THE INFLUENCE OF MOBILE PRODUCT INFORMATION ON BRAND PERCEPTION AND WILLINGNESS TO PAY FOR GREEN AND SUSTAINABLE PRODUCTS

Completed Research Paper

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Abstract
Efficient product packaging does not allow companies to provide extensive information to customers, but effort for consumers to assess more information online is high. Therefore, mobile tagging in terms of extended packaging is considered one of the most promising technologies within Marketing and Information Systems (IS). It is considered to be a means to easily communicate information to consumers because it efficiently bridges the gap between product and information. However, evidence that allows managers to validate the positive perception of this technology is not yet available. This paper addresses this research gap by investigating how extended packaging influences brand perception and willingness to pay. We show that for green products that were produced organically and sustainably, this technology can be used to heighten the brand perception. Furthermore, we show that transmitting relevant information increases the willingness to pay significantly for organic goods, but not for sustainably produced goods.

Keywords: Mobile information, mobile tagging, extended packaging, willingness to pay, green IS, branding, sustainability
Introduction

Within the past few years, environmental sustainability has become one of the most often discussed topics among organizations and societies. Although green and sustainable action can potentially have a significant influence on the future development of resources, the climate and human health, we have not yet developed enough effective strategies and tools to improve the sustainability of production and consumption. In particular, we have not yet determined the role that Marketing can play in supporting organizational and individual understanding and the use of ISs and IT for enhanced decision making, knowledge sharing and creativity in design and manufacture (Butler 2011). Whereas green IT focuses on information and communication technologies as sources of environmental problems (Murugesan 2008), the term green IS refers to the intelligent use of ISs to facilitate sustainable behavior within organizations and society and thereby establishes how the transformative power of ISs can help to create an ecologically sustainable society (Watson et al. 2010). The majority of studies address green IS at the organizational level, and very few studies are dedicated to the power of green IS at the individual level (Jenkin et al. 2011). However, the sustainable production of goods is one of the main ways to ensure that our present needs can be met without compromising the ability of future generations to meet their own needs. Thus, lowering the consumption of goods that are less favorable for the environment and society has a leveraging effect on the future of our society and ecosystems. This can be accomplished by increasing the consumption of green and sustainable goods. As long as no stricter rules are established that force companies to account for the impact of their production as a whole or that monetarily incentivize a cradle-to-cradle design process that takes into account the long-term effect of manufacturing, consumers will remain the main force that encourages green and sustainable production through demand for these products. Therefore, marketers should make use of the opportunities ISs provide for improving consumer behavior.

However, due to increases in advertising and general information overload, it is difficult for consumers to remember specific products and assign advertised green and sustainable attributes to a product when these attributes are not heavily promoted by the manufacturer (Fraj & Martinez 2007; Koller et al. 2011; Meenaghan 1995). Furthermore, consumers often do not thoroughly inform themselves; rather, they frequently decide to purchase products based on familiarity or spontaneously, depending on the kind of buying decision (Bellenger & Korgaonkar 1980; Bunn 1993). Nevertheless, the volume of green (e.g., organic and sustainable) products available has increased in recent years. Organic food is produce that has been independently certified as having been grown free of chemicals. Organic groceries are considered more beneficial to consumer health because they contain fewer potentially harmful substances. The global organic food market generated total revenues of $59,341.2 million in 2010, exhibiting a compound annual growth rate (CAGR) of 12% for the period spanning 2006-2010 (Research and Markets 2012). The market for sustainable goods, which ensure that economic, ecological and social factors are taken into account during production, is also on the upswing. For example, the demand for sustainably produced coffee has grown by 433% over the past five years (Potts et al. 2010). Both forms of production are considered pro-environmental. Organic production does not make use of pesticides, which is beneficial to consumers and the environment, and its lower energy requirements allow for low-emissions production. The sustainable production of goods focuses on the impact of entrepreneurial action on the environment and society and encourages long-term corporate decisions that not only improve the status quo but also have an ongoing positive impact on all three areas (economic, ecological and social). However, even with the growth that has occurred in the last few years, the market share of both organic and sustainable production remains low; for example, sustainably produced coffee only accounted for approximately 8% of global coffee exports in 2009 (Potts et al. 2010).

