Search Engines and Social Business – Implications from the Case of Ecosia

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***Abstract*— The environmental impact of search engines is facing increasing public attention within the discussion about Green IS and Green IT. The search engine Ecosia takes advantage of this situation by pursuing a Social Business model which distinguishes itself from other major search engines in the market. Enterprises following this concept have the goal to make positive social or environmental contributions to the society. They are not aiming for profit maximization.**

Ecosia contributes to the society by spending most of its revenues for environmental purposes. At least 80% of its revenues are donated to the World Wildlife Fund (WWF). Regarding this, the question arises if Social Business models possess a potential for success in the search engine market. This is related to the question, how users perceive this kind of sustainable behavior and if this has an impact on the utilization of search services.

To investigate these questions we apply case study research to generate initial hypothesis and insights.

The findings provide implications on the relevance and impact of Social Businesses in the scope of web services and information systems (IS) research. It also generates insights on the overall significance of sustainability in web services.

This paper is an initial starting point for further research on Social Businesses and IT-based green business models in IS. It contributes to the emerging research of sustainable IS, which investigates social and environmental aspects in the scope of IS research.

Index Terms—Sustainability, web services, search engines, business models, Social Business, Green IT, Green IS

I. Introduction

The increasing dissemination and utilization of Information Technology (IT) into all areas of life lead to rising energy consumption and growing environmental problems. IT accounts for two percent of the global 820 million tons of CO_2 emissions each year [1].

In Information Systems (IS) the environmental impact of IT and related measures for its reduction and management are being discussed under the headline of Green IS and Green IT [2-5].

Within the scope of this discussion the environmental impact of search engines and their enormous data centers are facing increasing public attention. The market leader Google for example operates approximately 450,000 servers, consuming about 800 Giga Watt hours (GWh) of electricity per year [6]. By this Google is indirectly responsible for enormous amounts of CO_2 emissions, because electricity is most often generated by coal or gas combustion which creates CO_2 emissions.

Estimations about the level of caused CO_2 emissions by a Google search request vary between 1g to 10g and are being discussed controversially [7], [8]. Thus, regardless of the financial success, Google has come under criticism in environmental issues.

The search engine Ecosia takes advantage of this situation by pursuing an IT-based green business model which distinguishes itself from the main search engines in the market. Ecosia is not aiming for profit maximization. Instead it follows the emerging concept of Social Business in whose context it tries to make a positive environmental contribution to the society [9].

To achieve its objectives Ecosia cooperates with nonprofit organizations (NGOs) and established search engine providers such as Bing and Yahoo.

Research from other domains illustrates that sustainable products and services can positively influence consumer behavior [10-12]. This trend can be especially observed in the food industry with the increasing prominence of organic food. It is likely to disseminate into other types of industries [13].

Regarding the Social Business model of Ecosia the following research questions arise:

1) Do Social Business models possess a potential for success in the search engine market?
2) How big could be the potential market share of a Social Business enterprise in the search engine market?
3) How can Social Businesses influence the competition in the search engine market?

These three questions are being answered by an explorative case study of the search engine Ecosia and a thorough literature review. The aim of this paper is to develop first hypotheses for the case of Social Businesses in the scope web services and IS research.

In IS research the emerging topic of Social Business is still lacking theoretical foundation and demands further scientific investigation. This paper wants to show professionals and researchers new opportunities by Social Business models. It is a starting point for future business start-ups and further research.

This paper belongs to the emerging research branch of sustainable IS which investigates social and environmental questions and aspects in the scope of IS [14], [2].

II. Related Research

A. Traditional Business Models

A good business model is essential to every successful enterprise or organization [15]. It should describe a path from basic human needs to continuous financial success [15]. For this the business model substantiates all essential elements. Following Teece [16] the essence of a business model is "… *in defining the manner by which the enterprise delivers value to customers, entices customers to pay for value, and converts those payments to profit. It thus reflects management's hypothesis about what customers want, how they want it, and how the enterprise can organize to best meet those needs, get paid for doing so, and make a profit."*

This customer and profit focused definition neglects the fact, that other business actors and organizations can also play an important role in a business model. Furthermore, the objectives of these actors can be of monetary and nonmonetary type. Especially companies following the concept of Social-Business (see Section II.B) pursue nonmonetary objectives.

Timmers [17] offers a broader definition which also mentions other business actors and general benefits. From his point of view, a business model is defined as *„…an architecture for the products, services and information flows, including a description of various business actors and their roles, a description of the potential benefits for the various business actors, and a description of the sources of revenues."*

In a business model the actors do not have to be necessarily business actors. Also governmental and nongovernmental organizations can play a substantial role. They are generally referred to as stakeholders [18]. Therefore, the definition of Timmers [17] has to be expanded to comprise also Social Business models.

