

A Conceptual Framework for Individual Green Information Technology Consumption and its Impact

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Abstract:

The purpose of this paper is to develop a conceptual framework that examines consumers regarding their purchasing behavior, environmental awareness and knowledge of attributes of the green IT product, opinion leaders, the increasing of awareness of organizations' eco-strategies, and green marketing. The framework is based on Diffusion of Innovation (DOI), Unified Theory of Acceptance and Use of Technology 2 (UTAUT2), and literature on opinion leaders, environmental concerns, G-Readiness, and green marketing. The result draws ten propositions. There are ten constructs which are Relative advantage, Noticeability, Social influence, Price-value, Opinion leader, Environmental concern, Attitude toward green IT, Green IT use, an Perceived green business encouragement, and Perceived increasing of green marketing. This framework renders an idea for researchers and practitioners to further investigate green IT consumption and its impact on organizations. The framework shows that organizations should monitor the increase of green consumption and improve their green strategy.

Keywords:

Green, Information system, Conceptual framework, Environment.

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1Introduction

Business, technology and environment are essential and inextricably intertwined in today's world. So much so that the vast majority of people today would find it difficult, if not impossible to attain happiness or even survive. As for technology, it is crucial if business owners want to put their business on the fast track. The potential of technology is boundless.

The environment has been affected by climate change, to such a degree that it has had an effect on the way we live, and our quality of life. Currently, most countries in the world are focusing on global warming prevention policies to some degree. The result is governments in many countries are adopting laws and policies to control many business sectors in regard to environmental pollution, such as greenhouse gases.

In the course of doing business, most key people (e.g., owners, CEOs, managers) in many firms are always striving to cut costs, develop markets and improve performance because these are ways to make their profits grow more vigorously. Key people in businesses have a misguided notion that eco-strategy is a threat as it leads to increased pressure on companies to conform to the requirements of governmental green certification labels^{1,2}.

If business executives take a different perspective, they would see that this is not a threat it is a great opportunity instead. As they deploy eco -strategy, they will learn cost cutting strategies for their firms and methods of maintaining steady business growth. They will find ways to enhance their performance and improve their brand image as well^{3,4}.

The threshold of growth of IT products, such as smartphones and tablets, is increasing exponentially. As a result, the amount of electronic waste and greenhouse gasses are increasing drastically. This study, therefore, proposes to create a conceptual model with an ability to predict the behavior of green IT consumption and the increase of green marketing.

The purpose of this study is to develop a conceptual framework with an ability to investigate perspectives of consumers regarding their purchasing behavior, environmental awareness, characteristics of the green IT gadget that appeals to consumers, opinion leaders who might influence them, impact on the increasing awareness of organizations of eco-strategy, and green marketing. In particular, this study concerns the questions 'what are essential attributes of the green IT products that attract consumers?'

This paper is organized as follows: The first section introduces the background of the research, and study questions. Section 2 discusses about green IT. Section 3 explains literature related to this conceptual framework. The final section summarizes how the conceptual framework operates, and what are the benefits for both researchers and practitioners.

2Theoretical Background

2.1 Green IT product

In this study, a green IT product is defined as an IT product which has less negative impact on the environment. Velte et al.⁵ addressed some of the problems that are given as reasons to buy and use greener IT; they are lower volume of toxins (lead, mercury, PCBs, etc.), reduced power consumption, less heat emission, lower CO₂ emissions, and easier disposal in greener IT goods than IT equipments with no green indicators. Toxins, plastic and metal components have negative impact on the ecosystem and cause fluctuations in climate to become worse, as already discussed in the introduction section.

Green consumption or green IT use refers to the behaviors that are most regularly cited as being examples of it. Purchasing products that have a reduced environmental impact, avoiding products with aerosols, and purchasing recycled paper products are examples of this⁶.

3 Study Constructs

This section explores the conceptual framework and its eleven constructs. There are relative advantage, noticeability, opinion leader, social influence, and price value, as green IT product constructs. Environmental concern construct from the study of Van Liere and Dunlap⁷. There are two adapted constructs; one is Attitude toward Green IT adapted from Behavioral intention in UTAUT2, and the other is Green IT use which based on Use behavior in UTAUT2. Perceived green business encouragement based on G-readiness in the study of Molla et al.⁸, and Perceived increase of green marketing based from concept of Juwaheer et al.⁹

3.1 Relative advantage

Relative advantage is the degree to which an innovation is perceived as being better than the idea it supersedes¹⁰. Its degree is often expressed as economic profitability or conveying social prestige. It is consistently the best predictor of adoption and usage of technology¹¹⁻¹³.