Improved information and advertising for green products and the higher market share that these products will presumably enjoy as a result can facilitate a more conscious way of consuming. Given that special displays at the point of sale that focus on specific products are only available for restricted periods of time and that manufacturers of green and sustainable goods are often not the overall market leaders and therefore do not possess the financial power to execute far-reaching promotional campaigns, there is a clear lack of opportunities for green and sustainable product advertising. Most of these products are competing with conventional, cheaper products in general stores; they are not bought at specialty stores like they were a few decades ago (Willer & Kilcher 2010). Thus, it is necessary to market these products in
accordance with the requirements of these general stores. Furthermore, product packaging usually does not allow for the adequate presentation of detailed product information. Because most consumers decide what they are going to purchase at the point of sale, the conventional online information provided by the manufacturer is not helpful. However, mobile tagging can allow manufacturers and retailers to link the packaging for the offline good directly to the online information, bridging the gap between the product and the information. The use of this method would not be possible without ISs.

The idea behind mobile tagging is to enable consumers to acquire product information everywhere, for example at the point of sale. Extended packaging can be understood as an opportunity for customers to gather more product information by scanning part of the package with a smart phone and is thus a specific form of mobile tagging (Green 2010). Providing mobile information can be an easy and cost-effective way for firms to ensure that consumers are able to learn about product specifications directly at the point of sale. Due to the uncomplicated installation requirements and low entry costs, this strategy can be used by both small companies and market leaders. Not surprisingly, this technique and the marketing opportunities that it represents have generated significant interest; more than 30% of all smart phone users are said to have downloaded barcode-scanning applications, and 17% of smart phone owners have downloaded QR reader apps (Insight Express 2011; Scanlife 2010). However, studies that empirically measure the impact of the information provided (e.g., on brand perception and willingness to pay) are scarce.

This lack of empirical evidence is partly due to the newness of this technique. Even though usage is consistently rising and marketers are already considering the opportunities associated with providing bar-coded information, coupons and loyalty programs directly at the point of sale, no data on the consequences of providing this added information to consumers have yet been published. The lack of information on subsequent purchases or increased buying frequency makes it especially difficult to measure the influence of the information. In most settings, only the number of product scans and the information accessed can be monitored, but the influence on the consumer remains unclear.

In this paper, we examine whether mobile product information on organic ingredients and sustainable production can improve consumers’ perception of a brand, as strong branding is one of the most successful ways of ensuring recurring purchases and increases the price that firms can charge over the long term (Chaudhuri & Holbrook 2001; Jacoby & Kyner 1973). Furthermore, we study the influence of such information on willingness to pay (WTP) for a product, which is especially important for organic and sustainable products that are often marketed at higher prices (Koller et al. 2011). To empirically investigate these questions, we observe the changes in brand perception caused by scanning a product and receiving product information. After this laboratory experiment, we use the BDM method in a more field-oriented experimental setting to measure the influence of added information on consumer WTP. Our results contribute to the research on green IS and the literature on mobile tagging and extended packaging.

The remainder of this paper is structured as follows. In the next section, we discuss the theoretical background on green IS and communication, mobile tagging and extended packaging. We then determine whether the information provided in our setting is perceived as credible, thereby ensuring that any perceived effects are due to the provision of credible mobile information on sustainable production and organic products and that the information is consistent with the brand concept. Next, we introduce an empirical study focused on the effect of mobile product information on brand perception for a well-known organic grocery brand. We then present our empirical research on WTP for a product from this brand and discuss results, practical implications and directions for further research.
Theoretical Background

**Green IS and Communication**

During the last few years, the importance of green IS has increased, but the number of research projects within this area is still quite limited. Many studies still focus on potential areas for research, the expected contributions of that research or the discussion of basic terms, showing that there remains a need for additional research in this area (Hasan & Dwyer 2010; Jenkin et al. 2011; Loeser & Erek 2011; Molla 2009). Due to the increasing use of technology and public IS activity, ISs, particularly green ISs, now often exist in a social context (Sidorova et al. 2008), and sustainability is one of the most important starting points for such systems. Research shows that ISs play a critical role in enhancing the environmental and economic performance of practices and processes within organizations, but decisions made by individuals also contribute substantially to environmental sustainability (Melville 2010). For example, Graham et al. (2011) show that receiving more information about the environmental impact of driving habits led people to select their trips more carefully to avoid pollution, generating a change in personal behavior that may have an enormous overall impact. In *mindful consumption* (Sheth et al. 2011), the investment of individuals in themselves, their community and nature encourages more sustainable consumption. This customer-centric approach to sustainability is based on being aware of consequences of consumption. One of the main ways to promote this type of consumption in markets in which overconsumption is prevalent (e.g., most Western countries) is to lower the use of over-marketing methods such as aggressive pricing and promotions and to focus instead on quality, value and informing consumers more thoroughly.