Hence, a business model describes the architecture for the products, services and information flows, including a description of relevant economic and noneconomic stakeholders and their roles, a description of the potential economic, social and environmental benefits for the various business stakeholders and a description of the sources of revenues.

B. Characteristics of Social Businesses

The concept of Social Business can be interpreted as a form of business model, which primarily pursuits social and environmental objectives under the constraint of cost-coverage. It reverses the profit maximization principle by a benefit maximization principle [19]. For this reason it distinguishes itself clearly from traditional business models. A comparison of these two types is summarized in Table 1.

The concept of Social Business has grown from the work of the Nobel Peace Prize recipient Muhammad Yunus [9]. Companies aligning their business model according to the Social Business model measure their success by the impact on people or environment, rather than the amount of profit made in a given period [20]. Their value creation is done by satisfying basic human needs for a more peaceful, righteous and preserved word.

TABLE I
COMPARISON OF TRADITIONAL AND SOCIAL BUSINESS MODELS

Attribute	Traditional business model	Social Business model
Objective	Profit maximization	Maximization of social and/or environmental benefits
Side condition	Socially and environmentally reconcilable	Full cost recovery
Main target group	Shareholders	Society
Appropriation of profits	Dividends to shareholders, reinvestment	Reinvestment, extension of activities, payback of investors
Objectives of investors	Added value (one-dimensional)	Contribution to society, conservation of value (multi-dimensional)

From a financial perspective, Social Business enterprises can be classified into four categories [19]:

1) No cost recovery
2) Some cost recovery
3) Full cost recovery
4) More than full cost recovery

The side condition of a Social Business enterprise is to operate at or beyond the cost recovery point [9]. Hereby donations can play a significant role as a source of revenue.

The investors of Social Business models will in general not receive any dividends or speculative profits. This is expressed by the definition from Yunus [9].

"Thus, a Social-Business might be defined as a non-loss, non-dividend business."

Instead, profits are passed on to the target group or are used to increase social and environmental activities. Investors seek a double bottom line profit – financial value conservation as well as positive social and environmental impact.

A related economic concept is called the "Bottom of the Pyramid". The expression describes the poorest socio-economic group of the global population. The concept illustrates opportunities for companies to approach this neglected customer segment and to obtain a market position [21].

We define a Social Business model, which is primarily based on IT and pursuing environmental objectives as an IT-based green business model.

III. Methodology

The questions in this paper are answered by applying case study research. Case study research is a widely acknowledged and used methodology in IS research [22].

Case study research can serve multiple purposes: describing phenomena, testing theories or developing new theories and hypothesis [23], [24]. This corresponds with the papers intention to derive hypothesis regarding Social Business enterprises in the search engine market.

It generates insights by examining a phenomenon in its natural setting [23], [25]. Case study research is suitable for exploration of new topic areas which lack empirical validation [26], [24], [27]. This applies to the given situation of Social Business models in the search engine market; therefore the application of case study research is appropriate.

Social Business models in the search engine market are rare. Most of them do not provide sufficient information for any kind of analysis. Exceptions from this are the three examples of Forestle, Znout and Ecosia. They were all initiated by the same founder [28]. Due to unsolved legal questions Forestle and Znout are not developed further [28]. Therefore, this paper is based on the search engine Ecosia, which provides substantial and verifiable data on its own activities.

Case study research employs various data collection methods, such as document and literature analysis, interviews, observations or questionnaires [24]. Our investigation is based on:

- multiple interviews with the founder and CEO of Ecosia Christian Kroll,
- an in depth analysis of all information provided by Ecosia,
- a comprehensive market and media research
- and an extensive literature research

Due to the limitations of case study research our findings demand further validation through quantitative and qualitative research regarding the concept of Social Business in IS.

IV. Ecosia's Social Business Model

A. Company overview

Ecosia is an independent, non-profit internet search engine, which defines itself as a Social Business enterprise [9]. Ecosia spends at least 80% of its revenues to a rainforest protection program run by the WWF. Therefore, each web search saves up to 2 m^2 of rainforest. By this over 202 million m^2 of rainforest equal to more than 28,000 football pitches have been protected (see Figure 1).

