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Information Systems Frontiers
A Journal of Research and Innovation

ISSN 1387-3326

Inf Syst Front
DOI 10.1007/s10796-016-9733-z



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Green information systems use in social enterprise: the case of a community-led eco-localization website in the West Midlands region of the UK

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Abstract This study examines the intention of environmentally-oriented social enterprises to continue using Green IS (an eco-localization website here) in Herefordshire located in the West Midlands region of the United Kingdom. The Herefordshire Greenlinks (HGL) Association is a local business community that operates primarily through the HGL Website in order to help local social enterprises find and trade local eco-friendly goods and services. It is an example of a “market-based” approach to solving social and environmental issues that is inspired by a bottom-up view of community development and eco-localization. Based on the theory of uses and gratification of media use and the new environmental paradigm, we propose a research model that outlines the various factors contributing to intention to continue using an eco-localization website. The research model and its associated hypotheses were empirically tested using a dataset generated from a survey of 83 small social enterprises. The results demonstrate the importance of three different types of gratification – content, social and performance gratification as well as users’ environmental concerns in determining the intention to continue using an eco-localization website. This study contributes to the Green IS literature by extending research to the social sector environment, and it also provides practical insight for designers of such community-led eco-localization websites.

Keywords Green IS · Social enterprise · Uses and Gratifications theory · IS continuance

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1 Introduction

Sustainability and different ways of achieving it have been important topics of research in different disciplines. Likewise, information systems (IS) researchers have been at the frontiers of advancing the significant role that ecologically-focused information systems, commonly known as Green IS, play in promoting sustainability (Watson et al. 2010; Melville 2010; Malhotra et al. 2013; vom Brocke et al. 2013; Gholami et al. 2016). Green IS refers to “the application of interacting information technologies to create purposeful systems to help organizations develop ecological sustainability” (Chen et al. 2011). There are a number of systems which can fulfill this definition, such as collaborative video and teleconferencing (Dwyer and Hasan 2012; Jenkin et al. 2011), smart phone based environmental information systems (Pitt et al. 2011), enterprise carbon and emission management systems (Rush and Melville 2012), energy informatics systems (Corbett 2013; Watson et al. 2010) and different types of energy awareness systems that encourage environmental sustainability related learning, behaviors and practices.

The use of Green IS in the energy, logistics, transportation, and manufacturing sectors can lead to more sustainable business operations (Kranz et al. 2015; Koo et al. 2014). It can also produce medium or long term changes to behavior and economic structure towards more eco-sustainable practices (Loock et al. 2013; Seidel et al. 2013). Thus far, much of the Green IS research has focused on large business organizations and on the initial adoption of Green IS (Ryoo and Koo 2013; Hertel and Wiesent 2013; Yang et al. 2016; Thomas et al. 2016). There is a gap in the literature with regards to Green IS use in social enterprises (particularly “small” social enterprises) and at post-adoption level. To address these gaps, in this paper, we investigate the Green IS use by small social enterprises.

The Green IS under investigation is a UK based website –the Herefordshire Greenlinks (HGL)¹ developed by the Herefordshire Greenlinks Association (more detail in Section 2). The HGL Website brings together Herefordshire's social enterprises that want to improve green credentials, save energy costs and win a loyal following of local customers. It is designed to help consumers and small social enterprises find and trade local eco-friendly goods and services. The HGL Website creates awareness regarding eco-sustainable consumption and business practices and facilitates green behavior among consumers and businesses. The HGL Website is therefore a Green IS that enables eco-localization because of its emphasis on local and eco-sustainable production, resources and consumption. Although there is a general consensus regarding the potentials and opportunities created by Green IS in general, there is relatively little understanding on why social enterprises use Green IS such as eco-localization websites.

Social enterprises have lately been attracting considerable political interest particularly in the United Kingdom, with official support culminating in UK Coalition Government's (2010–2015) Big Society agenda (Underwood et al. 2012). Social enterprises matter when considering environmental sustainability challenges, because they operate at a community level where sustainability issues can be both clearly perceived and effectively tackled (Peattie 2013). Social enterprises operating at a community level can create more sustainable systems of production and consumption and simultaneously provide more sustainable livelihoods. In the UK, numerous social enterprises ranging from small charities to large social enterprises are involved in some sort of environmental sustainability initiatives. In 2009, these social enterprises diverted about 250,000 tons of material and saved an estimated half a million tons of CO₂ emissions (Hallett 2013). Social enterprise is a relatively new area of research in the information systems literature, particularly in the context of sustainability (Ratten 2013; Richardson et al. 2014). Therefore, our emphasis on the intention of social enterprises to continue using Green IS adds new and important insights to the current body of knowledge concerning Green IS which has mainly focused on large businesses.

The main research question guiding this study is “*What are the motivational drivers behind the intention of environmentally-oriented social enterprises to continue using an eco-localization website such as the HGL Website?*” Answers to this question will guide the formulation of intervention strategies for effective engagement and promotion of green business through the use of information systems. It has been suggested that Green IS could help create green awareness among professionals, businesses, and the citizens by facilitating community building, engaging groups in

participatory decisions, and supporting education and green advocacy campaigns (Murugesan 2008). Along these lines, environmental web portals, local community websites, shared marketing platforms for eco-localization and various other e-commerce systems can play an important role. However, in order to be able to play a meaningful role in promoting sustainability initiatives, it is imperative that information systems developed for such purposes are not just adopted but also continuously used by the targeted users.

We contribute to the Green IS literature by addressing three issues. First, the majority of Green IS studies have focused on large organizations and research on Green IS in the context of social enterprise is relatively scarce (Coffey et al. 2013). Decisions to use information systems in small business enterprises often differ significantly from those in larger organizations, and therefore call for studies that are dedicated to the particular context of small business enterprises. In fact, for very small enterprises — which are the focus of the current study, such decisions might bear more resemblance to individual adoption and use decisions; since often the enterprise is owned and run by a single person or is a small family run business (see Premkumar 2003; Thong et al. 2006; Teo 2007; Bruque and Moyano 2007). Thus, this study brings the social enterprise perspective to Green IS literature.