Thus, in addition to enabling more efficient and sustainable processes, providing information may change or intensify the behavior of individuals, creating significant opportunity for green ISs. However, the method of transmitting the information must fit the goal. Research shows that the language of effective environmental campaigns needs to be adjusted based on the importance of the issue. When a cause is perceived as very important, requests can be pushy without alienating people. However, as soon as individual private conviction is lower, heavily promoted ideas and requests should be replaced by more subtle appeals and information (Kronrod et al. 2012). Therefore, external communications regarding sustainable behavior should not be interpreted as only having an upside; instead, they should be carefully planned to ensure that the information is truly valued by customers and stakeholders (Maignan et al. 2005).

Furthermore, companies need to keep in mind that sustainability-oriented behavior (e.g., corporate social responsibility (CSR)) must be communicated in a way that is consistent with the concept of the product and the brand. For example, when a luxury brand lets consumers know about the brand’s investment in CSR, a conflict may emerge because buying the brand is simultaneously a self-enhancing and a community-serving action (i.e., it also protects our natural resources). This type of conflict may cause confusion and less favorable consumer evaluations (Torelli et al. 2011). Sen & Bhattacharya (2001) find that it is necessary to align CSR initiatives with the overall company strategy and its competitive positioning to avoid discontinuity and negative consumer responses. Communicating pro-social or pro-environmental content, therefore, does not instantly enhance brand or company reputation; instead, such campaigns should be controlled to ensure matching and credibility. Research shows that the sustainable production of goods is positively related to the gentleness of products. So as soon as consumers expect products to be “safe,” “friendly,” or “protective”, a sustainable approach increases consumer preferences for a particular product. Consumers usually value gentleness in products such as soaps, shampoo, and lotion, and appreciate strength in categories such as car tires or laundry detergents. However, when strength is valued, lower product ethicality can actually improve consumer perception (Gildea 1994; Luchs et al. 2010). Luo & Bhattacharya (2006) show that CSR has a positive influence on firm value which is mediated by customer satisfaction when innovativeness is high, and that it lowers customer satisfaction, and thereby decreases market value, when innovativeness is low.

Hence, research shows that communicating a firm’s efforts to enhance the sustainability of products via organic or sustainable production or CSR can very positively affect consumer perceptions of brands and their willingness to act on that preference. However, communicating this information is difficult because of the previously noted constraints and because conventional advertising, competitive pricing and a very
high budget are often not desirable for producers of organic or sustainable products. Even as increasingly more large companies with large marketing budgets are becoming interested in producing organic or sustainable goods, the focus on quality and the general conception of green brands is inconsistent with the goals of high-frequency, competitive marketing campaigns. It is necessary to keep in mind the concept of \textit{mindful consumption} and develop a technology that allows green companies to communicate information about products and sustainable achievements without overwhelming potential consumers with undesired information or marketing material. We therefore introduce mobile tagging and extended packaging as a way to inform consumers about product and brand advantages.

\textbf{Mobile Tagging and Extended Packaging}

Mobile marketing, which involves the communication of information between a firm and its customers using a mobile device, has increased in importance in retail in recent years (Shankar et al. 2010). Increasingly more consumers are using smart phones and can therefore make use of technologies such as scanning, location-based services and augmented reality, which customers can access by scanning the barcode that is present on almost all products or the QR code that is specifically placed on some items (which allows the consumer to immediately see that he can scan it). Mobile marketing therefore has the potential to connect producers and retailers more intimately with consumers using ubiquitous advanced technology. Furthermore, this approach enables consumers to make sound decisions by making product information available everywhere, including at the point of sale. As approximately 50\%-70\% of brand decisions are said to be made in-store, additional information at the point of sale can be an important decision influencer (Inman et al. 1998; POPAI 1995). Hence, information, and the apps that provide it, will be an important differentiating criterion for organizational IS strategies based on its malleability and easy deliverability using smart phone applications (Pitt et al. 2011).

Bellman et al. (2011) show that mobile phone applications have generated strong interest among marketers, especially due to the high level of user engagement that they encourage and the positive impact that they might have on user attitudes toward the featured brand. The findings present in this research suggest that understanding how to maximize the impact of mobile phone apps will be essential to future research. In addition to couponing and applications that enable consumers to obtain lower prices, scanning applications have garnered significant interest among executives. The idea that consumers voluntarily search for information regarding product origins or ingredients or competitive pricing is appealing because these interactions seem to be when producers and retailers can truly influence the buying process. Studies suggest that consumers value the ability to access additional information or product-related services on their mobile phones while they are shopping in retail stores and that as many as 50\% of smartphone owners use their device when shopping in a store (GS1 2009; WSL Strategic Retail 2011). Modern scanning applications use QR codes that are specifically designed for being scanned by smart phone users, enabling them to identify the additional information that they can access. Such applications also often use the barcodes that are already located on the product, especially when the scanning application is offering the information instead of the producer itself (as with Barcoo for price comparisons). The applications have improved in recent years, and most of their issues with speed have been addressed (Adelmann 2007; Ohbuchi et al. 2004; Toye et al. 2006; Von Reischach et al. 2010).

