Social and Community Informatics and Social Theories of Networks

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Abstract

There are Non Government Organisations (NGOs), technical and academic interest in the community driven Athlone Living Lab and its social innovations. With actors across many disciplines, it is necessary that the successful solutions can be utilised by other NGO's without creating social casualties. The social research background to the project needs to be understood so that the project can reach an academic audience in multi-disciplinary fields. Also that the data generated by this successful project may be used to demonstrate important principles that have enabled the community to develop from a Community in Tension (CiT) to a community in transformation.

Key words: Social Informatics; Community Informatics; Living Labs; Actor Network Theory.

1 Introduction.

The computer, microchip and telecommunication developments in the last twenty years have led to a radical change in society. (Carr 2008). Society and marketing as a whole have found in difficult to react quickly to the mass of possibilities technology has promised.

Most activities that we engage in are controlled by built in software. These may not be linked to a computer – many household appliances, for example washing machines, microwaves, run by built in software. More dangerously so does industrial machines and medical tools. Communication wireless technology in mobile phones has opened up the possibility of quicker and more effective information collection and control, and this creates new social dynamics and loci of information.

In the context of the Athlone Living Lab information is needed by technical and academic staff as to the social research background to these fields. Working across many disciplines, it is important that language is understood by all the partners from the community, academia and industry. This paper seeks to introduce the research fields of social and community informatics and describe how the living lab concept fits into the social science paradigm. The format is

- To describe the development of each separate research field.

- To describe recent community and social projects and
- To describe social science networking theories that will be of use.

2 Social informatics

Aim:

Social Informatics is a body of research that examines the social aspects of computerization. It aims to ensure that technical research agendas and systems designs are relevant to people's lives.[1]

Definition:

The main definition for Social Informatics is

"*The interdisciplinary study of the design, uses and consequences of information technologies that takes into account their interaction with institutional and cultural contexts."* (Kling 1999).

Social informatics examines

1. the role of information technology in social and organizational change,
2. the uses of information technologies in social contexts,
3. the ways that the social organization of information technology is influenced by social forces and social practices.[2]

Social informatics was birthed in 1996 as a reaction to the technological and information 'revolution' which was seen to be happening in the 1980's onwards. [3]

The driving force in the emerging field of Social Informatics was Prof. Rob Kling. Kling's academic interest was with organisations relationship with technology, and how people engaged with the new technological process. However the sphere of investigation has widened from its origins and now covers many fields of social technological interaction. (See Figure 1).

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[1] (Rob Klein Social Informatics Centre (Http://rkcsi.indiana.edu/index.php/history-of-the term 2009).

[2] Rob Klein Social Informatics Centre (Http://rkcsi.indiana.edu/index.php/mission. 8/3/2009)