Second, the majority of the Green IS studies have focused on the decision to adopt an IS (Benamati and Rajkumar 2008; Chen et al. 2010; Gholami et al. 2013; Mishra et al. 2014; Akman and Mishra 2015). Although initial adoption is an important first step, more research is needed to understand the intention to continue using Green IS. The implementation of IS can truly be considered a success when a significant number of users have moved beyond initial adoption, and use or intend to use the system on a continued basis (Bhattacharjee 2001; Venkatesh et al. 2003). Previous research has found that the factors influencing users' adoption decision and intention to continue using are different (Karahanna et al. 1999; Limayem et al. 2003). When it comes to Green IS, given the inherent problems that Green IS are designed to address —that is environmental sustainability, in addition to initial adoption, continuance is very important (Dedrick 2010; Melville 2010). Intention to continue using the HGL Website by Hertfordshire business community is crucial to the survival of this local community and for achieving economic, environmental and social values.

Third, a number of theories have been formulated to help understand the factors that influence organizational Green IS initiatives, such as motivational theory (Molla and Abareshi 2012), institutional theory (Chen et al. 2010) and the technology-organization-environment framework (Dao et al. 2011). Based on the uses and gratification perspective on media use (O'Keefe and Sulanowski 1995) and the new environmental paradigm (NEP) (Dunlap et al. 2000), this study examines how the different dimensions of gratification (or

¹ <http://www.herefordshiregreenlinks.info/>

satisfaction) with the HGL Website, and the business owners' environmental concerns are associated with the intention to continue using the HGL Website. Thus, this paper extends the theoretical foundations of Green IS literature as well.

The remaining sections of the paper are organized as follows. Section 2 provides more information on social enterprises in general and on the HGL in particular. Section 3 presents the theoretical background of the study and outlines the research hypotheses. The research methodology and the results of the study are presented in Section 4. The finding and their implication and limitations of the study are discussed in Section 5 followed by conclusion in Section 6.

2 Social enterprise and the Herefordshire Greenlinks

Capitalism strives at maximizing profit, but often fails on many social and economic objectives. There has been growing interest in new models of social enterprise that seek alternative ways of delivering products and services, while securing the triple bottom line of social, environmental and economic sustainability (Underwood et al. 2012; Cato 2013). The social dimension of the social enterprise refers to the conventional view of not-for-profit organizations (NGOs) addressing social needs, mainly where the government and private sector are unable or do not wish to intervene (Vickers and Lyon 2012). The enterprise dimension of the social enterprise on the other hand, focuses on the economic value and refers to "Neoliberal perspectives emphasizing business opportunities, the efficiency of unfettered markets and a need to restrict the role of the government, by transferring responsibilities to the private sector and the civil society" (Sepulveda 2009: p.12).

Social enterprises are part of a spectrum of organizations ranging from charities whose main aim is to create social value, to the organizations whose main objective is to create business value (see Fig. 1). In between the two extremes, there is a category of organizations which combine social and environmental values with economic value which is referred to as "social enterprise" (Prakash and Tan 2014). One of the first successful social enterprises, the Rochdale Society for Equitable Pioneers, was formed in 1844, in the UK which was the basis for development of the modern co-operative movement (Prakash and Tan 2014).

Social enterprises contribute to the social dimension of sustainability by reinforcing relationships that bind individuals who share similar interests and values (Shepherd and Patzelt 2011; Maclean et al. 2012). Social enterprises reconcile the "conflicting goals" of being both social and an enterprise by fulfilling the need for sustainable economic and social development while maximizing the economic impact and return to stakeholders. Watson et al. (2012) argue "the economic organization of current society predominantly reflects the operation of self-interest. Treating people and organizations

as autonomous maximizing utilitarians, however, fails to recognize that our innate social nature and non-economic priorities greatly influence our decisions, needs, and behaviors, and that we are strongly influenced by others. Behavioral economics addresses some of the shortcomings of traditional individual self-interest oriented economic analysis. Solutions to sustainability need to also consider our social side" (p.29).

As a good example of the social enterprise, the first recycling services in the UK were developed by local groups of people who were affiliated to "Friends of the Earth"² and became an environmentally oriented social enterprise, eventually providing service to large populations all around the country (Hallett 2013). According to Vickers and Lyon (2012), there are three types of environmentally oriented social enterprises – "Small and Beautiful", "Green Knowledge Economy", and "Green Collar Army". "Small and Beautiful" enterprises are the ones that try to make a deep impact via close engagement within specific communities and local economies; "Green Knowledge Economy" enterprises are the ones which seek a wider impact through developing, sharing and selling knowledge; and "Green Collar Army" enterprises focus on employment creation.

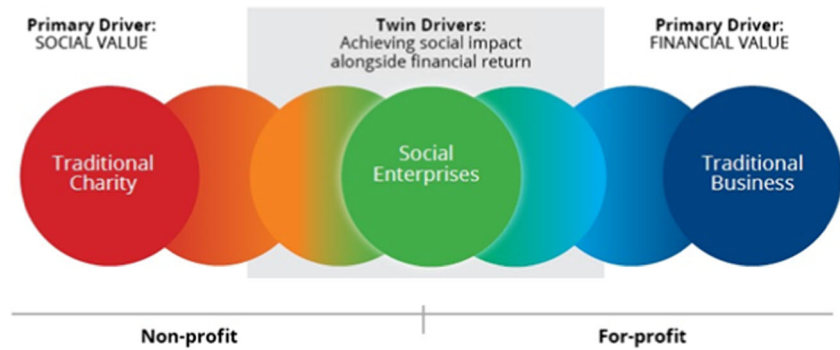
The Herefordshire Greenlinks is a green business association located in the West Midlands region of the UK, and has 400 social enterprise members that are interested in various aspects of sustainability trying to make an impact within the Herefordshire local economy through eco-localization of goods and services. The association owns the Herefordshire Greenlinks (HGL) Website which has been running for over 10 years. The HGL Website is a networking platform that helps environmentally-oriented social enterprises find and trade local eco-friendly goods and services. The HGL Association members co-operate to support each other, improve environmental performance, share best practice such as energy saving techniques, contribute to training courses, and co-operate on procurement. To enable these activities, the HGL website holds a business directory, best practice section, green badging scheme, information, videos, and a discussion forum. The HGL Website is used mainly for communication between the businesses (mainly small social enterprises) that are part of the network. For a business, getting listed in the HGL Association's business directory is free; however for a subscription fee of £50, members can get an enhanced listing that gives them access to some advanced features of the website. The money collected through the subscription fees is used for hosting and maintaining the website.