This type of scanning application makes it possible for the consumer to access information through mobile tags, which is why the process is often called mobile tagging. Extended packaging can thus be understood as providing an opportunity for customers to gather more product information by scanning part of the package with a smart phone and is thus a specific form of mobile tagging that employs the product itself rather than advertisements for the product (Green 2010). Research shows that providing mobile information (e.g., regarding ingredients) can be an easy, cost-effective and well-accepted way to let consumers know the details of a product (Foo & Idrus 2011). Due to its uncomplicated installation and low entry costs, this technology can be used by small companies and market leaders alike. Most QR scanners use this application to receive product information, and consumers are most likely to use it in this manner when the code is placed on the product itself (Insight Express 2011).

However, research in this area is scarce, presumably for several reasons. First, the technology itself is new, and it has only recently begun to gain acceptance and popularity. Second (and as a result), although the usage of the technology is increasing, data on the consequences of providing the added information to
consumers have not yet been published. Third, the relationship between a consumer’s actual purchase and the information that researchers can derive from mobile tags (for example, information about where a scan was conducted and what content was seen) is generally unclear. Therefore, it is very difficult to measure the influence of the technology and the information, and conclusions can only be drawn in an experimental manner at this juncture.

In this paper, we explore the use of mobile tagging technology in green ISs. We examine the effect of mobile product information regarding organic ingredients and sustainable production on brand perception, keeping in mind that strong branding is one of the most successful ways of ensuring higher accepted price levels and recurring purchases (Chaudhuri & Holbrook 2001; Jacoby & Kyner 1973). We then study the influence of this kind of information on willingness to pay (WTP), which is especially important for organic and sustainable products, which are often more expensive. To empirically examine these issues, we observe the changes in brand perception caused by scanning a product and receiving different kinds of information. After this laboratory experiment, we use the BDM method in a more field-oriented experimental setting to measure the influence of added information on consumer WTP.

Empirical Study

In the empirical portion of this paper, we let participants use smart phones to access extended packaging information that highlights the organic and sustainable production of an organic beverage. We distinguish between the information that highlights the organic benefits of the product (e.g., information indicating that the product is higher quality, contains less pesticide residue or is not genetically modified) and information regarding the sustainable nature of the product (i.e., information that shows consumers that the brand focuses on positively influencing the environment and considers the social, economic and environmental dimensions of its actions and those of its employees during the production process). We add a control group to indicate how the tagging experience more generally affects the participants. In the first study, we furthermore add a control group which is not exposed to any additional information at all, merely participating in the rest of the survey. We choose to research what influences the purchase of green products. Toward this end, we take three steps. First, we ensure that the transmitted information is perceived as credible by consumers. Second, we investigate how the experience affects participant perceptions regarding the well-known brand, thereby focusing on how the additional information contributes to the image of a green brand that is already well established. We then choose to focus on the effect of the technology on WTP, taking into account that higher costs are one of the main obstacles to the consumption of green and sustainable goods.

Information Provided by the Smartphone Application

Because this paper focuses on how information received from extended packaging can increase the demand for green and sustainable products and, thus, benefit manufacturers, we decided to focus our analysis on a single product offered by an organic, sustainable brand. Furthermore, it seemed important to focus on an application that was already in use during the study and that provided detailed information in a modern style. We decided to distinguish between information regarding the organic product itself and information about the sustainable production of the product and the company ethos. This differentiation allowed us to distinguish from among the effects of information about organic products (which are only offered by a small percentage of manufacturers) and information about sustainability (which almost all manufacturers can provide if they are willing to adapt company strategies, production processes and other facets of their operations). Furthermore, we introduced two groups that helped us illustrate the general effect of the scanning procedure in comparison to a reference group which did not receive any information about the product at all and a control group that did not experience any scanning.