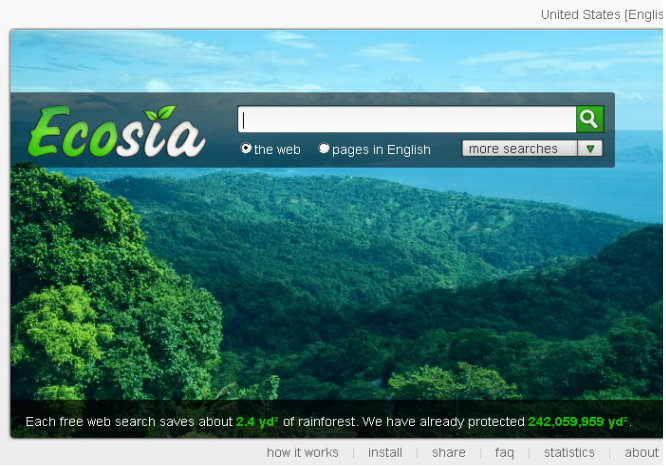

Fig. 1. Web interface of Ecosia's search service

The project uses the money for the sustainable protection of rainforests in the Brazilian Juruena National Park [29], [30]. This distinguishes the search engine from other major ones in the market. Ecosia is an example of a Social Business model in the search engine market (see Table 2).

TABLE 2
Overview of Ecosia

Ecosia	
Foundation	2009
Headquarter	Wittenberg / Germany
Industry	Internet, Social Business
Products and services	Internet search services
Short description	Ecosia is an independent non-profit website. At least 80% of its search income goes to a rainforest protection program run by the WWF
	Bing and Yahoo provide search results and sponsored links to generate advertising revenue
Partners	Yahoo, Bing, WWF
URL	http://www.ecosia.org
Revenue (estimated 2010)	approx. Euro 140,000
Donations to WWF (estimated 2010)	approx. Euro 112,000
Employees	3 core employees, 10 to 15 supporters
IT infrastructure	1 server, use of the external infrastructure from Yahoo and Bing

B. Mechanics of the Social Business Model

Bing and Yahoo provide Ecosia with search results and sponsored links (see Figure 2). Ecosia does not run an own search index because of financial restrictions. Its revenues are generated by user clicks on sponsored links. A small portion of these revenues is intended for the technology partners. Ecosia receives an average of 0.13 Euro Cent per click on a sponsored link. At least 80% of this amount is donated to WWF. The remaining 20% are used for salaries, servers, domains, marketing and corporations with other enterprises.

In doing so the CEO pays himself a salary below 1,000 Euro per month [31].

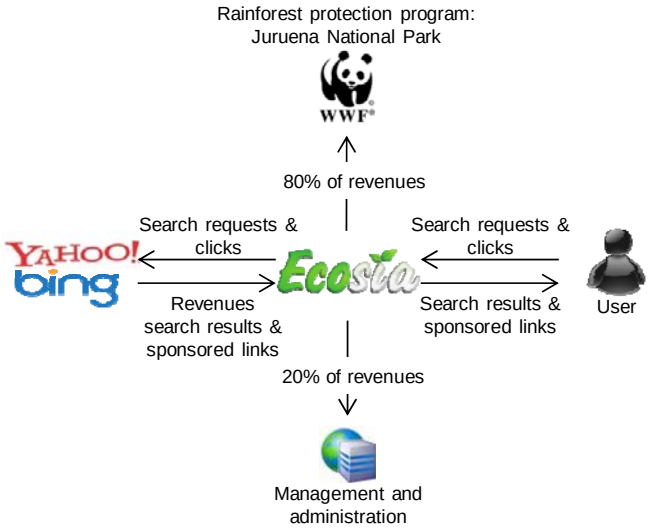

Fig. 1. Social Business Model of Ecosia

Therefore Ecosia operates just at full cost recovery and can be classified as a class 3 Social Business enterprise (see Section II.B).

Since the foundation of Ecosia in the year 2009 the number of search requests has steadily increased. In April 2010 Ecosia generated over 11,000 Euro of revenues with around 9 million search requests summing up to a market share of approximately 0.2% among the German search engines [32], [33]. The majority of Ecosia's search requests originated from Germany (55%), Switzerland (13%) and France (10%) [34]. The Social Business model imposes a narrow financial scope for Ecosia. It depends on marketing tools such as word-of-mouth advertising, press releases and media interviews. This marketing strategy has been successful in Germany and is confirmed by numerous publications [35], [31], [36].

In the long run, Ecosia aims to gain a global market share of one percent. According to its own account, the company is confronted with the following strategic challenges to achieve this goal [28]:

- self-financing by increased revenues,
- relationship management of existing partnerships,
- obtaining Google as an additional partner,
- internationalization of user groups, especially in the US,
- development of university and school partnerships.