The aspects of Relative advantage depend on the nature of the innovation¹². For example, a new tablet PC that utilizes a new model of processor, which consumes less energy, may be evaluated as having a relative advantage in energy consumption. If consumers are looking for IT products that use less energy, they will buy this new tablet PC and the rate of adoption will increase. In this study, the advantages of green IT products lie in their minimal impact on the environment and efficient use of energy. Thus, we choose to apply Relative advantage in this conceptual framework.

For other DOI constructs, Compatibility and Complexity have no duties in this study framework because there is no difference between a green IT product and a non-green IT product in so far as utility. As for Trialability and Observability, it is not necessary for a consumer to try if he/she already knows how a green IT product can reduce negative impact on the environment. Thus, Relative advantage is likely to be the only construct that is suitable for this study.

P1: Relative Advantage has positive impact on Attitude toward Green IT.

3.2 Social influence

It is the degree to which an individual perceives the importance of a new system for another to believe that he/she/they should use it¹⁴. Social influence as a direct determinant of Behavioral intention is embodied in social factors from theories which are Subjective norm, Social factor, and Image. Brown and Venkatesh¹⁵ employed Subjective norm in their study of technology adoption in households, such as in the case of the PC. They explained that normative beliefs came from three constructs – Friends and family influences¹⁶, Secondary sources' influences¹⁶, and Workplace referents' influences¹⁷. The statistic result shows that Subjective norm (or normative beliefs) had effect on Behavior intention.

Not only society but also culture is included in the Social influence. Bandyopadhyay and Fraccastoro¹⁸ emphasized that Culture (as a Social influence) is a significant construct in influencing consumers' Behavioral intention. They found that Social influence has impact on Behavioral intention. Likewise, Maldonado et al.¹⁹ studied in technology (E-learning) acceptance in Peru and proposed that Social influence has a positive impact on Behavioral intention. There is enough empirical evidence to prove that Social influence has an impact on the decision to adopt a technology.

For other UTAUT's constructs, this study does not employ performance expectancy and effort expectancy from UTAUT are not pertinent by definition. Performance expectancy in UTAUT is more targeted on individual job, but Relative advantage in DOI has an inherently wider scope than Performance Expectancy, which is the degree to which an innovation is

perceived as being better than the idea it supersedes¹⁰. In regard to effort expectancy in UTAUT, as discussed earlier, this study model has no duty for complexity, and effort expectancy has almost the same purpose to complexity, thus there is no reason to employ effort expectancy.

P2: Social influence has a positive impact on Attitude toward Green IT.

3.3 Price value

One of new constructs that Venkatesh et al.²⁰ added in to the original UTAUT is Price value. The study found that Price value is important because consumers must pay for the technology they desire, while employees are not required to pay for the technology utilized by their employer. In this regard, a monetary scale was added in the UTAUT2 to improve its ability to predict IT acceptance. Venkatesh et al.²⁰ reviewed three studies²²⁻²⁴ as evidence to prove that Price value has a significant relation with Behavioral intention. When a consumer perceives the benefit of utilizing a technology is more valuable than its cost, the Price value will have positive impact on Behavioral intention²⁰. Will a consumer pay a premium price to buy a green IT product rather than a non-green IT product?

P3: Price Value has positive impact on Attitude toward Green IT.

3.4 Noticeability

‘How does one identify a green IT product?’ Most prominently, it has an environmentally friendly label display on its package or surface. ‘What does such a label mean?’ It means the contents have a green design. Velte et al.²¹ stressed that the word ‘green design’ implies that through the design and manufacturing process there was focus on these areas: (1) ‘design for repair’, if IT equipment is repairable, its life expectancy will be longer than IT products that cannot be repaired; (2) ‘design for upgradability’, an end-user will not have to buy a new PC unless the one he/she has is not designed for upgradability, for example; (3) ‘design to minimize power consumption’, between an energy-efficient notebook and an energy-hungry laptop, surely most people are likely to buy the energy efficient one rather than the energy-sponge, if both have the same performance; and (4) ‘design for recycling/ clean disposal’, such a greener IT item is easier to recycle than a non-green one (pp. 138-139). In reality, it is not difficult to compare an individual IT product’s environmental impact when a consumer understands what the green labels (e.g., Energy star, blue angle, recyclable symbol) represents.

P4: Noticeability has positive impact on Attitude toward Green IT.

3.5 Opinion Leader

An opinion leader is an individual or group of people that has an opinion leadership, which is the degree to which an individual is able to influence other individuals’ attitudes or overt (visible) behavior informally in a desired way with relative frequency²⁵. In other words, an opinion leader is like a figurehead such as a favorite celebrity. Rogers²⁵ explained that an opinion leader can accelerate the diffusion phase of an innovation. For business, an opinion leader is important in promoting a product because a good opinion leader can improve positive effect on the consumer’s desire. That means an opinion leader can help in increasing of the rate of adoption.