We ensured that the information that we planned to provide to the participants was perceived as credible. This step allowed us to ensure that our findings would be a function of the effect of the information itself and of the reactions of the participants to that information rather than a function of potential flaws affecting the information (for more details, please refer to the appendix). We designed three different versions of the content. First, we provided information about the sustainability practices of the company.
For example, the participants learned from the scan that the brand was cultivating raw materials within
the area of production to lower the amount of fuel used, that the company planted trees to offset their
water consumption and that the needs of employees and their personal growth were a central focus of the
firm. There were also several other sustainability projects that the participants could review. Next, we
developed a version of the application that explained the organic production processes used to generate
the specific product and that indicated that all of the raw materials were organic. The participants in this
condition also received information about the gentle production process used, which was meant to
heighten the agreeability of the product which is typical for many organic products. Third, we designed a
control version of the information. To control for the effects of the experience of using the app in general,
we generated a version that explained the organic production and specifications of a completely different
organic beverage that was unknown to the participants. Keeping all other survey questions and
circumstances the same, we expected participants to enjoy the scanning procedure in general, thus
slightly increasing their attitude towards the brand. A fourth group of participants was used to determine
general experimental effects; therefore, this group did participate in the study in general, but did not
participate in the scanning process at all. The basic appearance of the application, which works like a
usual barcode or QR scan, is shown in Figure 1.

![Figure 1. Stimulus Design Provided by ecoScan](image)

**Study I: Measuring the Influence of the Application on Brand Perception**

**Study Setup**

Six research assistants asked random individuals in a university lobby to participate in the process and
offered them a small reward in return (a chocolate bar). A total of 467 participants agreed to participate in
the study. The participants followed the advisors to the laboratory where the study was conducted. Of the
participants, 95.3% were students, and the average age within the sample was 23.57 years (with a range
from 16 to 56). The participants answered general questions about their gender, their age and their
experience with smart phones previous to the study. They then stated how often they bought the product
in question. To assess brand image, we used several adjectives describing consumer perceptions of the
brand (Batra et al. 2012; Meenaghan 1995; Torelli et al. 2011). We then measured the perception of these
12 randomly sorted brand core values (which had been provided by the company itself) using 7-point
bipolar scales (e.g., "This brand is honest" – "This brand is fake"). Next, we offered each participant a
product sample of their choice. We asked participants from the first three groups to scan the product’s barcode using smart phones on which the scanning application had been previously installed. These participants were randomly connected to one of the previously generated versions of the material. The participants who were assigned to the information control group received information about a completely unrelated product from another brand. The participants who were assigned to the scanning control group were not able to notice the opportunity to scan. Therefore, they merely participated in the study and received a product sample. Figure 2 presents the design of the study.

The research assistants were available at all times, but all of the participants completed the process easily on their own. After the participants had finished their sample and part of them had explored the application, we again measured their perception of the brand with reference to the pre-defined core values. To control for any possible memory effect, all of the adjectives were presented in a modified random order and were again measured on 7-point bipolar scales. The participants were then asked when they were going to buy the product in question again.

The Effect of Mobile Product Information on Brand Perception

The study features two measures of the core values of the brand. We wanted to monitor the changes in brand perception that were generated by the different information given to the participants. Hence, we interpreted the brand’s image as perceived by each participant using the sum of the scores for the brand core values. We then coded the effect of the experiment as the difference between each individual’s brand perception after the activity and their rating of the brand core values before the activity:

\[ \Delta BCV = \sum_{i=1}^{12} BCV_{after} - \sum_{i=1}^{12} BCV_{before} \]

The overall change in brand perception generated by the use of mobile scanning is presented in Table 1. The fourth group, which did not receive any additional information but received a product sample, did not
show a minor significant overall effect. Even on the individual level of the twelve brand core values, merely the adjective “social” faced a significant increase (M = .306, SD = 1.333, t (113) = 2.420, p = .017) which is attributable to the free sample.

But even though the information control group did only receive information that was completely unrelated to the brand and product, the positive experience of the scanning process as such caused a significant increase of brand perception (M = 1.769, SD = 4.927, t (117) = 3.662, p = .000). This effect was clearly caused by the product sampling conducted in combination with the participants’ general positive experience scanning and using the smart phones. To distinguish between the different information treatments, we conducted an ANOVA. The results of the ANOVA indicate significant differences in brand perception (F (2,324) = 6.689, p = .001). Table 1 provides the mean changes in brand perception and the standard deviation.

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Standard Deviation</th>
<th>Sig. (2-sided)</th>
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<tbody>
<tr>
<td>Sustainable</td>
<td>+4.75</td>
<td>6.79</td>
<td>.000</td>
</tr>
<tr>
<td>Organic</td>
<td>+3.43</td>
<td>5.95</td>
<td>.000</td>
</tr>
<tr>
<td>Information Control</td>
<td>+1.77</td>
<td>4.93</td>
<td>.000</td>
</tr>
<tr>
<td>Scanning Control</td>
<td>+.35</td>
<td>5.18</td>
<td>.496</td>
</tr>
</tbody>
</table>

