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The Past, Present and Future of Social Networking and Outsourcing: Impact on Theory and Practice

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Abstract

Development practice continually evolves. Some of the latest evolutions are emerging as a combination of Social Networking and Outsourcing activity resulting in the emergence of crowdsourcing or Open-Global sourcing. This paper examines some examples from history of technology informed social networking activity along with examples of some current activity. The historical perspective helps to provide some interesting insights into how activity may evolve. Some of the changes may be subtle but far reaching. Open-Global sourcing is a Social Innovation that is redefining business practice and stretching existing theories. The paper identifies areas of theory that are being 'stretched' and argues that Open-Global sourcing is an area calling for theoretical development.

Keywords: Social Networking, Open-Global sourcing, Crowdsourcing, Innovation

1.0 Introduction

This theoretical paper explores the importance of the technologically enabled social networking phenomenon on information systems development and some of the many theories that that support information systems as a discipline. The aim of paper is to provoke thought and discussion on how information systems (both the type of systems and the discipline) and information systems development will evolve.

Information systems development, and consequently information systems as a discipline, continually evolves as the technological, business and social environment evolves (Avison and Fitzgerald 1995, DiBona et al 1999, Adams and Avison 2003). One significant current area of technological, business and social change is the social networking phenomenon. Some form of social networking has always been part of human activity. The emergence of Web 2.0 technologies, in the wider sense, is enabling new forms of social networking. This coupled with evolution of outsourcing

practices is resulting in the emergence of crowdsourcing or Open-global sourcing (Surowiecki 2004, Howells 2006, Adams and Ramos 2007, Johnson 2008). Crowdsourcing/ Open-global sourcing offer organizations a new way of outsourcing that draws upon a vast global knowledge community. The transitions to Web 3.0 technologies (Lassila and Hendler, 2007) are likely to change interaction and collaboration between people as well as system and environment needs. The technological capabilities and social practices encourage the continual march towards globalization and a connected up world (Giddens 2002, Holton 2008).

Open-global sourcing has its foundations within the open sourcing practices which has been significant part of software development for many years (DiBona et al 1999, Raymond 2001). As Stallman notes when discussing the development of the GNU operating system: "Sharing of software was not limited to our particular community; it is as old as computers, just as sharing of recipes is as old as cooking" (Stallman 1999, p53). Early systems development was open source. For instance, the evolution Unix from Berkley since the 1970's (McKusick 1999) and the development of the Internet Engineering Task Force (IETF), and arguably the development of internet protocols from the 1980's (Bradner 1999). The results of the open source mindset was some very powerful and fault tolerant systems, including the development of the Internet protocols (through the Request For Comments system), the World Wide Web, and Unix and Linux. These are serious and very substantial accomplishments based on an open collaboration mindset from a global community. Many corporations still have some aspects of open source within their software profile (Raymond 2001).

Crowdsourcing/open-global sourcing is an example of social innovation (Gabor 1970). One of the best examples of social innovation that have a significant impact on business working practices is the Program (or Project) Evaluation and Review Technique – or PERT. Gabor (1970) examines 137 inventions and innovations in which he classifies 73 of them as 'hardware', 27 as biological and 37 as social innovations of which PERT is one: "When the Polaris submarine was conceived, four major inventions were needed for its success: the nuclear drive, accurate location under water, the solid-fuel rocket, and inertial guidance. As a fifth, one can add 'PERT', a planning scheme that made it possible for millions of parts supplied by 11,000 manufacturers to arrive in time and to fit together" (Gabor 1970,p6).

The impact of social innovations can be quite subtle but far reaching. They do not translate to a ‘technological’ innovation as such (say which results in some technological step ‘forward’), they provide some new thinking and changes in working or social practices that enable something new that was not possible before. There is no clear ‘technological step’, and bits of what is possible would already be there. For instance PERT enables the ability to plan the collaboration of many different contributors to produce a complex and usually large system with very many components, within a guideline budget and timeframe. (Yes there are several examples of large system being developed that went over budget or over time, but this misses the real accomplishment – that of actually producing an incredibly complex system at all!) The collaboration capability was ‘already there’ except it just needed things to come together, particularly the mindset that the project can be coordinated and managed that way. The mindset that big complex systems could be produced possibly helped drive forward investment into other big systems. Many of the larger information systems development projects have utilised PERT type approaches, either within the development methodology or the system itself would be part of PERT controlled larger project (such as the command and control system for submarine or a large military ship).