A person who has opinion leadership can make the communication stronger than people who are non-opinion leaders^{26, 27}. In this regard, a good opinion leader can create strong communication between the business and consumers. Accordingly, if a physically attractive opinion leader helps business to promote green IT product, many consumers are more likely to buy and use it. Although most consumers cannot identify green IT products^{28, 9}, when an opinion leader promotes it on the media, many consumers will learn more about identifying and acquiring green IT products.

Many researchers realize that a person with high opinion leadership can help businesses sell their product faster. However, the question that remains is ‘What kind of person would

be a good opinion leader or the most powerful leader?’ Forbes.com²⁹ published its list of the top seventy -two world’s most powerful people of 2013. In this research, we classify these people into five fields: Political leader (e.g., Vladimir Putin), Technology leader (e.g., Bill Gates), Religious leader (e.g., Pope Francis), Business leader (e.g., Warren Buffett), and Media leader (e.g., Rupert Murdoch).

P5: Opinion Leader has positive impact on Attitude toward Green IT.

3.6 Environmental Concern

It is one of the more popular constructs that researchers use in their studies. In literature, Environmental concern^{7,2} has often been used as a surrogate for social responsibility³⁰.

Environmental concern is still popular in many studies of environmental-friendliness to this day. There are some studies of the mobile phone and its impact on the environment in the IS field. For example, Tsarenko et al.³¹ studied environmentally conscious consumption in retailers and peers as external influences. They brought Environmental concern as a construct and mediator in their study framework. In their study, Environmental concern can be seen as emanating from political discourse where it is defined as the whole range of environmentally related perceptions, emotions, knowledge, attitudes, values and behaviors.

Tsarenko et al.³¹ argued that many researchers^{32, 33} found a strong relationship between Environmental concern and environmentally conscious behavior. Environmental concern has partial impact through retailer influence and peer influence on Behavior. Thus, being concerned for the environment and an individual’s self-perceptions of being socially attuned do not significantly result in environmentally sustainable consumption. Once Tsarenko et al.³¹ applied Environmental concern as a mediator; other researchers in various study fields applied it as a moderator and have had various results.

Kim and Choi³² explained that Environmental concern denotes the orientation of individuals toward the environment and their level of concern with environmental issues. According to survey results, people who report positive attitudes and high level of environmental concern are more likely to engage in purchasing behavior. Thus, we employed Environmental concern in this conceptual framework.

P6: Environmental Concern has positive impact on Attitude toward Green IT.

3.7 Attitude toward Green IT

In this study, ‘Attitude toward Green IT’ is defined as the degree to which an individual is aware of negative impact on the environment and understands that the green product has less or no harm on the environment. This construct is based on behavioral intention. Venkatesh et al.¹⁴ discovered that there was a significant positive influence in the relationship between behavioral intention and use behavioral.

The relationship between Behavioral Intention to Use Behavioral has been explained in many previous studies and theories. Most researchers in MIS fields understand that if a human has an intention to do something, he/she will do it, especially in regard to information systems and technology. This means Behavioral Intention has a significant impact on Use Behavioral. This fact appears repeatedly in related research.

P7: Attitude toward Green IT has positive impact on Green IT Use.

3.8 Green IT Use and Perceived green business encouragement

In this study, perceived green business encouragement is defined as the degree to which a consumer motives organization to aware of the standpoint of the consumer on environmental issues. One part in what Porter³⁴ said in his Five Competitive Forces is that the consumer is very important to all businesses. Freeman³⁵ has developed the typical stakeholder map that shows that there are many stakeholders involved in the survival of a firm. One of the important stakeholders is the consumer. Porter³⁴ and Freeman³⁵ explained something similar, and many researchers realized that consumers have the power to push the business in the direction they want it to go.

The study by Chang and Fong³⁶ discovered that Green Product Quality has a positive impact on customer satisfaction and creates customer loyalty. It also found that Green Product

Quality and Green Corporate Image lead to consumer satisfaction and loyalty. In this regard, some companies must go green to project the positive image of environmental concern to improve customer satisfaction. Kotler et al.³⁷ wrote similarly that consumers have more options and can make choices based on criteria beyond product, price, and distribution channels. That is to say, consumers have some power to change business in the way they want. Consequently, when many buyers become green consumers, they leave no choice for businesses but to go green.

P8: Green IT Use has a positive impact on Perceived green business encouragement.

To measure the perceived green business encouragement, we prefer to adapt G-Readiness. Molla et al.⁸ pointed out that G-Readiness carries five dimensions that relate to the path of an organization to go green. These are attitude construct, policy construct, practice construct, technology construct, and governance construct. When measuring the consumer's opinion towards green strategy of organizations, researchers can use G-Readiness with questions adjusted appropriately for organizations versus consumers. 'When most people use green IT products, businesses should deploy green IT policies, such as green supply chain' (5-Point Likert Scale) is an example of measurement items that are adapted from G-Readiness.