There were no statistically significant differences between the group that received information regarding the organic production and the group that gained knowledge about the sustainable production (p = .328). However, brand perception seemed to improve slightly more when the participants encountered mobile information about the sustainable production and management style used by the company. Letting consumers know that the product was organic also improved the brand image significantly more than only providing a product sample and enabling scanning. Figure 3 depicts the details of the changes in brand perception, separately representing the entire brand core values employed for all scanning groups. As there is no noteworthy effect within the group that did not scan, the analysis will focus on the differences between the kind of information transmitted from now on.
In addition to determining the effect of app use on brand perception, we monitored an interesting development in the stated buying frequency. The participants were asked before using the app how often each month they bought the study product. The answers indicated that, on average, the participants bought the product 0.93 times/month. After the participants had finished the survey, we asked them how long it would be before they bought the product again. We then calculated the change in buying frequency as the difference between the first and second answers in terms of months. Although there are noteworthy differences between the groups, as depicted in Table 2, the results of an ANOVA were insignificant ($F(2, 269) = 1.816, p = .165$). In this area, however, unlike in branding, information about sustainable production may be less relevant than information about the origin of the product’s ingredients and the manufacturing process. Consumers may appreciate a company’s efforts to act sustainably, but they are not as heavily influenced by these efforts as they are by those initiatives of the firm that may benefit them personally (e.g., organic product offerings). To deepen our insight into the consumption process and the influence of extended packaging, we next conducted an investigation of consumer WTP and the impact of mobile information.

### Table 2. Changes in Stated Buying Frequency

<table>
<thead>
<tr>
<th></th>
<th>Change in consumption (bottles/month)</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sustainable</td>
<td>+1.73</td>
<td>4.93</td>
</tr>
<tr>
<td>Organic</td>
<td>+2.78</td>
<td>6.79</td>
</tr>
<tr>
<td>Information Control</td>
<td>+1.52</td>
<td>5.95</td>
</tr>
</tbody>
</table>
Study II: Measuring the Influence of Mobile Product Information on Willingness to Pay

Study Setup

Four research assistants installed a booth on a busy shopping street and asked randomly selected individuals to participate in the research. There was no reward offered, but the participants were told that they would be assisting in the research and that their participation would include the potential obligation to buy a beverage. In total, 390 participants agreed to participate in the study out of approximately 600 that were addressed. 59.6% were female. Because the process involved a one-to-one structured oral interview, we chose not to verify the age of the participants to avoid alienating them. The sample consisted of a manifold crowd, which is why we do not expect any kind of bias within the sample. Of the study participants, 55.2% owned smart phones. The participants were asked to access the mobile information as explained above; again, the application was already installed. As before, the participants were randomly linked to one of the three versions. We then measured the WTP for the beverage. Figure 4 shows the setup of the study.

To estimate the WTP, we used the BDM method described by Wertenbroch & Skiera (2002). One of the major advantages of this method is that the participants are obligated to buy and that their answers are therefore more realistic than when other methods are used. This is also one of the reasons why WTP measured by BDM is usually lower than those measured with other methods. Because we conducted the experiment on a popular shopping street, there were several other venues from which the study beverage could be acquired within a short walking distance, further supporting the validity of the results. Depending on the venue, the product could have been acquired nearby for approximately .80€ to 1.20€. The process functioned as follows. The participants received instructions about the buying process that led to their WTP estimation. The participants were told that their price offer determined the maximum price that they may pay for the designated product. The actual price was determined randomly. The participants stated their maximum offer and then had the opportunity to revise it. For example, if a participant stated 1.00€ as his maximum price, the research assistant asked, “So, if the product is 1.05€, you will not want to buy it anymore?” The bargaining process ended when the participant was no longer willing to increase the price. After the final offer was made, the participant determined the final price himself. He selected a ball from a receptacle that contained a number of balls listing different prices. The participant was unable to see the balls while selecting his choice and did not know the range of prices that
they listed. If the maximum price stipulated by the participant was higher than the price listed on the ball, he had to buy the product, but he only needed to pay the price stated on his selected ball. If his price offer was lower than the price on the ball, he was not able to buy the product. In this way, the participant was provided with incentive to state his real maximum price because doing so increased his chance of receiving the product. This mechanism is depicted in Figure 5. We verified that the participants understood this mechanism before beginning the bidding process to ensure that all decisions were made on that basis. On a scale from 1 to 5, with 5 being “absolutely,” we asked whether it was truly clear to them why they should state their maximum price. On average, the answer was 4.81 (SD = .503). In the end, only two participants did not fulfill their obligation to buy and were therefore eliminated from the sample.