Managing the existing relationships is of vital importance to Ecosia, because the company is not operating an own search index and is therefore dependent on the search technology from Bing and Yahoo to provide competitive search services.

Obtaining the market leader Google as an additional partner would enhance Ecosia's search services significantly. Users would then be able to select one of the three search engines. This could potentially lead to more users and higher revenues, which enables Ecosia to donate more money for rainforest protection.

To reach a global share of one percent in the search engine market Ecosia needs to internationalize its user groups and grow beyond the German and European market

Young and better educated people tend to be more interested in environmental issues. For this reason Ecosia is developing university and school partnerships to get in contact with this target group.

V. Findings

A. Market potential

The case study shows a steadily increasing number of Ecosia users (see Section IV). According to Facebook.com Ecosia's growing popularity is illustrated by over 150,000 people who "like" the search engine [37].

From this derives the question about the potential market share of a Social Business model in the search engine market. In this section we will answer the first research question (see Section I).

In the case of Ecosia the user acquisition is not done by a typical product or service differentiation. Instead the environmental focus of the business model is being advertised and communicated towards the users. Therefore, users who are receptive for environmental topics belong to the target group of Ecosia.

Hints concerning the market potential are provided from the consumer group called LOHAS. LOHAS stands for Lifestyle of Health and Sustainability and describes a *"movement with strong influence on consumption and values"* within the society [13], [38]. This lifestyle does not portray an exclusive target group but a *"new social majority"* [38]. This trend can be observed in the food industry with the increasing prominence of organic food. It is likely to disseminate into other types of industries [13].

The expanding share of the LOHAS on the German market was estimated to be one-third in 2007 [38]. If these findings are transferred to search engine users, it can be assumed that one-third of all users would rather prefer a search engine with a Social Business model than a traditional search engine.

Research on the marketing of Green IT PCs shows similar findings. Results from a conjoint-analysis of 500 internet users estimate a potential market share for PCs with environmental friendly product attributes of up to 26.6% [39]. For this target group environmental attributes are relatively more important than price and performance. The members of this target group are significantly older, better educated and have an above average probability to be female [39]. Other research confirms the finding that women value environmentally friendly products and services higher than men [40].

The above findings lead to the hypothesis that at least one quarter of all users could be enticed to use a Social Business search engine, such as Ecosia. It can be assumed that the relevant target group for is likely to be older, better educated

and female.

B. Competitive potential

Bing and Yahoo provide technical support to Ecosia. A partnership with Google is aspired (see Section IV) although the internet giant hesitates. This leads to the question how a Social Business model can be a strategic instrument and influence the competition in the search engine market. In this section we will answer the second research question (see Section I).

First, an analysis of the competitive environment is necessary. With a market share of 89.6% Google is dominating the German search engine market [41]. Bing and Yahoo merely possess a market share of 2.2% respectively 2.6% [41]. The German search engine market is with approximately 4% much smaller than the US market's 17% share of all global search requests [32]. Also on the international level the market lead of Google is unchallenged, although it is not as explicit as in Germany. In the US the three major search engines Google (65.1%), Yahoo (13.8%) and Bing (13.0%) share about 92% of the market amongst themselves [42].

Besides Ecosia there are other providers in the search engine market which claim to follow the concept of Social Business (see Table 3).

The statements of these providers are hard to impartially verify and therefore, have to be treated with caution. An exception from this is Ecosia, which provides detailed information concerning users, revenues and donations proved by transfer forms.

Except from GoodSearch all companies were founded in the past two years. This illustrates a growing importance of Social Business models for web services. The overview (see Table 3) shows that every major search engine provider is cooperating in some form with Social Businesses. Yahoo is hereby more active than Bing and Google.

The motivation of Bing and Yahoo to cooperate with Ecosia derives from the insight that every new Ecosia user is more likely to have used Google before [28]. Therefore, Bing and Yahoo view Ecosia as a strategic instrument to take market share away from Google and to exert pressure on Google in the scope of environmental issues.

As a profit maximizing company it does not seem reasonable for Google to cooperate with Ecosia, because a growing user number of Ecosia would mean decreasing profits for Google. Nevertheless, switching costs for search engine users are very low. Therefore, this development exerts pressure on the market leader Google demanding a reaction. Especially if the user number of Ecosia keeps growing, public attention is rising and Bing as well as Yahoo stay committed to their partnership with Ecosia. This could finally lead Google to also cooperate with Ecosia or to initiate own projects in this topic area.