The HGL Association strives to develop a connected picture of a sustainable local economy. Obtaining "green certification" is another important motivation for local businesses to join the HGL Association.³ With rising energy prices and

² <http://www.foe.co.uk/>

³ <https://www.theguardian.com/sustainable-business/blog/first-steps-sme-sustainability-campaign>

Fig. 1 Social Enterprise (Prakash and Tan 2014)



legislations such as mandatory carbon reporting, more businesses are adopting green certification. The businesses will be able to show those credentials to customers and supply chain partners. Further, the association has been active and successful in persuading the Herefordshire Council to initiate sustainable procurement policy. The UK's Sustainable Procurement Task Force (HM Government 2010) recommends that environmental, economic and social priorities should be included in all public sector procurement. The aim is to optimize goods procurement and delivery, while reducing environmental impacts and carbon footprint. The HGL Association is the only independent, business-led green network in the West Midlands region of the UK that does not have funding support from its local authority which makes it a good example of social enterprise. It uses the HGL Website to achieve social and environmental objectives as well as creating economic value.

The HGL Association provided the researchers with access to its community of social enterprises, and therefore served as a research setting for carrying out a survey to test the proposed research model. Members of the HGL Association are primarily micro and small sized enterprises (see Appendix 1). This is based on the UK Government's and the EU's definition of SME. Micro business has less than 10 employees and turnover under £2 million; Small business: Less than 50 employees and turnover under £10 million; and Medium business: Less than 250 employees and turnover under £50 million. In 2013, there were 4.9 million businesses in the UK, over 99% of which were small and medium enterprises. There were five million micro-businesses in the UK in 2014, accounting for 96% of all businesses.

3 Theoretical background and hypotheses

This study develops a model for studying the intention to continue using an eco-localization website by drawing upon the uses and gratification theory on media use (O'Keefe and Sulanowski 1995) and the new environmental paradigm (Dunlap et al. 2000). We examine how the different dimensions of gratification (or satisfaction) and environmental

concerns are associated with the intention to continue using the website. In the following subsections, the importance of examining IS continuance is outlined and the relevant theoretical perspectives are introduced and corresponding hypotheses developed.

3.1 IS continuance

IS continuance refers to the intention to continue using a given information systems. Merely examining adoption intention of information systems is not enough, since it is followed by a process of deeper evaluation through actual use that may or may not lead to continuance. The gap between expectations before adoption and evaluation after actual use influences the intention to continue using the IS. Based on the expectation-confirmation-theory (Oliver 1980), Bhattacharjee (2001) proposed the IS continuance model which goes beyond IS adoption models and includes users' post-adoption behavior. According to expectation-confirmation-theory, a higher satisfaction results in positive confirmation of expectations and the confirmation explains the intention to continue using the IS. Satisfied users will form an intention to continue using the IS in future, while dissatisfied customers decide to discontinue. IS continuance has been studied in various contexts (Hong et al. 2008, Limayem et al. 2007, Vatanasombut et al. 1980, Sorebo and Eikebrokk 2008). For instance, Lin and Shih (2008) investigated the factors for consumers' intention to continue using mobile commerce services and found that post-adoption satisfaction had significantly greater influence on intention to continue using the IS than the pre-adoption constructs.

Most of the previous studies of post-adoption behavior primarily examined the impact of cognitive factors and ignored other important factors such as "social" (which is particularly important in the context of social enterprises) or "emotional" factors (such as environmental concerns in the context of sustainability) which may be important in explaining the intention to continue using the IS (Hyunjeong et al. 2012). Thus, some theoretical extensions may be required to explain users' intention to continue using Green IS in general and eco-localization websites in particular. In this

context, we draw upon the uses and gratification theory to identify factors that enhance satisfaction with Green IS use, and can therefore have an impact on the intention to continue using the Green IS.

3.2 Uses and gratification theory

Uses and gratifications theory is an important theory in explaining the motivation for using a media such as radio, television, cable TV, VCR remote controls, digital TV, the Internet and mobile phones (e.g. O'Keefe and Sulanowski 1995; Leung and Wei 2000). It is also appropriate for studying Internet use because of the Internet's media-like characteristics (Ruggiero 2000; Weiser 2001; Johnson and Kaye 2003). Gratifications are regarded as an aspect of satisfaction with use of the media (Herzog 1944). Therefore, gratification occurs when people are able to satisfy certain needs through the use of a media. The uses and gratification theory assumes that users have motives for using media and expect to fulfil certain outcomes through their interaction with the media. The success of the media itself and the extent to which it can achieve its intended purpose is determined by its ability to fulfil the expectations of potential users.

The two major dimensions of gratification for media use are identified as "content gratifications" and "performance gratifications" (Cutler and Danowski 1980; Stafford and Stafford 1996). The content gratification is related to the messages carried by the media, and performance gratification refers to the extent to which the media can improve business and environmental performance (Cutler and Danowski 1980). Previous research suggests that consumers use media either for the content carried by the media, or for the benefit they anticipate to get from the media use process. Users may be motivated by enjoyment of the process of random browsing and site navigation (Hoffman and Novak 1995), while users of specific websites might be motivated by the desire for specific informational content (Stafford and Stafford 1996).

William McGuire (1974), the renowned communications theorist argues it is less important to know how a user came to a media than to understand how the media could hold a user — after initial adoption of the media. Accordingly, in line with studies examining the post-adoption of IS, we are interested in understanding how the media retains users (Barker and Groenne 1997; Lohse and Spiller 1998). Initial research on Internet use found that users' site selection was generally motivated by content considerations rather than by recreational browsing (Drèze and Zufryden 1997, McDonald 1997, Stafford and Stafford 1996). Therefore, it is important to investigate the potential uses and associated expected performance and social gratifications from using the media (Armstrong and Hagel 1996; Junglas et al. 2013).

For environmentally-oriented social enterprises, the use of eco-localization website (the HGL Website here) has to fulfil both the informational and performance needs as well as the need for social inclusion (Papacharissi 2008). Research should therefore focus on combination of such needs and the resulting gratifications (content, social and performance) when the needs are fulfilled in order to understand the intention to continue using the website. We are interested in investigating the interplay between the content, social and performance forms of gratification that the HGL Website can afford the users. In this context, the gratifications can also be classified into two categories — "means" gratification and "ends" gratification. Broadly, "ends" can be conceptualized as the fundamental objective that the decision maker may value in a given context, while the "means" are the ways or methods to achieve the end (Keeney 1994; Torkzadeh and Dhillon 2002). For instance, users' fundamental objective might be to achieve a certain level of performance through the use of the eco-localization website. In order to achieve this performance, they expect the content provided by the website as well as the social interaction supported by the website to be gratifying. Typically, the "means" variables and "ends" variables (in this case the different kinds of gratification) are closely related to each other.