![Figure 5. The Process used to Estimate Willingness to Pay](image)

**The Effect of Mobile Product Information on Willingness to Pay**

The study shows that extended packaging is a viable means of increasing individuals’ WTP for organic products. Table 3 depicts the effects of mobile information on individuals as the mean and the corresponding standard deviation. Whereas transmitting information about sustainable production has a higher impact on consumer perceptions of a green brand, the information about the organic product has a greater impact on the actual purchase and price of the product. Learning about the organic product made the participants more likely to want the beverage, whereas learning about the sustainability of the brand actually lowered the participants’ interest in consuming the product ($F(2, 386) = 3.452, p = .033$). Enabling the individual to receive more detailed information about the organic product generated a 17% increase in WTP in comparison to the results for the sustainability and control groups. The ANOVA showed that this effect is significant ($F(2, 386) = 4.925, p = .008$), which means that increasing the knowledge about the sustainability of the brand even immediately prior to the purchase did not heighten consumers’ WTP for the green product. The thirstiness of the participants did not have any significant effect on the WTP. Owning a smartphone increased the WTP for both the group that received information about the organic produce ($F(1,128) = 4.028, p = .047$, mean difference = $0.16\€$) and sustainable information ($F(1,130) = 3.436, p = .066$, mean difference = $0.19\€$), but not for the information control group.
Table 3. Changes in Willingness to Pay, Estimated Purchase Price, Perceived Product Value and Desire for the Product

<table>
<thead>
<tr>
<th></th>
<th>Sustainable</th>
<th>Organic</th>
<th>Control</th>
</tr>
</thead>
<tbody>
<tr>
<td>Estimated Purchase Price (in €)</td>
<td>1.26 (.50)</td>
<td>1.34 (.46)</td>
<td>1.26 (.48)</td>
</tr>
<tr>
<td>“This beverage is worth its price”*</td>
<td>3.28 (1.05)</td>
<td>3.50 (.99)</td>
<td>3.28 (.99)</td>
</tr>
<tr>
<td>“I long for this beverage”**</td>
<td>2.84 (1.40)</td>
<td>3.26 (1.18)</td>
<td>3.01 (1.35)</td>
</tr>
<tr>
<td>Willingness to Pay (in €)</td>
<td>1.06 (.58)</td>
<td>1.24 (.45)</td>
<td>1.06 (.49)</td>
</tr>
</tbody>
</table>

Standard deviation reported in parentheses
* = On a scale from 1 to 5, with 5 being “very much”

In addition to stating their own WTP, the participants assessed the estimated purchase price and stated how much the beverage was worth after using the mobile application. The results are consistent with the findings for WTP: the participants who received the information about the organic ingredients were willing to pay a higher price and felt that the product was more worthy of that price. The ANOVA showed that the overall effect on retail prices was not significant (F (2, 386) = 1.147, p = .319). However, when compared directly, the group that received information felt that the beverage was more worth its price than the group that became informed about the sustainable production (F (1, 252) = 3.049, p = .082). The finding that the information about organic produce heightened the longing for the beverage was not significant at conventional levels (F (2, 255) = 2.639, p = .105).

Figure 6 indicates the percentage of participants within the groups who were willing to pay at specific price levels. The WTP of the organic information group strictly outranges the two other groups. For example, almost all of the participants who received information about the organic produce were willing to pay .50€, but only about 90% of those who received information about the sustainable production did. After the amount of about 1.50€, the differences between groups diminish.

Figure 6. Consumers’ Willingness to Pay Based on the Assessed Mobile Information
General Discussion

In this paper, we tested how mobile information transmitted via extended packaging can influence the perception and consumption of green brands. The results of a laboratory experiment and a field experiment confirm that the usage of extended packaging can improve consumer perceptions regarding a green brand. Branding is regarded as one of the core determinants of a buying decision, which implies that improvements in branding will have a positive impact on demand.

In addition to branding, price is a major obstacle to the consumption of green products. This research shows that enabling consumers to use mobile tagging to access further information about organic products has a significant positive impact on WTP. However, we also show that companies that act sustainably cannot ask higher prices merely based on such initiatives. Therefore, mobile tagging may help green companies to market their achievements and generate a better perception of their brands, but they must use some caution in pricing their goods. In addition, better brand perception may generate a higher commitment to the brand and establish company value in the long term, whereas in the short term, only the WTP for products that offer direct benefits for the consumer (e.g., organic products) will be positively affected. Brands that are committed to social responsibility and focus on the sustainable production of their goods cannot benefit in the short term from consumers’ WTP. This research therefore adds to our knowledge about the power of green ISs.

Although this research contributes to the literature on both mobile tagging and extended packaging and to the literature on green ISs, it also has limitations. Using an experimental approach, the experiment does not perfectly represent real-life decisions. Unfortunately, the prospective linkage between mobile information gathering and mobile payment and the derived data, which will facilitate understanding the connection between information and purchase, is not yet established. A second limitation is the student sample we used in the first study. However, given the content of the study, we may in fact have underestimated the effect in working with students. Thus, assume that the effect should increase when consumers are completely unbiased and are voluntarily scanning packages. Third, we did not compare extended packaging and other ways of transmitting information. Further research should point out differences that derive from the medium.