TABLE 3
SELECTION OF SOCIAL BUSINESS WEB SEARCH SERVICES

Name	URL	Launched	Partners	Commitment
Benefind [43]	benefind.de	2009	Yahoo, Bing	Donation of 0.5 Euro Cent per search query to charitable purposes
Blackle [44]	blackle.com	2010	Google	Energy saving internet search by black background
Ecocho [45]	ecocho.eu	2008	Yahoo	Purchase of CO_2 certificates
Ecosia [29]	ecosia.org	2009	Yahoo, Bing, WWF	Donation of 80% of all revenues to the WWF
Forestle [46]	forestle.de	2008	Yahoo, The Nature Conservancy	Donation of 90% of all revenues to the group The Nature Conservancy
GoodSearch [47]	goodsearch.com	2005	Yahoo	Donation of 50% of the profit for charitable purposes
TREEHOO! [48]	treehoo.com	2008	Yahoo, Trees for the Future	Donation of 50% of the profit to the group „Trees for the Future" to plant trees
Znout [49]	znout.org	2008	Google	Purchase of CO_2 certificates

If Ecosia succeeds in skimming the market potential (see Section V.A) a "Race to the Top" can be expected [50]. In this situation the three major search engines will start to compete over their social and environmental contribution to serve the people and the planet better [19]. The environmental contribution of the whole search engine market to the society would grow.

C. Business and Research Implications

Finally, we have to discuss the implications for business and research derived from our findings.

First, there are clear implications for Ecosia. The analysis of the market potential (see Section V.A) backs Ecosia's business model. Ecosia should direct its communication towards older, better educated and female users. This also needs to be considered when selecting appropriate marketing tools and channels. Ecosia also has to develop the overall sustainability of its Social Business model. The vital dependence on the strong personal commitment of the founder imposes a great risk. Therefore, the whole concept of Ecosia should be supported by multiple actors. This would allow a continuous transformation process without putting the search engine at stake.

Second, there are implications for business. The case of Ecosia illustrates, that an internet based Social Business model in connection with strong personal commitment can be successful and creates positive benefits for the society (see Section IV). The potential market share of a Social Business search engine should be around one-quarter. Furthermore, the case study illustrates that Ecosia's business model offers the possibility to conquer a market niche even in a quasi monopolistic market such as the global search engine market. The commitment of one company can move other companies to follow – leading to a competition over social and environmental contributions, a so called "Race to the Top". By this effect the objectives of a Social Business can be achieved indirectly (see Section V.B).

Furthermore, it can be stated that the value of a service is not only determined by its performance, quality or price, also the business model influences the users' perception. Therefore, including social and environmental aspects into traditional business model leads to an emergence of new business models. This leads to a multiplicity of opportunities beyond the search engine market. Especially markets in which social and environmental issues have been neglected and the target group of environmentally oriented consumers has not been addressed seem to be suitable (see Section V.A). A possible example of this would be the idea of an eco-Ebay.com or a socially oriented Amazon.com, which would donate a certain percentage of their revenues. By doing so, it should be possible to obtain quickly a significant number of customers or users.

Third, there are implications for research. This paper is a first initial approach to grasp the relevance of Social Business in IS research. The dynamic of the IS field makes it highly relevant for this concept. Still, the topic is lacking theoretical foundation and demands further scientific investigation. Applicable theories and concepts are needed to further elaborate this idea. Investigating the "Race to the Top" effect in IS or estimating the relevance of environmental protection in IS services should be the next steps of research.

Further research should also focus on the idea of IT-based green business models, for which Ecosia is an example. An analysis of present examples and the development of new IT-based green should contribute to the research on Green IS.

VI. Conclusion and Discussion

The case study illustrates how a market niche in a quasi monopolistic market, such as the search engine market can be conquered by a Social Business model. In this situation the support by other market actors seems likely. For them it is a strategic instrument to tackle the market leader (see Section V.B).

The development can finally lead companies to a competition over social and environmental contributions, called "Race to the Top".

Due to the application of single case study research there are a number of clear limitations. These findings demand further validation. Future research will follow these next steps:

- Surveys with the users of Ecosia and other search engines should provide additional data on the market potential of Social Business search engines.
- Multiple case studies with other internet based Social Business enterprises are recommended [25]. This should provide findings on the market relevance and future significance of these types of business models.
- Implementation of an experimental, student-run Social Business.

Giving the growing dissemination and application of IT and the societal shift the relevance of social and environmental topics is destined to gain even more importance in the future. In this context Social Business enterprises in the scope of IS are a new development which demands further investigation. Therefore, this paper contributes a first concept and initial hypotheses by analyzing the phenomenon Social Business in the search engine market.

VII. LITERATURE

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