3.9 Perceived increasing of green marketing

Green marketing is defined as the marketing of products which cause less or no harm to the environment; it integrates activities such as modification of products, packaging, production processes and advertising. Moreover, it increases awareness on compliance marketing among industries³⁸. Many previous studies have various perspectives on green marketing. For example, green marketing elicits some degree of consumer purchase intention⁹. On the other hand, consumers are participants in green marketing³⁹. In this regard, green marketing and consumers are bound together - both consumers and businesses are a root to green marketing. It will bring us to sustainability development.

In the study of Juwaheer et al.⁹, there are five factors: consumer beliefs, green labeling, green branding, and green advertising, but not all of them have a strong relationship with purchase intention of consumers. As a result, green branding and green advertising have a positive correlation with purchase intention of consumers. Therefore, we recommend two dimensions of green marketing which are green branding and green advertising to adapt them as measurement items.

P9: Green IT Use and Perceived green business encouragement has a positive impact on Perceived increasing of green marketing.

4 Conclusion

A conceptual framework is proposed in this study to determine essential attributes of the green IT products attracting consumers. It explains impacts of green consumption behavior impact on a business as well. It also determines parties (consumers or businesses) that have power to increase environmental friendliness in market.

It is axiomatic that a product which has good characteristics and functions will induce motivation to purchase it, especially for technology. To support the previous sentence, the framework (Figure 1) suggests that consumers would buy green IT products with three essential attributes: relative advantage (P1), price value (P3), and noticeability (P4). When consumers perceive that green IT products have benefits (e.g., low energy consumption, low CO₂ emission),

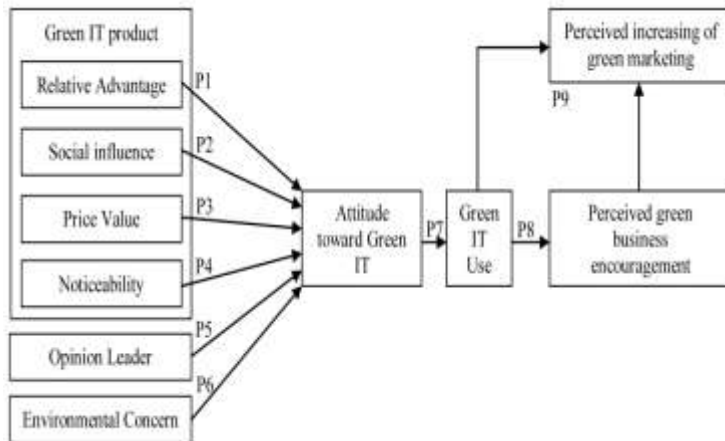


Fig. 1 The conceptual framework of individual green IT consumption and its impacts

easy to find on the shelf in a shop, and the price is reasonable, they will probably sway toward buying green IT product.

Society and environmental concerns are likely to have some bearing on consumer decisions to buy IT products. The study employed three constructs to determine social factors that impact purchasing behavior: social influence (P2), opinion leader (P5), and environmental concern (P6). Society can influence people to become green consumers. For instance, when parents, family members, friends and favorite celebrities say that or she uses products which have less negative impact on the environment, this action can push some consumers to absorb their environmental concerns osmotically and start to go green.

In general, people tend to use green IT products after they perceive the benefits of green IT products (P7). The following list of consumer perceptions regarding the importance of an environmentally friendly attribute in an IT product, and consumers will buy and use one with environmental consciousness. When environmental friendliness is significant in a society, businesses have no choice but to go green to survive in the market (P8).

Last, green marketing will proliferate because many organizations compete to become the environmental leader for better advantage. We suggested that both consumers and businesses have power to increase environmental friendliness in the marketplace (P9). For consumers, if they have high awareness of negative impact on the environment, consumers are going to increase environmental friendliness in their purchasing and using behavior. The result is consumers want more green IT products on the market. For business, when a firm starts looking for cost cutting, differentiation, or to improve its look, green strategy can be the way to achieve this goal. At this point, the road to sustainability development is established.

For practitioners, especially key people in private and public sectors, this conceptual framework offers insight into causal factors of consumers and their green consumption. Practitioners have a better understanding of impact on organization and awareness to improve green strategy in their organizations to attract consumers. The green movement provides advantages to some degree, such as first-mover advantage, cost saving, differentiation, and so on.

For researchers, the framework shows the clear picture of green IT consumption and its impact on an increase of green marketing that gives chances for further research and practice.

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