Our findings have a number of implications for practice. To date, it seems that mobile tagging is a technology that consumers value and is therefore worthwhile, especially given the widespread use of smart phones and the low entry and maintenance costs. Still, the connection between ISs and green products is rather new; in previous years, the potential customers of green companies and the potential users of smart phones were not exactly the same. Based on our results, the technology is a good match for green products. This finding makes sense given the over-marketing and the wasteful handling of resources that are often features of traditional marketing.

Furthermore, extended packaging is a growing trend that adds another dimension to consumer-friendly packaging. If consumers can make decisions based on sound information, their choices should improve. For example, it is possible for consumers with specific requirements to assess whether a product perfectly fits them. This technology can facilitate better consumer satisfaction and higher repurchase rates and reduce the number of products thrown away. Furthermore, extended packaging can be interpreted as a seamless opportunity for branding in a mobilized world. In addition to the added information about the products’ ingredients and origins, which truly extends the package, the technology may make a real difference by communicating a firm’s sustainability initiatives, even when the brand is quite well known. Thus, both small and large companies can hope to benefit by providing information about product and company features that benefit the customer or society.

One last consideration involves the technology we used. Mobile tagging and extended packaging are comparatively new topics in IS studies. By measuring the impact of a potential scan and transmitted information on consumers, we may be able to show changes on individual levels, but we cannot predict the overall influence this technology will have on the market. Hence, future studies should gather and evaluate data about which the impact of scans is put into perspective given the overall market development and demand. Depending on the situation, functionality and specific design of devices and applications, individuals may feel and act differently. Hence, there is a need for more research concerning the design of the applications and their handling by consumers. Such work will ensure that this technology becomes relevant for both green and conventional ISs.
References


Appendix

To ensure that our chosen study brand and the transmitted information was perceived as credible, we ran the content against other campaigns. Ninety students evaluated five brands (in total, we used 9 brands and 10 campaigns, which were evaluated by 180 students) on a scale from 1-5, with 5 being the highest. The average age of participants was 21.97 years, and 42.2% of them were female. We measured brand recognition and how much participants liked the brand. The participants were then shown 30-second advertisements of a campaign the brand had conducted. To account for the different subjects of the information, we were going to give our study participants, we distinguished between consumer-centric (e.g., organic, vitamin-enriched) and society-centric campaigns (e.g., sustainable, good for society). After the advertisements, participants evaluated brand and campaign. We did not find significant differences between the credibility of the different information we provided about our study brand and found that our study brand was well known and perceived as a good company and was therefore a good match for the general study.

<table>
<thead>
<tr>
<th>Study Brand</th>
<th>Mean I know</th>
<th>I like</th>
<th>I understand this campaign</th>
<th>... is responsible</th>
<th>This campaign is credible</th>
<th>... is a good company</th>
<th>... is better than other brands in this category</th>
<th>... is good for society</th>
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<tr>
<td>BP</td>
<td><strong>4.06</strong></td>
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<td><strong>4.29</strong></td>
<td><strong>3.08</strong></td>
<td><strong>2.52</strong></td>
<td><strong>2.77</strong></td>
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<td><strong>3.72</strong></td>
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<td><strong>3.46</strong></td>
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<tr>
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<td><strong>5.0</strong></td>
<td><strong>3.90</strong></td>
<td><strong>4.40</strong></td>
<td><strong>3.41</strong></td>
<td><strong>3.04</strong></td>
<td><strong>3.29</strong></td>
<td><strong>3.52</strong></td>
<td><strong>3.48</strong></td>
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<td>Microsoft</td>
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<td><strong>3.81</strong></td>
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<td><strong>3.40</strong></td>
<td><strong>3.69</strong></td>
<td><strong>3.43</strong></td>
<td><strong>3.60</strong></td>
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<tr>
<th>Study Brand</th>
<th>Mean I know</th>
<th>I like</th>
<th>I understand this campaign</th>
<th>... is responsible</th>
<th>This campaign is credible</th>
<th>... is a good company</th>
<th>... is better than other brands in this category</th>
<th>... is good for the consumer</th>
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<tbody>
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<td><strong>3.72</strong></td>
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<td><strong>3.60</strong></td>
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<td>Vitamin-enriched fruit gum (Storck)</td>
<td>Mean</td>
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<td><strong>4.53</strong></td>
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<td><strong>3.79</strong></td>
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