Content gratification refers to the satisfaction that users feel with the content provided by the HGL Website. Previous research has repeatedly highlighted that information acquisition is an important motivation to use a particular media, and users consume the content to fulfil their informational and entertainment needs (Shao 2009). When the website is able to satisfy the content-related needs that users have, it results in content gratification. When the content provided is gratifying, it is likely that users will also be favorably disposed towards the benefits of using the website, and this will result in performance gratification. As mentioned earlier, performance gratification refers to the extent to which the social enterprises are able to improve their business and environmental performance and effectiveness by using the website. Therefore, content gratification is the "means" gratification through which the user can achieve the "end" objective — which is performance gratification. We hypothesize:

H1: Users' content gratification with an eco-localization website is positively associated with performance gratification.

Social gratification has been proposed as an important component that enhances users' overall satisfaction with use of the media. This is particularly true in the context of the HGL Association which is a social enterprise solving environmental issues by creating new types of relationships — a community focused service provider. The HGL Association is an

example of environmentally-oriented social enterprise which tries to make a deep impact within a particular community (in Herefordshire located in West Midlands region of UK), and is inspired by bottom-up view of community development and eco-localization. Therefore, enabling social interactions among its members is a core objective of the HGL Website. In this context, social gratification is a “means” objective which subsequently fulfills an “ends” objective. Consequently, for the HGL Website members, gratification with the social interaction afforded by the HGL Website will enhance the overall performance gratification that members feel with using the HGL Website. Therefore, we propose:

H2: Users' social gratification from using an eco-localization website is positively associated with performance gratification.

The HGL Website aims to address sustainability through eco-localization within the Herefordshire community by providing information regarding local businesses and services (i.e., localized content), thus binding groups of individuals with similar interest, and addresses the social dimension of sustainability. It has been found that the extent to which people are satisfied or gratified with the social interaction component of using a website is often determined by the nature and relevancy of the content that they are able to access. Thus, content gratification serves as the “means” through which the users expect to fulfill the “end” objective of achieving social gratification. Thus, we hypothesize:

H3: Users' content gratification with an eco-localization website is positively associated with social gratification.

While these social and content motives can bring the user to the website, it is also important to understand the factors that can retain their interest in the media. Based on this, it can be argued that the performance gratification with the HGL Website is the “end” objective, which when achieved will positively influence the intention to continue using the website. We define performance gratification as the extent to which the social enterprises are able to improve their business and environmental performance and effectiveness by using the website. In the context of the HGL Website, performance gratification will reflect that users are satisfied with the business and environmental benefits that can be realized from using the HGL Website. Therefore, we hypothesize:

H4: Users' performance gratification with an eco-localization website is positively associated with the intention to continue using the website.

3.3 User's environmental concerns

Melville (2010) argues that there are other factors not included in current IS use models that could play an important role in shaping beliefs and attitudes about Green IS use such as pre-existing beliefs about the environmental outcome of one's behavior. Green IS use may be motivated out of concern for the environment even if economic benefits might not be tangible in the short term (Fuchs 2008). A business owner who is aware of the environmental implications of his or her choice might come to a different decision than one who does not care about the environment.

Dunlap and van Liere's (1978) new environmental paradigm (NEP) is widely used as a measure of pro-environmental orientation. Dunlap et al. (2000) develop a revised NEP in order to improve the original one in several respects: it taps into a wider range of facets of an ecological worldview; it offers a balanced set of pro- and anti-NEP items; and it avoids outmoded terminology (Dunlap et al. 2000). Many studies have found that the NEP (and the corresponding measurement scale) is a reliable and valid tool to measure environmental values (Fransson and Garling 1999; Olli et al. 2001). We include business owners' “environmental concerns” in the conceptual model. Drawing from the NEP, we argue that business owners' concerns about the natural environment motivate the intention to continue using the HGL Website. Users' environmental concerns is also key to the concept of social enterprise where the objective is to safeguard the triple bottom line of social, environmental and economic sustainability. The following hypothesis is thus put forward:

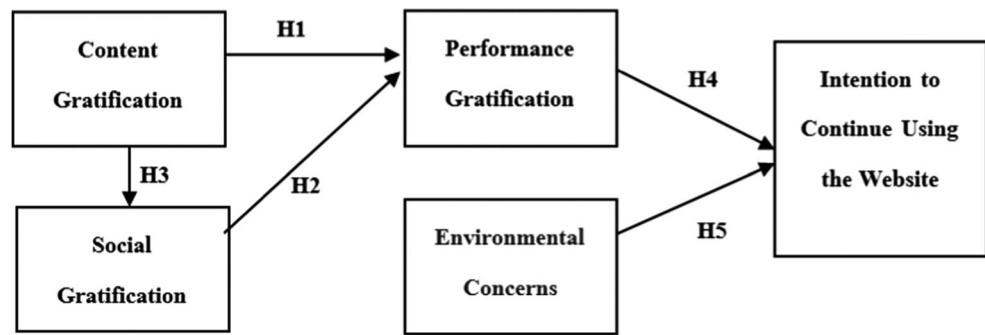
H5: Users' environmental concerns are positively associated with their intention to continue using an eco-localization website.

Based on the above argument, we propose the following research model to examine the impact of content gratification, social gratification, performance gratification as well as users' environmental concerns on the intention to continue using the HGL Website (Fig. 2).

Our model is an intention-based individual level model. Studies have shown that intention-based models of IS use can also be applied to decision-making for micro and small enterprises (Harrison et al. 1997, Lim et al. 2002, Riemenschneider et al. 2003, Benamati and Rajkumar 2008, Gholami et al. 2010). This is because for such enterprises, decisions to use IS are centralized in a single decision maker (Levy et al. 2005).

In fact, a distinguishing characteristic of SMEs compared to large organization is that decision-making is centralized in a reduced number of people (Thong 1999). Key decisions to use IS are made solely by individuals with high authority in the

Fig. 2 Proposed research model



firm, such as the CEO or IT head. Unlike decisions to use other complicated software applications, firm level decisions on adoption and use of Internet technologies and websites (such as the HGL Website) can be relatively simple (Afuah and Tucci 2001). There is then considerably less discrepancies between individual-level and firm-level decisions, particularly for small and micro enterprises (Harrison et al. 1997).

