Open Sustainability: Supporting Citizen Co-creation for Sustainability

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Abstract

This short paper illustrates how open source and the philosophy behind it can be used to enhance sustainable behaviour. Open source development has been very prominent and successful in the software industry bringing different people together to work for a common cause with ego gratifications and future career prospects being some of the micro level incentives for participating. Taking the incentives from open source and trying to apply this to sustainability issues in a community is proposed as a solution for increasing citizen participation while creating solutions for sustainable society and living.

Introduction

The information network currently emerging is an extremely important factor for future sustainability. The word ‘green’ is truly multifaceted and has all sorts of environmental, political and industrial connotations. In the literature, ‘green’ is defined as “any object or process, animate or inanimate, dynamically invested in and actively in support of harmonious and sustained environmentally friendly coexistence” (Mann et al., 2009, p. 2; Molla, 2009). In combination with IT, green is just as multifaceted, but here it is possible to adopt a definition geared at business that describes green IT as processes that involves “the strategic deployment of operations and information technology to dynamically, sustainably and responsibly align business-oriented goals with green objectives for the entire duration of operations” (Mann et al., 2009, p. 2). In the context of this paper open source systems are built on top of the current networked information economy, i.e. Green IT. It empowers people along three dimensions essential to the open source movement, (1) they can do more by themselves, (2) they can do more together by others without the constraints of traditional social and economic organization, and (3) they can exploit new non-traditional types of organizations. The objective of this research paper is to illustrate how open source and the philosophy behind the open source movement can be used to enhance sustainable behaviour and provide solutions related to a sustainable society through IT in a community. The study should be seen an attempt to focus on a possible solution to sustainability issues by co-creating open source solutions that can also be used e.g. for crowdsourcing, community-based social marketing and social learning.

Two assumptions are made; the first is that sustainability (e.g. Jackson, 2011; UN, 1987) is crucial for our survival and a long-time process including social, economic and environmental issues. The problems are increasingly global and intertwined, which is true also for some of the solutions. Most solutions are, however, local and demand effort and engagement from individuals and other actors in the local communities. The second assumption is that the local community administration, citizens and organizations of that community are interdependent. One example is that political pressure from individuals affects rules and policies, which in turn will regulate and normalize the everyday lives of the citizens and provide commercial opportunities for local entrepreneurs. Typical areas of consideration in the local community are health and care, education, CO₂ transmission in transportation and energy consumption. There are many different ways to try to control and influence energy consumption, taxation is one way and legislation another. One such attempt is the EU (2006) Directive on energy end-use efficiency and energy services and repealing. Yet, if the citizens become involved and engaged in these issues, governmental interventions could be minimized.
Open Source Philosophy

The fundamental concept of open source is old, really old. Sharing basic ideas of how to design and construct different things such as buildings, tools, food etc. and at the same time handing over the descriptions on how to make and alter the final product, has been around since the dawn of man. In the early ages of computer software the source code often was distributed along with the end product and even though software companies eventually started to seal the source and only distributed the retail product that could be installed and used, the idea of free and open software was kept alive. The term open source is a relatively late addition to the phenomenon and was coined at a meeting in the beginning of 1998 in Palo Alto, CA (Bretthauer, 2002). It is also a rather broad in terms of definition based on that property is defined on the right to distribute and not the right to exclude (Weber, 2004). Open source is a “revolutionary new model of software development and distribution, originating from the ideology that software should be free and open” (Xu & Jones, 2010, p. 69) and has, in general, two characteristics (e.g. Benkler, 2006; Krogh & Spaeth, 2007; OSI, n.d.; Ramond, 1999): (1) a license that gives any user the right to use, inspect, modify and distribute derivative works and (2) a development process that includes volunteers. Involving volunteers is not a requirement but the development of open source is often based on initiation by a project manager with volunteers joining later on to take part of different tasks in the development. Because most people involved in open source projects are volunteers, the development model becomes more interesting and harder to understand than in traditional firms where a majority of resources are integrated or controlled through strategic alliances (cf. Williamson, 1975; 1985). Research has found that “the patterns of time spending for developing OS/FS [Open Source/Free Software] show that this activity still resembles rather a hobby than salaried work” (Ghosh et al., 2002, p. 66). When characterizing successful open source works, Weber (2004) identifies four principles: (1) empowering people to experiment, (2) enabling bits of information to find each other, (3) structuring information so it can recombine with other pieces, and (4) creating a governance system that sustains this process. Raymond (1999) describes two models used when working with open source – the Cathedral model, where the source is being developed in a restricted group and released with each version of the final product and the Bazaar model, in which the source is developed over the Internet and continuously viewable for the general public. The two models are often connected to two different types of open source communities – those sponsored by corporate organizations and autonomous communities (West & O'Mahony, 2008). A crucial difference is the control of the end product. While in autonomous communities’ open source projects are driven by the individual participants’ wishes to be part of the project, corporate organizations open source projects are driven by a desire to retain some control of the work. Hence, it is important to take all independent contributors personal interests and values into account when deciding if and how to create an open source community to develop a product. Introducing multiple contributors triggers the logic of collective actions. Olson (1965, p. 2) states that “rational, self-interested individuals will not act to achieve their common or group interest”. This implies that large groups are less likely to achieve the goals they have set out to accomplish than small groups, which leads to an “under-supply of public goods” (Krogh & Spaeth, 2007, p. 238) because of the unrestricted use of the end result. Still, open source and other public goods are common and the success is due to different rewards that the participants perceive as a part of such projects (Hardin, 1982). The two main rewards identified when volunteering in open source projects - career and ego gratification incentives (Lerner & Triole, 2002), do not fundamentally collide with the idea of sponsored projects. Participating in such projects might strengthen the career opportunities and, depending on personal values, affect the ego gratification since the peer network might give similar gratifications even
though there is a corporate sponsor. Also, failing or neglecting to contribute to a collaborative project may result in so-called social punishment, i.e. loss of reputation, shadowing a future collaboration and other social and psychological influences (Cai & Kock, 2009). While there are key factors that can be observed, the general knowledge of motivations among open source developers is still in an early stage (e.g. Sauer, 2007; Zeitlyn, 2003). The value that a corporate firm gets is a tricky business when it comes to open source and similar to the values a firm perceives when engaging in other collaborations, i.e. access to resources and knowledge (e.g. Faulkner, 1995; Gulati et al., 2000; Jarillo, 1988; Mejtoft & Nordin, 2007).