The changing of the mindset that comes with a social innovation is arguably more important than a technological innovation since it changes the belief systems within a society and so changes the direction of new innovations, both technological and further social innovation.

From Toffler and Toffler’s (1980, 2003) perspective, change stimulates change, which is the life blood of creativity and innovation. In a similar light, Damsgaard and Gao (2004) examining the evolutionary innovation of the mobile telecommunications market, describe the process as an ‘innovation circle’ where the introduction of a new technology stimulates further innovations in the mobile market place. Adams (2007) takes a similar approach that includes the user in the innovation process and refers to this as the problem-solution space or innovation-space. A representation of this is given in figure 1.

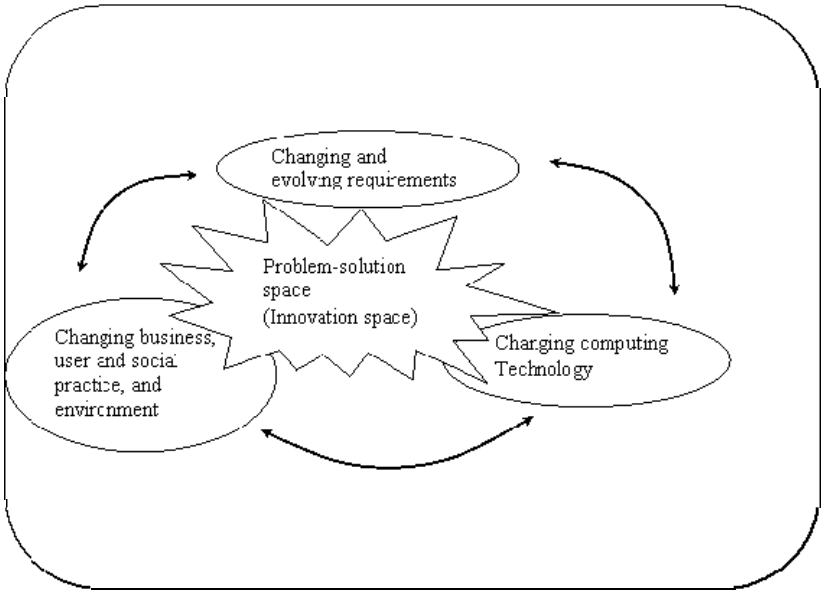

Figure 1: Innovation space with evolving technology and user practices (from Adams 2007)

Innovations are usually stimulated when someone identifies a set of problems and starts looking for solutions to those problems, or when identify an opportunity to do something different. In a dynamic environment, when there are technological or social changes then this stimulates changes in user practices and needs. As user practices and needs evolve further opportunity emerges for technological and social led innovations. The evolving user practices within the process are the prime breading ground for social innovations. Much of the diverse set of social networking practices are examples of social innovation. As the general technological, business and social evolves then theories, such covering economic, business and social practices will also evolve (Winter 1964; Winter 1971).

The next sections examine the past, present and futures of technologically supported social networking leading to open-global sourcing.

2.0 Social Networking - The Past: The early technological years

Through the Industrial Revolution there were many technological innovations but also social innovations both of which had corresponding significant changes to social structures (Ashton 1986, Deane 1988, Marshall 1982). Marshall discussing the changes in social structures during the time of the Industrial Revolution notes “It was the Industrial Revolution that first challenged and then shattered the traditional

framework and substituted a society based on class. In the eighteenth century political power and the possession of land went hand in hand. With the coming of the new industry this dominance began to crack. Men who were neither landowners nor gentlemen could nevertheless create wealth through the possession of factories and foundries. It was no longer only the landowner and the merchants who could call the political tune." (Marshall 1982, p92). New social networking structures emerged around this time with the introduction of a range of new clubs, societies, guilds, cooperatives and unions. For instance, in the 1770's a group of the new professionals of civil engineers in Britain headed by John Smeaton, establish a Society of Civil Engineers (Ashton 1986, Watson 1989), or as it later become known as the Smeatonian Society of Civil Engineers, which evolved into the Institution of Civil Engineers in the early 1800's. The social innovation of a Merchant's Guild or Engineering Institute brings together the peers of professionals who then can act as a body to influence the public policy and practice on development, laws, economic and social practice and expectations: They change society.

