's pineapple industry in favor of post-war, 1945, and a preference for the first stage and rare research in the third stage which will be an area to develop.

Chang (2015) considered, in addition to personnel training, that government should provide a good environment for the development of production, stable cultivation techniques, to construct the risk-avoiding mechanism and stabilize the farmers' income, meanwhile, upgrade the fruit industry to the second or third stage from the first stage, to construct a complete industrial value chain and promote sustainable industrial development.

Lu (2016) pointed out that some special regulations were formed to enhance the agro-processed food by the Council of Agriculture. Agricultural raw materials used in the production could be retroactive and traceable, GAP, CAS, sales history or organic verification as priority. The use of food additives shall comply with the relevant provisions of "Act Governing Food Sanitation" such as the use of food additives and limits etc.

Total Quality Management

Wu and Lin (1994) pointed out that the overall meaning of "Total Quality Management" is a comprehensive quality approach to achieve the goal such as prior arrangements with the proper design which will lead all units and persons committed to quality improvement at all times and could continue to meet consumers demand. Lin (2003) considered TQM is a systematic method. An integration and reinterpretation of the quality inspection such as statistical quality control, quality assurance and strategic quality management etc. Lin (2007) emphasized that to promote the effectiveness of TQM, then to establish TQM culture through the strict review by organizations. Lin emphasized to place the objectives on reaching the highest level as a measure of performance such as cost, time plan, human resources development, new product development, and customer satisfaction degree etc. Lin (1999) presented some arguments in both theory and practice. Lin considered that the customer-oriented, full participation, the fact management, sustainable improvement and quality commitment, are the full implementation of key quality. Lin (2006) described that quality is an approach to business. It includes continuous improvement and breakthrough events and

gives many ways of innovation on various areas.

Innovation

Chen and Liu (2011) studied that innovation is a new mode of production to meet market demand. Innovation is the effective use the resources of corporation, it is the driving force behind economic growth. Hsu (2006) considered that innovation has already existed, and it could be better and more profitable if there are with new ideas. Hung and Kao (2012) pointed out that improving the manufacturing method or put the new elements into the manufacturing process leaving to improve the effectiveness or output. All of them are technical processes of innovation. Kuo (2013) pointed out that the "creative" refers to the generation of new ideas or methods; "Innovation" is to use new ideas or methods to solve problems; however, "entrepreneurship" is to create a new career. Kotler and Kevin (2006) emphasizes that the value can be regarded as the combination of quality, service and price, QSP. When quality and service rise, prices will be fallen and the value will be increased. Qu and Sun (2012) presented the key to business success lies in entrepreneur leaders and entrepreneurial team. Drucker (1985) pointed out that "change" provides a unique opportunity to create new things when change has occurred the entrepreneurs can take advantage of the opportunity to create new value.

Study Method

Yin (1994) considered that the case study is an empirical inquiry (empirical inquiry) to study then phenomenon under the real background. Accordingly, this study conducted the observation of the producer through establishing the good relations between the observer and the producer. At the same time, an interview guide or interview context of semi-structured questionnaire was designed on the basis of reference documents. Basically, in the broader structure and issues as the basis for interviews, it is not limited to word description or order of questions. Study framework shown as Figure 1.

In this study, three official interviews with producer were made through comprehensive record, FB and telephone

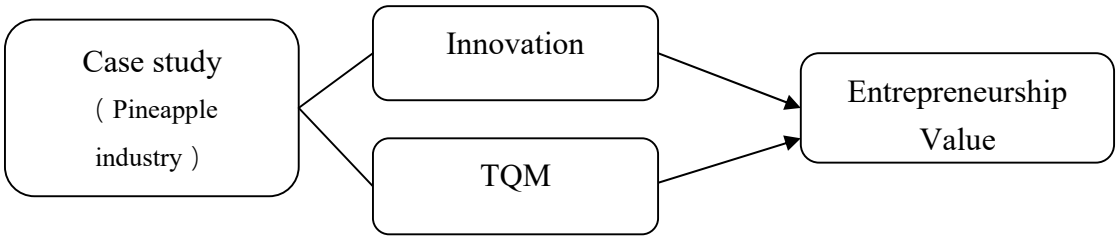

Figure 1. Study Framework

Table 1. Interview and Observation Record

Item	**The first interview**	**The second interview**	**The third interview**
Interview time	November 18, 2014	October 2, 2015	October 22, 2015
Record time	68 minutes	76 minutes	120 minutes

interview and to rearrange the content after each interview. The producer was observed with much confidence at the first interview and the producer had his unique blueprint and implementation methods about pineapple industry. The second interview focused on the fresh organic pineapple processing product and how to find the trusted partners to assist the organic products. The pineapple field was the place for the third interview recorded the actual farming field service management and organic pineapple. The formal interview time and observation record as shown in Table 1.

Data Analysis

The Producer said, by an interview of National Cheng Kung University magazine (Liao, 2013): "Entrepreneurial means to create our own value. Agricul-

ture is the balanced result of livelihood, life and the life. As a farmer for more than a year, I put my role from the pure producer at the beginning, now I feel that I communicate with the community through farming. I don't care how much money I can earn, but ponder how to create the value out of this process. I deem pineapple as an important works in my life and convinced that the back of value is the price."

The movie "The Farmer and His Field" (2014) introduced the organic pineapple of producer. The producer went back to his familiar hometown - Guanmiao, Tainan as a farmer to create his own value. The producer insisted on planting his natural non-toxic pineapple to consumers, meanwhile, to create wider range of processed products. The producer positioned himself to communicate the community via farming. He didn't consider making money as a first consideration. It is important to think about how to create the value of the entire process. He deemed pineapple as an important works in his life and do believe that once the value to find out, the more advanced prices will get along with the product itself.