4 Research method

In order to test the above hypotheses, we focused on a particular type of Green IS that is the HGL Website for eco-localization.

4.1 Operationalization of the constructs

Our central argument is that gratifications with the eco-localization website and the business owners' environmental concerns influence the intention to continue using the HGL Website. Corresponding to this argument, the research was concerned with five main constructs and their relationship (Fig. 2): content gratification, performance gratification, social gratification, environmental concern and intention to continue using the HGL Website. Intention to continue using the website was measured based on Bhattacharjee (2001) using three items. Performance gratification, content gratification and social gratification were each measured using nine, four and four items respectively (Stafford et al. 2004). All the fifteen items of the new ecological paradigm (NEP) scale (Dunlap et al. 2000) were used to operationalize environmental concerns. Respondents were asked to show their degree of agreement or disagreement to each of the statements on a five point Likert scale (1 = strongly disagree; 5 = strongly agree). Table 1 provides a summary of the research variables and measures.

4.2 Study context and data collection

The data were collected using an online survey. An email outlining the purpose of the study and containing the link to

the online survey was sent to all the 400 members of the HGL Association. The data collection was facilitated and conducted in February 2013 by the founder of the Association (and the administrator of the HGL Website) who lives in the area and is personally acquainted with the local business owners. There was a single respondent per company.

A total of 89 responses were received (yielding a response rate of 22%) of which 83 responses were usable for analysis purposes. The summary information of the respondents is presented in Appendix 1, although not used in the hypothesis testing due to inadequate data for undertaking a multi-group analysis. Generally speaking, 50% of the respondents were from the Services, Tourism and Leisure, Food and Energy and Construction sectors. The key personnel who answered the questionnaire were the business owners and they have been recognized as the key decision makers for intention to continue using the HGL Website. This was confirmed by follow-up calls by one of the researchers. Our sample primarily comprises micro and small sized enterprises. A low response rate of 22% was not surprising as seen in previous literature (e.g. Gholami et al. 2013).

The majority have annual turnover less than £100,000 (63%) and consider the level of Internet (54%) and IT knowledge (59%) in their firm as intermediate. Further, 84% have their own website and 48% and 38% agree that they have been provided with enough information about the HGL Association services and the HGL Website benefits, respectively. To test for nonresponse bias, we compared the demographic characteristics of respondents and the non-respondents and found no significant differences. While demographic information was collected, it was not used in the analysis.

4.3 Data analysis –instrument validation

In preparing the data for analysis, seven environmental concern (NEP 2, 4, 6, 8, 10, 12 14) items and one item for intention to continue using the website (ContInt3) which were negatively worded in the survey were reverse scored. In a survey research, common method bias (CMB) is a major issue.

Table 1 Summary of research variables

Variable	Items	References
Intention to continue using the website	ContInt1. We intend to continue using the HGL Website rather than other alternative means. ContInt2. We intend to continue using the HGL Website rather than discontinuing its use. ContInt3. We would rather discontinue using the HGL Website.	Bhattacharjee (2001)
Performance gratification	Using the HGL Website, we are able to .. PG1. improve business performance PG2. accomplish more business activities PG3. have greater control over our business PG4. conduct business easily PG5. enhance business effectiveness PG6. reach out to our customers PG7. look for resources related to green business PG8. search for relevant information for our green initiatives PG9. improve our green credentials	Stafford et al. (2004)
Content gratification	meet our information needs regarding green business practices acquire more knowledge about sustainable initiatives get information about recent developments in sustainability get information about other sustainable businesses	Stafford et al. (2004)
Social gratification	develop our social network connect to like-minded businesses / individuals have meaningful interactions with other green businesses communicate business practices with others	Stafford et al. (2004)
Environmental concerns	We are approaching the limit of the number of people the earth can support. Humans have the right to modify the natural environment to suit their needs. When humans interfere with nature, it often produces disastrous consequences. Human ingenuity will insure that we do not make the earth unlivable. Humans are severely abusing the earth. The earth has plenty of natural resources if we just learn how to develop them. Plants and animals have as much right as humans to exist. The balance of nature is strong enough to cope with the impacts of modern industrial nations. Despite our special abilities, humans are still subject to the laws of nature. The so-called "ecological crisis" facing humankind has been greatly exaggerated. The earth is like a spaceship with very limited room and resources. Humans were meant to rule over the rest of nature. The balance of nature is very delicate and easily upset. Humans will eventually learn enough about how nature works to be able to control it. If things continue on their present course, we will soon experience a major environmental catastrophe	Dunlap et al. (2000)

During the design of the survey instrument, we therefore took proactive steps to mitigate threats of methods effects by "protecting respondent anonymity and reducing evaluation apprehension" (Podsakoff et al. 2003, p. 887). In addition, to minimize item characteristics related method bias we used expert judges to sort and rate the items and a pilot test to ensure that the wording of the questions were clear (Conway and Lance 2010). Further, given the questions in the survey were not long enough to fatigue respondents, we believe that our data is not affected by context effect related method bias (Podsakoff et al. 2003).

Post-hoc, the severity of CMB was checked using Harman's single factor test (see Appendix 2). The un-rotated single factor solution accounted for 24% of the variance in the data which is less than the 50% threshold for CMB problems. Further, as reported in the next section, we have demonstrated adequate construct validity, which is "one way to rule out substantial method effects" (Conway and Lance 2010 p. 329). All of these indicate that even if CMB cannot be completely ruled out, it does not represent a significant bias in the data set.

The data were analyzed following a two stage approach of instrument validation and structural model tests. First, to

determine the psychometric property (reliability and validity) of the instrument, several statistical tests were performed on the data. During this process, it became apparent that the performance gratification items were tapping into two sub-domains. While PG 1–5 reflected the “business” performance related gratification, PG 6–9 reflected the “environmental” performance gratification of the HGL Website. As a result, we modeled performance gratification as a second order reflective-formative construct as suggested by Hair et al. (2014).

The new ecological paradigm (NEP) scale represents potentially five sub domains: Limits to growth (NEP 1, 6, 11), Human domination (NEP 2, 7, 12), Nature balance (NEP 3, 8, 13), Exemptionalism (4, 9, 14), and Eco-crisis (NEP 5, 10, 15) (Dunlap et al. 2000). However, previous research is inconsistent on the number of dimensions (single or more) that the scale measures. Indeed, Dunlap et al. (2000, p 431) advised that researchers, based on the internal consistency of the scale, should decide whether to treat the NEP as a single variable or not. In analyzing the NEP scale, our data supports a four dimension nine items scale.