There have been several examples of technology supported social networks. Perhaps one of the most interesting is the development of the Electrophone or Théâtrophone systems that enabled audio to be broadcast down the early telephones in the 1890's. This was one of the earliest examples of electronic broadcasting and predated the wireless broadcasting era of radio. The telephone broadcasts would bring news, concerts, sermons and a range of information to the relatively few homes and clubs (mostly based in urban centres). Lots of interesting social innovations emerged around the use of the electrophone type systems. A marketing opportunity resulted in dispersed groups of people coordinating together to provide a programme of events, for instance as Mee noted at the time: "The corps of musicians attached to each hall is so large that, although no individual performer, or group of performers, has more than a brief part, each day's programme lasts through the twenty-four hours. There are on that card for to-day, as you will see if you observe closely, distinct programmes of four of these concerts, each of a different order of music from the others, being now simultaneously performed, and any one of the four pieces now going on that you prefer you can hear by merely pressing the button which will connect your house wire with the hall where it is being rendered." (Mee 1898, p339). The social innovation of a connected national timetable of performances, news reports and sermons resulted in

a significant impact on society - effectively coordinating social practices across large groups of people within society to listen to the news as the same time, disseminating information about common issues or provide them mass education. The town, county, country or world got a little smaller and connected in the mindset of the population.

Other more recent examples of social networking would include the explosions of telephone exchanges in farming communities in the USA in the early 20th century, or the growth of CB radio 'trucker' networks across the USA and Europe in the mid 20th century or in the early internet years the grow of internet communities such as the Farmers' wives communities in rural Australia. Each of these resulted in the social network evolving social innovations to meet some of the specific needs of the group – for instance, communication, education, and economic support of isolated communities or a new communication network (and language) to report traffic problems. Going back further one could consider the Garamut drums in Papa New Guinea which resulted in the social innovations of rituals, social structures and language (of the drums) that enabled supportive communities to live together in dense forest.

3.0 Social Networking - The present: The Open-Global phenomenon

Crowdsourcing or open-global sourcing offers organizations a new way of outsourcing that draws upon a vast knowledge community typically embedded in social networking infrastructure and user practices (Howe 2006). Crowdsourcing involves taking tasks that were traditionally performed by employees and then outsourcing them in the form of an open call to a large yet undefined group of people. At one level it can be a mix of open sourcing and outsourcing: bringing together contributors from a global community around an interesting and challenging task, but the task is specific to a particular organization and being conducted in a similar way as an outsourcing activity. So a company could post a problem by an open call across the Internet leaving it open to any individuals to offer their solutions to the problem. Typically there is an incentive such as a prize for the best solution, which the company mass produces. Howe (2008) categorizes crowdsourcing into four models: collective intelligence, crowd creation, crowd voting and crowd funding, laying out

examples that businesses can tailor to their own circumstances. The crowdfunding model is based on providing funding to individuals to create intellectual assets – then individual contributors are rewarded from the funding (though it could also be sharing IPR from the idea). Crowd voting model implies that people vote for their favourite innovation proposals or products, so getting the 'crowd' to choose the best or more attractive option. The crowd creation model is used by businesses to find some new ideals or generating new content. The collective intelligence model implies that companies ask people inside and outside the company to help solve problems and suggest new products.

There are a variety of existing support mechanisms for Open-global sourcing activity such as the general Web 2.0 technologies (Wikis, Blogs, forums etc) and the move to Web 3.0 technologies are set to provide more seamless interaction and collaboration capabilities (Lassila and Hendler, 2007). Further support to enable sharing of ideas and information from a wider community, and handling some of the interactions and management tasks, are offered by proprietary systems such as Chaordix (see http://www.chaordix.com/), Amazon's Mechanical Turk or Microsoft's Task Market.

Outsourcing practice has been continually evolving (Beulen et al 2005, Carmel and Tjia 2005). Adams and Ramos (2009) argue that there has been an evolution from outsourcing to open-global sourcing, and define key attributes of each service provision (see table 1).