Collaboration and Co-creation

In all forms of cooperation, trust between partners and commitment to the project are essential for a successful outcome (Lynch, 1990; Morgan & Hunt, 1994; Sherman & Sookdeo, 1992). In many projects between companies trust and commitment can partially be controlled using formal agreements to control and limit the risk in the project (Child et al., 2005; Das & Teng, 1998; Geringer & Herbert, 1989; Medcof, 1997). However, in volunteer projects the idea of using agreements to control independent developers may not work. Hence, open source projects rely heavily on the relations among individuals involved and the communication in the project group - interpersonal trust is a key factor (e.g. Child et al., 2005; Moorman et al., 1993; Morgan & Hunt, 1994; Narayandas & Rangan, 2004; Young-Ybarra & Wiersema, 1999; Zaheer et al., 1998). The fundamentals of open source furthermore radically limit one of the greatest dangers in collaborative projects, opportunistic behaviour (Das, 2005; Gnyawali & Madhavan, 2001; Gulati et al., 2000; Hamel, 1991; Williamson, 1975). Having an open source license, eliminates the risk that someone claims restricted access to the end product and lessens the dangers of someone taking advantage of the decentralized and collaborative production.

In open source projects the actual consumers of the final product are most often also involved in the development process. Even though not fundamentally stated, open source philosophy is based on the concept of creating value together, i.e. co-creation (e.g. Howe, 2006; Normann & Ramírez, 1993; Payne et al., 2008; Prahalad & Ramaswamy, 2000; 2004a; 2004b; Ramaswamy; 2008). Co-creation is typically used in the context of creating a continuous stream of joint firm-customer value, which is closely related to the service-dominant logic (e.g. Vargo & Lusch, 2004a; 2004b; 2006; 2008). This theoretical framework proposes that the value creation occurs when customers actually consume products (or services). This customer centric approach makes it more important to focus on the value that the customer experiences and render possible the personalization of the experience when consuming a product to maximize the perceived value. Co-creation and even the dialog between a firm and its customers or in-between a firm’s customers have historically been difficult and have most often been controlled by the firm. However, the rise and spreading of the Internet and global and cheap communication in the late 1990s facilitated firm-customer and inter-customer communication, dialogs and development and the “dialogue is no longer being controlled by corporations. Individual consumers can address and learn about businesses either on their own or through the collective knowledge of other customers” (Prahalad & Ramaswamy, 2000, p. 80). The Internet also allows for new types of commons to be created, efficient decentralized collective action practices tailored at the problem at hand. IT “provides a platform for new mechanisms for widely dispersed agents to adopt radically decentralized cooperation strategies other than by using proprietary and contractual claims to elicit prices or impose managerial commands” (Benkler, 2006, p. 63). The idea of Tim Berners-Lee (1999, p. 169) in the early days of the web, was that it would become “a much more powerful means of collaboration between people”. Today we live in an era that makes a lot more of
this possible and, what is popularized as, Web 2.0 is all about “harnessing collective intelligence” (O’Reilly, 2005). User generated content (e.g. Blackshaw & Nazzaro, 2006; OECD, 2007) and co-creation is a daily part of the life of the web, as well as in the endless amount of open source projects carried out each day. The magnitude of some open source projects today makes the collaboration complex and Langlois & Garzarelli (2008, p. 125) state that the collaborative model of open source resembles a hybrid between the bazaar and the cathedral models, “manifesting both voluntary production and conscious planning”.