Out of the four sub-dimensions, while Eco-crisis has all the three items, the other three sub-domains, that is, Human domination, Nature balance and Exemptionalism each has two items. Six items (NEP 1, 6, 11, 2, 8, 9) including all the three items of the limits to growth sub-domain had to be dropped as they didn't satisfy the criteria for validity and reliability. Based on these results, we modelled environmental concerns as a second order reflective-formative construct using the repeated indicator approach.

The result of the first order instrument validation stage shows that the measurement model is valid and reliable. In terms of convergent validity, all but one factor loadings have a value greater than 0.7 and the Average Variance Extracted is greater than 0.5 (Table 2). The Composite Reliability values are also greater than 0.7 for all of the constructs providing evidence of internal consistency of the measures. Likewise, except for three variables all Cronbach alpha values are greater than 0.7 and none of the remaining three Cronbach alpha values fall below 0.5 to raise a serious concern of reliability. Further the square root of the AVE is larger than the off diagonal inter-construct correlation (Table 3) supporting discriminant validity. In addition, all indicators load higher with their respective theorized construct than with any other construct with all cross loading differences >0.10 and inter-construct correlations well below the 0.80 threshold.

Two of the constructs were modeled as second order reflective-formative and validated through a two-stage approach for collinearity of indicators (Hair et al. 2014, p. 231). The performance gratification construct was modeled from the first order constructs of business performance and environmental performance gratification. Environmental concern was modeled from the first order constructs of eco-crisis, exemptionalism, human domination and nature balance. As

indicated in Table 4, since all VIF values are <3.3 and the tolerance values are >0.20 , there is little collinearity problem.

4.4 Hypothesis testing

To test the hypotheses underlying the model presented in Fig. 2, the proposed direct effects were estimated using the latent variable scores in partial least square (PLS). To estimate the significance of the path coefficients, 2000 sample bootstrapping was performed. The results are presented in Table 5. The model explains 19% of the variance in intention to continue using the HGL Website and 37.8% of the variance in performance gratification. As indicated in Table 5 and Fig. 3, all the path coefficients are significant at 95% confidence interval.

The results of our data analysis indicate that content gratification is significantly associated with performance and social gratification, thus providing support for the uses and gratification theory. In addition, it was found that environmental concerns are significantly associated with intention to continue using the HGL Website. This finding indicates that for continued use of information systems that promote green practices and green businesses, the standard technology use related variables need to be supplemented with the factors that specifically tap into the users' environmental concerns.

Although our sample size ($n = 83$) is relatively small and we have recognized this as one of the limitations of the study, it is acceptable. We established the adequacy of the sample size using two post-hoc methods. First, Goodhue et al. (2012, p. 998) recommend the use of Cohen's power test in order to establish if a given sample size is adequate to detect the desired effect size with 80% statistical power. Hair et al. (2014, p. 20) developed a sample size recommendation using Cohen's power theory.

Based on this recommendation, for the parameters in our model (maximum of two exogenous variables, R^2 value of 0.37, $p < 0.05$), a sample size of 52 is adequate to achieve an 80% statistical power. Second, we performed a post-hoc G*Power analysis which indicates that with 9 latent and 29 observed variables, our sample size is large enough and has adequate power (80%) to detect large effect size variations in the endogenous variables.

5 Discussion of findings and implications

Previous research on Green IS has either focused on understanding how to make IS greener (such as by addressing power management issues and developing more power aware systems and technologies), and the capability of organizations to make their IS green (Molla et al. 2009), or on exploring the different ways in which IS can facilitate the achievement of sustainability related targets and objectives within organizations, communities, and the society at large. For instance,

Table 2 Validity and reliability of the first order measures

Construct	Item	Loading	AVE	CR	Alpha
Content Gratification	CG1	0.88	0.87	0.96	0.95
	CG2	0.97			
	CG3	0.96			
	CG4	0.92			
Social Gratification	SG1	0.82	0.80	0.94	0.92
	SG2	0.92			
	SG3	0.93			
	SG4	0.91			
Performance Gratification _ Business	PG1	0.95	0.81	0.96	0.94
	PG2	0.93			
	PG3	0.80			
	PG4	0.90			
	PG5	0.91			
Performance Gratification _ Environment	PG6	0.74	0.78	0.93	0.90
	PG7	0.92			
	PG8	0.91			
	PG9	0.94			
Environmental Concern_Eco-crisis	NEP5	0.81	0.63	0.83	0.70
	NEP10	0.77			
	NEP15	0.79			
Environmental Concern_ Exemptionalism	NEP4	0.64	0.67	0.79	0.57
	NEP14	0.96			
Environmental Concern_ Human domination	NEP7	0.87	0.67	0.80	0.51
	NEP12	0.76			
Environmental Concern_ Nature balance	NEP 3	0.880.77	0.68	0.81	0.53
	NEP13				
Intention to Continue Using the Website	ContInt1	0.8	0.77	0.91	0.85
	ContInt2	0.86			
	ContInt3	0.90			

information systems could contribute towards sustainability initiatives by providing more information to users regarding the impacts and implications of their behavior, or information systems could enable individuals or organizations to start and promote sustainable business initiatives.

Based on the uses and gratification perspective on media use, this study examines how the different dimensions of gratification are associated with the intention to continue using an eco-localization website. The uses and gratification theory assumes that users have motives for using the eco-

Table 3 Discriminant validity of first order measurement model

	1	2	3	4	5	6	7	8	9	AVE
1. Content Gratification	0.93*									0.87
2. Social Gratification	0.74	0.90								0.80
3. Performance Gratification _Business	0.17	0.35	0.90							0.81
4. Performance Gratification _Environment	0.81	0.73	0.23	0.88						0.78
5. Environmental Concern _Eco-crisis	0.14	0.00	0.01	0.02	0.79					0.63
6. Environmental Concern_ Exemptionalism	0.02	0.00	0.08	-0.07	0.26	0.82				0.67
7. Environmental Concern_ Human domination	0.15	0.06	0.03	0.11	0.60	0.13	0.82			0.67
8. Environmental Concern_ Nature balance	0.07	-0.04	0.02	-0.10	0.74	0.23	0.57	0.82		0.68
9. Intention to Continue Using the Website	0.37	0.35	0.15	0.33	0.18	-0.13	0.27	0.13	0.88	0.77