Attributes	In-House tasks	Outsourced tasks	Offshoring tasks	Open-global sourcingtasks
Task participants	Host employees, in-house contractors	Employees and/or contractors of outsourcing company Sometimes on site or	Employees and/or contractors of offshoring company	Wider open global community Mix of experts and non-experts
Location of task workforce / participants	Host sites National to the organization	Host site or outsourcing company/contractor sites National to the organization	Offshoring company/ contractor sites International, specified locations/countries	Global, non-specified
Motivation of workforce / participants	Pay, bonuses, working conditions, company incentives, promotion	Devolved to outsourcing company Working conditions for onsite workers	Devolved to offsourcing company	Motivation by competition, gaming, payments, reputation This is an area calling for

	opportunities			innovation
Task control and management	Managed in-house Traditional management, hierarchical and matrix structures	Managed by tendering process and contract – Service Level Agreements (SLAs) Devolved micro management Controlled by testing to SLA	Managed by tendering process and contract – SLAs Devolved micro management Controlled by testing to SLA	Decollation and collation of tasks and sub tasks Management by motivation Open management
Benefits	Full control Retaining and developing expertise Flexibility of not being tied into SLAs	Ability to focus on core tasks and business activity Access to expertise and capability Cost containment and savings Low management and operation overheads	Ability to focus on core tasks and business activity Access to expertise and capability Cost containment and savings Low management and operation overheads Cost benefits from lower wages and operating cost	Access to vast knowledge and skill base Access to wider sources of innovation and IPR generation Ability to focus on core tasks and business activity Low management and operation overheads
Problems	Potential higher costs Need to maintain skill levels and wider capability Dilutes attention from core business activity High management and operation overheads	Lack of control Lock-in to SLAs and limitations on flexibility Remoteness of providers Differences in company motivations and culture	Lack of control Lock-in to SLAs and limitations on flexibility Remoteness of providers Differences in company motivations and culture Differences in national cultures and working practices	Lack of control Different and uncertain management overheads Increased uncertainty over time and quality of tasks IPR sharing and managing

Table 1: Evolution towards Open-global sourcing (From Adams and Ramos 2009)

Some examples of open-global sourcing include:-

uTest: This is an example from the software development and testing domain (see http://www.utest.com/). ‘uTest’ was formed in late 2007 and now claims to be the world's largest marketplace for software testing services with a global community of over 18,000 testers from more than 150 countries. uTest builds a virtual testing team from scratch for each customer, putting the call for

‘testing’ open to their testing community. Tester and would-be testers have to sign up to join the uTest community. They can then participate in whichever project or stage they want to and have the right skills for. Their pricing model is based on Pay-for-Performance where companies pay for any approved bugs, completed test scripts and usability surveys completed. uTest provides Forums and online meeting and exchanging facilities which helps develop the sense of community for the testers. There are various motivations from the participating testers, from monetary returns, control over which assignments they undertake, acceptance and recognition from expert testers and peers and also a fun or gaming element in participating in the assignments.

The Galaxy Zoo project: This example is from the astronomy and cosmology domain (see http://galaxyzoo.org/), also shows the huge potential to draw upon a vast human resource to tackle very large problems. The problem the cosmologist faced was how to robustly classify over one million galaxies from images collected through the Sloan Digital Sky Survey (SDSS) telescope. There are relatively few cosmologists in the world, so the task would take many years to do on their own. The original Galaxy Zoo was launched in July 2007. One million images were open to the general public to evaluate, supported with a marketing campaign and some instructions on what to do. The expectation was that it would take a few years for visitors to the site to work through the million images. However, within 24 hours of launch, the site was receiving 70,000 classifications an hour. More than 50 million classifications were received by the project during its first year from almost 150,000 people. This proved to be a very welcome result since having multiple classifications of the same object is important to assess the reliability of the each classification. Having a robust set of classification enables interesting science to done, for example examining attributes of galaxies with similar shapes. The next stage of the project Galaxy Zoo II captures more detail about each galaxy (such as shapes, colour, splitting the galaxies into elliptical and spirals and if the galaxy is spiral, then the direction of the arms), and so far there are about 200,000 contributors. Interestingly, the classifications in Galaxy Zoo by the general public turn out to be as good as those completed by professional astronomers.

The Goldcorp Challenge project: This is an example of a commercial application resulting in innovation and creative problem solving using crowdsourcing (Tapscott and Williams 2006). Goldcorp, a gold mining company, gave the general public access to all the information on their 55,000-acre gold mining property and, providing $½ Million prize money for a competition to identify where further gold is likely to be. The results were quite spectacular with contestants identifying 110 targets for possible gold. From these 80% of the new targets yielded substantial quantities of gold. This turned Goldcorp from a $100 million company to a $9 billion company (Tapscott and Williams 2006). This example demonstrates the potential to draw upon an undefined and large group of people to help address a company's problem solving and innovation issues.