The producer had neither the experience of agricultural nor food hygiene knowledge and concepts of quality management. He studied by himself everything. In addition, in the absence of his food processing plant, therefore, the fresh pineapple must be outsourced. Since organic pineapple don't have any harvest until 18 months after from planting, all the related issues about pineapple such as plantation management and quality control must be very careful. In order to taking into account the quality of fresh pineapple. The producer selected homegrown way to maintain product quality, and to reduce the cost.

The comprehensive interviews and observations will be divided into three parts: TQM, industry innovation and entrepreneurship value as follows.

Total Quality Management

The producer made of the dried pineapple with a processing of low temperature, low humidity, dry and free additives, thus, the flesh can maintain as the original color, and longer drying time. He had ever sold whose dried

pineapple for 12,000 kg within 12 hours through the Internet.

The producer:

"Pineapple can make a lot of products such as ice, pineapple cakes, dried fruit, juice and other enzymes etc. We have the ability to make the products well."

In addition, pineapple could boil with granulated sugar, without any water, spices or no any preservatives, stirring constantly while boiling, then, it will become the natural pineapple jam. The producer also discussed with his friends of making jam recipes, then, he tried to do. As for jam's jars, it is available from Yanchao, Kaohsiung. First, to clean each glass, then boiled and dried. Bottling after boiling, then immediately put on refrigeration in a vacuum state. The producer emphasized that the purpose of cleaning process is to bring the best natural jams to guests. He said one customer purchased pineapple jam and he found that jam was moldy after three and a half months in the refrigerator, which proved that the producer's product is safe. In addition, the limited pineapple ice sold during the summer only with no water, no emulsifiers or other formulation except sugar. Because the absence of additives, it tasted harder than the commercial ice cream. The best tasting period for the product is within one month, but it can save four to six months.

Industrial Innovation

The producer:

"After working in agriculture, industrial scale must be large, large scale could possibly reduce the costs, then, it may create more value."

The producer increased the product margins after transforming the fresh pineapple into processing industry (the second stage). By re-combination of existing resources and create a more efficient way to achieve the goal. Since the producer have no any physical store, the producer needed to deal with customers on FB, however, the producer also build up the good relationships with customers. It could strengthen the personal image, also to understand where needs to improve, and starting the visibility of the product.

The producer:

"Whether farmers, my partners, and I myself, I think we are all one. Find ways to help farmers grow somewhat, outsourcers and manufacturers have grown. As long as all of us could grow up, the money will come naturally. "

Many partners of the producer needed to care about such as seedlings wholesalers, materials suppliers, Taiwan Sugar Corporation, Tainan ice plant and Pingtung food processing plant and so on. For example, the producer purchased sugar waste product from Taiwan Sugar Corporation to sprinkle in the field which increased the soil organic substance, soften the soil and favorable drainage. A good product, in addition to good equipment, good technology combined with good raw material, but also need a good packaging design. For example, dried fruit "Phoenix Nest Flower" greatly appreciated by the market. At the beginning of farming, the producer was looking forward to the organic agriculture producers could link up with social welfare, so he decided 1% of the profits with the raised supplies back to his hometown elementary school. The producer continued to ponder how to create more processed value from pineapple industry after harvest.

Entrepreneurship Value

The producer:

"After working in agriculture, industrial scale must be large, large scale could possibly reduce the costs, then, it may create more value."

The producer's entrepreneurial opportunity is from the rarity of product. Guanmiao planted area accounts for 43% of 1,125 hectares in total Tainan plant area, wherein 2 organic farms, the producer and the other farm. However, only 0.18% out of 480 hectares at Guanmiao planting acreage belonged to him. There are 18 classes of agriculture production and marketing groups at Guanmiao out of total 42 in Tainan area. However, the organic production and marketing group is 0, the ratio for the planting area of organic pineapples is quite rare. The organic fresh pineapple means no spilling fertilizers, growth hormones or other chemical pesticide. The producer made his homemade or-

ganic fertilizer to produce natural health and safety pineapple. Such idea is able to the producer positioned in a very competitive market.

The producer:

“First, you must have the real power to help others ...The better model is to become yourself can make money. This allows you to do what you want to do, and it will become more selective, also you do not have to ask for help."

The producer found out the ancestors’ wisdom after he returned to farming. Also, he found the large-scale production will create more value after he actually planted. He tried to plant the pineapple on the different seasons, this may be in the different harvest season, also make the pineapple can supply without a break. He kept his ambition to promote Guanmiao brand pineapple, he convinced that do not worry about your pineapple will not be accepted by market as long as your produce with good quality. Through Internet marketing, the producer, a smallholder, established his "pineapple prince" image of Guanmiao pineapple via FB. Which made the customers to experience the brand Guanmiao pineapple is an excellent while also to expand the vision of farmer.

Conclusion

The producer believed that the current agriculture has become in an aging status. Maybe there will be an agricultural labor shortage after a few years and the plant technology can’t be passed from generation to generation. He innovated his pineapple product with the idea of "innovation is as the foundation of thinking and doing things" to produce his personal brand. The producer made the customers to know that Guanmiao not pineapple only through the Internet and media attention. The economic value of pineapple has been steadily growing up. The producer will develop the pineapple juice and pineapple enzymes in the future. He also anticipates himself to combine Guanmiao noodle, then to create "Pineapple Guanmiao Noodle". Furthermore, to become "Guanmiao" as a commercialized brand and promotes it out.

The producer believed that the significance of entrepreneurship is to create

the value for self-produce. The blueprint of pineapple industry has been is gradually formed in his mind. Definitely, the producer gradually upgrades the pineapple industry from the first stage (production) to rise to the third stage industry (sales).

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