*Diagonal values are square root of the AVE

Note: Diagonal elements are the square root of the AVE of the reflective scales while the diagonals are the correlations between constructs

Table 4 Validation of second order measurement model

Second order construct	First order formative constructs	Outer weight	t value	Collinearity statistics	
				Tolerance	VIF
Performance Gratification	Business performance	0.58	2.56	0.99	1.00
	Environmental performance	0.50	2.41	0.99	1.00
Environmental Concern	Eco-crisis	0.40	1.97	0.90	1.11
	Exemptionalism	0.57	2.80	0.37	2.66
	Human domination	0.85	3.56	0.56	1.78
	Nature balance	0.51	2.49	0.55	1.82

localization website and expect to fulfil certain outcomes through their interaction with the website. Therefore, the success of the eco-localization website and the extent to which it can achieve its intended purpose is determined by its ability to fulfil the expectations of potential users.

In the case of the HGL Website, the extent to which the members perceive the HGL Website fulfilling their expectations, is determined by content gratification and performance gratification, the two main forms of gratification identified by the uses and gratification theory. While content gratification refers to the satisfaction that people face with the information or content provided by the HGL Website, performance gratification refers to the satisfaction with the business and environmental performance resulting from using the website. Both of these are important factors that can explain intention to continue using the website. In addition, previous research has underlined the importance of social gratification when considering the use of a technology. In the following paragraphs, we discuss the theoretical and the practical implications of this research.

5.1 Theoretical implications

Uses and gratification theory has received significant attention in the use of communication media and more recently in the use of online media (e.g., Stafford et al. 2004). Generally, people seek to fulfil different needs reflected in their choice of online media such as blogs, social networks, virtual communities, etc. For instance, some people may choose a media for fulfilling their informational needs, while others focus on communication related needs when deciding to use a media.

The overall process of using the media and the resulting satisfaction can play a significant role in explaining the intention to continue using a chosen media. Our research provides empirical validation to the uses and gratification theory in the context of eco-localization websites used by environmentally-oriented social enterprises.

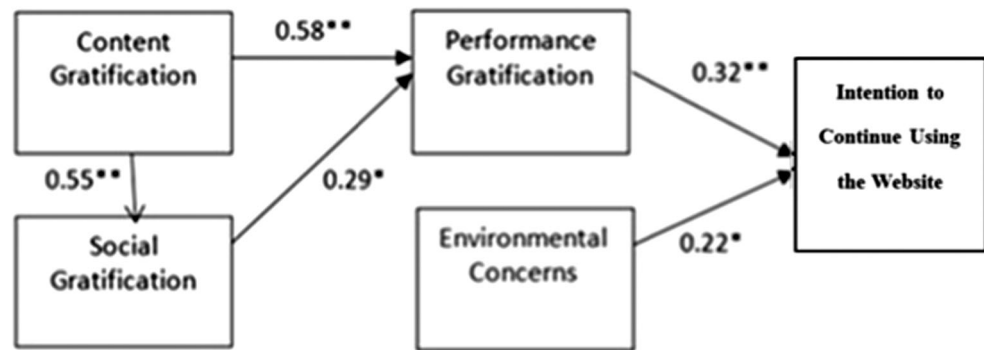
The expectation confirmation theory predicts when expectations from using a system are confirmed, users are satisfied with their experience of using the system, and this increases their intention to continue using IS. Drawing from expectation confirmation theory, we propose that confirmation of the different kind of expectations results in gratification (or satisfaction) which in turn would lead to the intention to continue using an eco-localization website. In addition to distinguishing between the three different types of gratification, we also investigate how these gratifications are inter-related to each other. Drawing upon the notion of “means” objectives and “ends” objectives (Keeney 1994), we provide theoretical support for the interrelationship among the different kinds of gratification.

Our results indicate that the impact of content gratification on intention to continue using the HGL Website is mediated by performance gratification and social gratification. In particular, performance gratification plays a significant positive role in determining the intention to continue using the HGL Website, and is determined by both content and social gratification. This finding reflects that the gratification with using the HGL Website in order to fulfill business goals is determined by both the extent to which people are satisfied with the content in the website, as well as the extent to which they feel gratified with the HGL Website for fulfilling their social

Table 5 Hypothesis Testing

Path	β	T Stat	P-Value	Hypothesis
Content Gratification - > Performance Gratification	0.58	6.11	<0.01	Supported
Content Gratification - > Social Gratification	0.55	11.28	<0.01	Supported
Environmental Concern - > Intention to Continue Using	0.22	2.83	<0.05	Supported
Performance Gratification - > Intention to Continue Using the Website	0.32	3.01	<0.01	Supported
Social Gratification - > Performance Gratification	0.29	2.42	<0.05	Supported

Fig. 3 Hypothesis testing (** $p < 0.01$, * $p < 0.05$)



needs within the community. It further highlights the importance of having relevant and gratifying content as an important means towards achieving other fundamental objectives, such as performance gratification.

Our research therefore demonstrates the applicability of the uses and gratification theory not just for personal media choice and use, but also when selection of the media has some commercial, environmental and social implications for the users. Further, we demonstrate in addition to the gratification variables, users' environmental concerns play a significant role in determining the intention to continue using the HGL Website. This finding shows people with high environmental concerns are likely to be more intrinsically motivated to use an eco-localization website that helps them in pursuing a more sustainable business.

5.2 Practical implications

Our results highlight that content gratification is significantly associated with both performance and social gratification. This emphasizes the importance of quality of the content on the eco-localization website. This has implications for the creation and maintenance of eco-localization websites such as the HGL Website. Members attribute a significant value to the content of these websites, and only when this content is deemed valuable, they are satisfied with using the website, and therefore intend to continue using it. The content of the website is therefore an extremely important means that help users in fulfilling their other objectives, such as expectations regarding performance, or social expectations. Administrators of such websites should pay special attention to ensuring that the content of the websites are regularly updated and managed with information that is of relevance to users. They should try to enhance their attractiveness to the community members by providing information that is locally relevant and is of use to its members.

In order to achieve performance gratification, design and usability features need to be evaluated. Particular attention needs to be paid to ensure all links provided in the website work, and website is found usable and easy to navigate for users with minimal previous training on how the different features of the website work. Therefore, methods that evaluate

user-site interaction between the HGL Website and the users should be extended and evaluated. During the design of such websites, we should also take the widely varying IT expertise and skills of users into account.