Open-global sourcing activity is resulting in a selection of interesting case examples, such as the above; however, it is in relatively early days for wide scale adoption by the wider business community. The attributes of Open-global sourcing are very different to the previous outsourcing and offshoring activities: time scales, resources and costs, outputs, risks and the participants involved are all likely to be different or have different attributes. For instance, it is likely that Open-global sourcing activity does not fit well into the 'command and control' perspective of many SLAs (Goo 2008, Goo et al 2008). New support structures, including social innovations, will have to emerge to support more wide scale use.

4.0 Social Networking - The Future: Implications for theory

Open-global sourcing is likely to have impact on both the development of systems, including how requirements are identified, how systems will be designed and chosen, how work will be parcelled up, distributed and collated, how systems will be tested. It is also likely to impact type of organization that will be using the systems and the corresponding nature of those systems

As discussed earlier, the evolving Open-global sourcing activity are examples of social innovation: they are not the results of a single 'technology' but the results of

new collaborating social practices, in a dynamic process. Indeed, a good comparison would be development of PERT discussed earlier. Similarly, Open-global sourcing activity is resulting in new ways to make possible the breakdown and coordination of very large and complex tasks involving contribution from many thousands of undefined participants. The potential scale and speed of execution of Open-global sourcing projects (such as robustly classifying one million galaxies in the matter of months) out performs existing in-house or outsourced approaches. It is simply not economically possible to do these types of projects by existing conventional methods. The social innovation of Open-global sourcing activity, just as the introduction of PERT activity, requires changes in management practices. It also requires and results in changes of mindset of the participants – the mindset is moving towards one of empowerment, of contribution and engagement. The Open-global sourcing mindset is changing our view of what an organization, what its boundaries are, how it is structured as well as many other of its attributes.

The technological and social capabilities – the social innovation building blocks - are already here for an ad hoc, or temporal, organization to emerge. For instance, an ad hoc organization could come together around a common theme. The temporal organization could be huge providing a vast resource of intellectual capital to address a particularly taxing common theme or problem. The example of Galaxy Zoo gives some inkling of the scale, speed and participation of such an organization: A very substantial task of classifying robustly one million galaxies, involving input from 200,000 people across the globe, and completed in months. The scale of the project is comparable to many large information systems projects such as would be found in many multinational corporations or government departments. The Open-global sourcing approach requires a rethink on how we view organizations, work, motivation, sharing of intellectual property, the legal aspects and boundaries, and many other aspects of the business and social environments.

The build blocks of future Open-global sourcing or some other form of social innovation may already be here – just waiting for the social innovation to form the mindset that brings the building blocks together.

One particularly area that is set to change in management practice of information systems development activity is the ‘command and control’ of views of outsourcing using defined Service Level Agreements (SLAs) (Goo 2008, Goo Et al 2008). SLAs typically require well defined requirements, quality of service delivery, costs, time scales etc. These do not fit well with the characteristics of Open-global sourcing activity in which there is more uncertainty, such as not knowing who and how many will participate, when the tasks will be completed or delivered (or even if they will be completed/delivered at all), and an unknown level of quality of service. Some of this uncertainty can be mitigated by using 3rd party broker or intermediary (Adams and Ramos 2009). Future Open-global sourcing could equally evolve into sharing some of the risks, and rewords, more directly with the contributing crowd participants. This would require development of micro intellectual property rights systems to enable sharing of gains. Much of these already exist in stock exchange share systems at one level and the micro token and voucher systems operating across much of the retail and supermarket sectors.

Indeed, systems of the future could be developed, directed or influenced by a wider crowd consisting of interested stakeholders, such as system users. Development practice could move towards user directed and user developed systems. Indeed, many of the existing building blocks are already available in the current evolving Open-global sourcing capabilities. Existing social innovations developed to break complex tasks down into small chunks and distribute around a vast community of potential contributors could be the building blocks of doing the same for large systems development projects. The scale and speed of systems development could change significantly to that of current practice.

Social innovations such as technology supported social networks, could significantly increase the speed of innovation diffusion. According to Rogers’ diffusion of innovations theory (Rogers 1995), social systems are important for communicating information and acceptance about the innovations. Social networks act as a conduit for disseminating information about an innovation. There are weakness and criticisms of innovation diffusion theory (Clayton 1997, Clark 1999), though possibly the strength of the innovation diffusion theory is its intuitive simplicity. It represents a pattern of adoption which ‘all things being equal’ shows how a successful technology

is likely to be defused throughout a population – or at least until it is replaced by another technology or innovation. When the innovations are information based or social based then the conduit for disseminating information also become a conduit for disseminating the innovation.