**User innovation for sustainability**

The philosophy behind open source and the co-creation of open source systems could be fundamental keys for the movement towards a sustainable society. In this section we describe how using IT for the interaction between citizens and local community administration adds a new twist to the open source discussion above, where interaction was between the open source organization and a company or within the organization. In the scenarios below we consequently have embedded the open source project in a system of three types of actors, the citizen/consumer, the government/administration and the company/service provider (figure 1) (Parag & Darby, 2009).

![Triangular View Enhanced with Open Source Community and Philosophy](After Parag & Darby, 2009, p. 3986).

Within any society, Hippel (2005, p. 2) argues that there are indications that, “users are the first to develop many and perhaps most new industrial and consumer products. Further, the contributions of users are growing steadily larger as a result of continuing advances in computer and communications capabilities”. We propose that this ability could be extended to many systems for sustainability and that to support these issues, user innovation and innovative processes could be facilitated through the open source philosophy.

Whether the initiative to solve a problem comes from the local government, a company or from an individual citizen the development of innovations can be more or less user centered (Hallqvist, 2010). The solution could be developed by asking the user, supported by knowledge about something the user does, involve the user as a participant for development, or provide for personalization of a system to user needs or behaviour. The citizen/consumer innovation process could start by one individual developing an idea into a prototype or a concept. This is diffused through networked media and a community is formed around the idea that develops it into a working prototype. As a complementary step there could be some commercialization of the idea to a product (Hippel, 2005). Furthermore user communities are efficient. They “can increase speed of innovation, implementation, test and dissemination of the result. There are also social benefits of communities” (Hippel, 2005). Also when it comes to adapting a product or a service user innovation is a key. “Most aesthetic innovation takes place ‘after’ production. It happens ‘after’ the wage labour relation, in consumption, in communities, on the street, and on the school yard.” (P2P foundation, 2009). Exploring diverse solutions creatively exploring already available technology will be more important as
IT technology develops (Todhunter, 2011). It is a mistake to assume that only technical skills are important in the development process.

How can government support such innovation? To start with they can acknowledge and measure the effects of users’ contribution. They can also support infrastructures such as open standards, collaborative tools and open up for communication. Finally, they can remove or at least adjust regulatory frameworks that hinder citizen participation (cf. Hippel, 2005). Companies could provide the means for innovation and exploit its results. There is also the possibility of new startups from innovative products developed by citizens. As an example of an additional feature an energy supplier could get more loyal customer base and the relationships established could be used for innovative business models. Some other pros of this process are that citizens can develop the idea into something that is exactly what they want for situations they are experts on, when doing this using open source they do not have to start from scratch because they can reuse innovations developed and shared by others. Knowledge on local issues is naturally used in the development which further could engage users. One example is neighbours finding solutions together, spurring each other on. We have already discussed additional benefits for the citizen involved in open source projects, e.g. emotional rewards, social status and development of skills. Finally, the local government will benefit in several ways. The projects engages citizens and organizes them, provides inexpensive solutions to difficult problems and increases awareness of the problem at hand along with skills to solve them which could simplify implementation of new or other solutions. Providing better, less expensive services to the citizens is also a good way of being re-elected. To establish the process the local government could make small investments encouraging citizens, local companies and other organizations. By participating the community, and also a company, will give tangible evidence of behaviour that could earn them trust and credibility. The innovation process could enhance the information flow between citizens, local administration and local companies which in turn could be used for a next round of innovation.

Concluding Remarks

This paper illustrates how open source can be used to work towards a sustainable society, which is crucial for survival and is a long-time process including social, economic and environmental issues. Open source has the fascinating ability to bring people together to work for a common cause without clear personal monetary gain; there are other important values to be won. This is one of the reasons why open source has been very prominent and successful in the software industry and today most software necessary for a typical family or firm can be accessed for free by open source license. Taking the incentives from open source applying them to sustainability issues might be a solution for increasing the participation in local communities creating a sustainable society and living. In the long run this is an important marketing resource for both the local community and the commercial firms that takes part of the development and give incentives for a co-creative environment. This paper has presented a conceptual model where open source thinking is embedded in a community based framework for developing sustainable IT solutions. Further research will be based on case studies to support the ideas of local community-citizen interaction through open source project for sustainability.

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