Finally, social interaction and community engagement is central to survival and success of such websites since the primary purpose of these websites is to enhance business community's involvement in various sustainability initiatives. Our results support this proposition, indicating that content gratification is significantly associated with social gratification. For instance, locally relevant content, such as information regarding the local community events (such as Greenlinks event 2011⁴ and 2012⁵ in Herefordshire) can help create awareness regarding sustainable business, and therefore leads to more participation by members. By sharing information about such events, and allowing people to communicate, the website can foster social gratification. Social gratification can influence the overall satisfaction with use of the eco-localization website, and enhance users' satisfaction regarding the overall performance of the website (performance gratification). Therefore, special attention needs to be paid on providing features that enable social interaction among users. Well-designed message boards, chat rooms and instant messaging systems can prove valuable in building social gratification (Farfaglia et al. 2006).

5.3 Limitations

This study has some limitations too. We only focused on a single business community – the Herefordshire Greenlinks Association, and their corresponding website. In order to generalize the findings, this study should be replicated in other similar settings, as cultural differences among different communities may result in users seeking different kinds of gratification from using such websites. The relatively small sample size reduced the power of our statistical analysis. A large-scale survey from similar social enterprises can help us validate the model on a larger scale and provide greater generalizability of the findings.

⁴ <https://www.youtube.com/watch?v=gPuRjiAdZZw>

⁵ <https://www.youtube.com/watch?v=O2M7sT37Nk8>

The model explains 19% of the variance in the intention to continue using the website. Future research may explore the impact of other factors that could explain more variance in intention to continue using the HGL Website. It is important to note that the current model may not be suitable for all kinds of Green IS. For instance, in the case of Green IS for energy saving or waste management, we may need to consider “functional variety” or “ease of use” in addition to social or content gratification. Further, longitudinal studies can help to investigate how the relative importance of the different gratification variables change as users get more experience with using the website, and how the interrelationships among the different gratification variables evolve over time. Finally, future studies could also apply other advanced measures for environmental concerns instead of NEP.

6 Conclusion

The solution to climate change is unlikely to be found by governments, businesses or civil society operating in isolation. The question of what shapes pro-environmental behavior is a complex one, and is difficult to understand and explain using a single theory or model. It has been proposed that both intrinsic factors such as pro-environmental knowledge and awareness, environmental concerns, and extrinsic factors such as institutional, social, economic and cultural factors can play an important role in determining pro-environmental behavior (Kollmuss and Agyeman 2002). While the intrinsic factors are harder to influence or change, there is significant potential for facilitating pro-environmental behavior by designing tools and interventions that can create conducive external conditions for pro-environmental behavior. Eco-localization websites such as the HGL Website can be considered one such tool.

However, for such websites to be effective and successful, it is important the target population continue using it. Applying the uses and gratification theory, we demonstrate the importance of three different types of gratification – content, social and performance gratification in determining intention to continue using the website. Based on the findings of a survey of local businesses that are members of the HGL Association, our research highlights the importance of content gratification in intention to continue using such eco-localization websites. Drawing from the concept of “means” objective and “end” or “fundamental” objective in a decision context (e.g., Keeney 1994; Torkzadeh and Dhillon 2002), we categorize certain gratifications as “means” and others as “ends”. Based on this categorization, the “ends” objective – in our case – performance gratification, influences the final decision that is intention to continue using the website. The “means” objective on the other hand facilitate the achievement of the “end”. The implications of these findings were discussed for designers of such eco-localization websites, as well as for future research.

Appendix 1

Table 6 Respondents' industry

	Frequency	Percent
Services	12	14.5
Tourism & leisure	10	12
Food	10	12
Energy & construction	10	12
Health & education	9	10.8
Countryside & gardens	7	8.4
Transport	6	7.2
Arts, crafts & clothing	6	7.2
Others	5	6
Fairtrade	4	4.8
Ethical finance	4	4.8
Total	83	100

Table 7 Respondents' Annual Turnover

	Frequency	Percent
Less than £100,000	52	62.7
£100,000 – £249,999	13	15.7
£250,000 – £499,999	7	8.4
£500,000 – £999,999	2	2.4
More than £1 Million	9	10.8
Total	83	100

Table 8 Level of internet and IT knowledge in the firm

Level	Internet knowledge		IT knowledge	
	Frequency	Percent	Frequency	Percent
Beginner	8	9.6	9	10.8
Intermediate	45	54.2	49	59
Expert	13	15.7	9	10.8
Advanced	17	20.5	16	19.3
Total	83	100	83	100

Table 9 Information about HGL

	% Disagree	% Agree
Receive enough information about the HGL association services	19.2	42.2
Receive enough information about the benefits of HGL Website	29	38.6

Appendix 2 Herman one factor test for common method bias

Table 10 Total variance explained

Component	Initial Eigenvalues			Extraction sums of squared loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	9.411	24.131	24.131	9.411	24.131	24.131
2	5.463	14.007	38.139			
3	4.158	10.660	48.799			
4	3.936	10.092	58.892			
5	2.206	5.655	64.547			
6	1.573	4.033	68.580			
7	1.323	3.393	71.973			
8	1.263	3.240	75.213			
9	1.059	2.715	77.927			
10	.994	2.550	80.477			
11	.846	2.170	82.647			
12	.711	1.824	84.471			
13	.622	1.595	86.066			
14	.594	1.523	87.589			
15	.537	1.378	88.967			
16	.504	1.294	90.260			
17	.466	1.196	91.456			
18	.420	1.077	92.533			
19	.379	.972	93.505			
20	.343	.878	94.383			
21	.304	.779	95.162			
22	.274	.703	95.865			
23	.267	.684	96.549			
24	.244	.625	97.175			
25	.208	.534	97.709			
26	.160	.410	98.119			
27	.154	.394	98.513			
28	.121	.310	98.823			
29	.110	.281	99.105			
30	.082	.209	99.314			
31	.075	.192	99.506			
32	.068	.175	99.682			
33	.045	.115	99.796			
34	.030	.078	99.874			
35	.028	.072	99.946			
36	.021	.054	100.000			
37	7.570E-008	1.941E-007	100.000			
38	1.528E-008	3.918E-008	100.000			
39	4.481E-009	1.149E-008	100.000			

Extraction method: principal component analysis

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