The Open-global mindset is already moving towards more empowerment and engagement, through participation in the crowd, in the development of projects. For the digital natives of the future it may be the norm for users to participate in, and have ownership of the development of their organization's system. Indeed, in the future the concept of having a separate development team may be alien to the system stakeholders and users. For instance, think of the wider population, say several million people, being actively involved in developing and shaping a national health records system – with the capability of developing a new system within half a year with refinements and new innovations continually. This would require changes to the mindset covering ownership, responsibility and empowerment.

4.0 Conclusion

The aim of this paper is to provoke thought and discussion. The evolution towards Open-global sourcing is resulting in subtle but significant changes to information systems development and to information systems as a discipline. Most of these changes are the result of social innovations that are based around social networking activity.

Current practice in Open-global sourcing is limited to a selection of interesting case examples. Some of these have achieved spectacular success, though there are several that have only moderate success as well as a few failures. But the mindset is changing. Web 2.0 technologies, and the slide towards Web 3.0 technologies and capabilities – what ever they turn out to be – are changing how people think about connecting, interacting, communicating and working together with other people. This is all fertile ground for social innovation.

Much of existing ‘theory of the firm’ covering organizational entities, structures, employees, factories, supply chains and many other aspects, have mostly evolved from the Industrial Revolution. The current information revolution, or Toffler’s 3rd wave, is ‘stretching’ these existing theories possibly to breaking level. This seems to be a very fertile area for further theoretical development and refinement. As Marshall (1982) noted the Industrial Revolution challenged and then shattered the traditional frameworks within society. A dominant current mindset is that we are going through a technological revolution similar to that of the Industrial Revolution, resulting in step change in ICT, connected globalization and mobility (e.g. Currie 2000, Giddens 2002, Kelly 2003, Gibson 2003, Damsgaard and Gao 2004, Dicken 2007, Holton 2008). Traditional frameworks within society are set to be challenged and possibly shattered.

However, it is also useful to reflect that the actual system use can be very different, and even be perverse and paradoxical, to that intended by the initial designers (Heber 1998, Arnold 2003, Adams and Fitch 2006). For instance, more effective car brakes which are designed to improve car safety can result in people driving faster and less safely (Arnold 2003). The use of social networking technologies and open-global sourcing activity may yet raise their own perverse and paradoxical use issues. Similarly, as Surowiecki (2004) identifies there are times when crowds get it wrong, sometimes quite spectacularly.

Social innovations are more fundamental than technological innovations: social innovation changes mindsets and consequently changes the direction of further technological and social innovations and society. This was clear when examining the Electrophone or Théâtrophone technological innovation which enabled audio to be broadcast down the early telephones; The social innovations changed society - collating together (global) news and entertainment, and making them available to the wider groups of people in society: “The humblest cottage will be in immediate contact with the city, and the ‘private wire’ will make all classes kin …So popular has the Pleasure Telephone become in Buda-Pesth that it has found its way into every public place of importance. There is not a public building in the capital where it is not in operation, and even the churches have not objected to it, as our illustrations show. … a summary of all the news is given at noon and again in the evening…. Patti and Paderewski may yet entertain us in our own drawing-rooms, and the luxuries of

princes may be at the command of us all" (Mee 1898, p 340). Similarly, another social innovation based on the Electrophone type systems were using for political change: one of the most significant possibly society changing examples being the use by the Pankurst's to popularise the 'vote for women' campaign. It also created great expectation which fuelled the development and adoption of the wireless radio broadcasting system which replaces the Electrophone systems. Indeed, the expectation of television was driven from experiences with the electrophone "…There is, indeed, no element in our social life which will be unprovided for, and if, as it is said to be not unlikely in the near future--the principle of sight is applied to the telephone as well as that of sound, earth will be in truth a paradise, and distance will lose its enchantment by being abolished altogether" (Mee 1898, p 344). Likewise, the early beginnings of the Open-global souring social innovations are laying the building blocks of future social innovations which will have a direct impact, possibly subtle but definitely significant, on the information systems discipline and development practice. The rate of change is likely to be phenomenal. As discussed earlier, when innovations are information based or when they are social innovation then information about the innovation as well as the innovation itself can be disseminated along the conduit of the social networking infrastructure. Consider the evolution of the social networking sites that have gone from zero to hundreds of millions of users or community members in less than 5 years, or the collection of knowledge in wikipedia and other wikis in similar timeframes. The future could be very interesting.

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