[3] Rob Klien Social Informatics Centre (Http://rkcsi.indiana.edu/index.php/history-of-the term 03/08/2009)
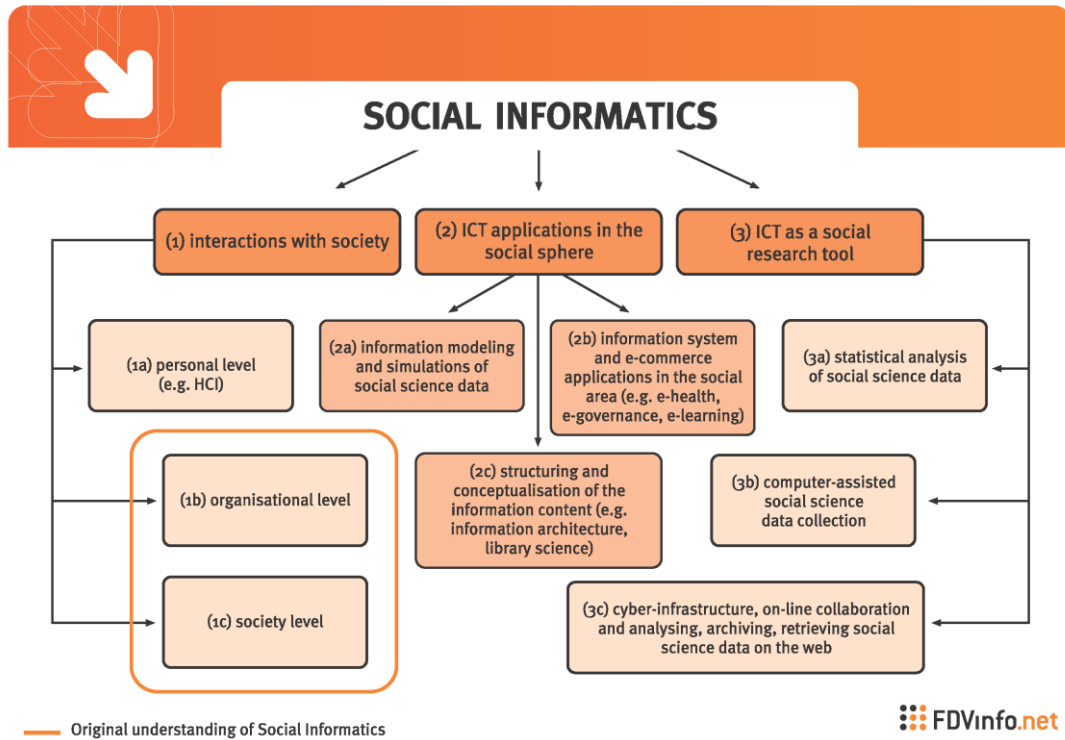
Figure 1 Development of Social Informatics [4]

2.1 University of Indiana USA

The key author for Social informatics is Rob Kling at the University of Indiana, America. His book Computerization and Controversy (1991) is the main collection of research into this field. However, Prof Klings' death in 2003 has led to a re-evaluation of the work, with colleagues like Roberta Lamb and Steve Sawyer, (2005), leading the way to strengthen the discipline with stronger conceptual perspectives. The research discipline was based on 'the problems being examined rather than by the theories or methods. The chosen means of investigation being normative, empirical and critical analyses. (Sawyer 2000): Kling particularly emphasises the ability to be critical of social assumptions that have been made by programmers and reporters. For example, a team of people needs to be defined by their gender and ability. However, it can be argued that without a theoretical basis the work is not defined and as seen by the range of interests below, becomes on observation of the world, rather than an investigation.

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[4] (http://www.social-formatics.org/uploadi/editor/1158776249plakat%20ENG1.pdf required 03/08/2009) University of Ljubljana

Kling (1996) lists social informatics investigations into

- Economic, deskilling,
- Work-life, flexibility home/part – time
- Class Division
- Human safety from air line controllers to users
- Democratization
- Employment   hollow economy
- Gender biases
- Military Security
- Health
- Computer Literacy
- Privacy
- Scholarship

This range of interests has led to a proliferation of research centres around the world, focusing on one or more aspects of these fields: the University of Indiana lists over twenty research centres in America, involved in political and government research. Many of these publish their own journals, but many publish in a trans-disciplinary way which makes tracking the discipline difficult.

3   British Research Centres:

There are many British Research Centres who embrace Social Informatics –Three main centres listed below: however most of the main universities have some interest in this field, including Manchester, Oxford, and Cambridge. The I.T. and Organisations B.A, in ECS, can be seen to have been directly influenced by this school of thought.

3.1 University of York

Social Informatics Research Unit (SIRU).

The Social Informatics (SI) unit in York focuses on "*Studying the big over arching sociological questions that the global spread of ICT invokes*"[5]. Its interests are in

- Community and political informatics
- Cultural digitization processes
- e-health and
- spatial informatics

SIRU publishes its own journal – The journal of Information, Communication and Society. (http://www.york.ac.uk/res/siru/)

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[5] University of York *http://www.york.ac.uk/res/siru/index.htm*   03/08/2009

3.2 Centre for Social Informatics, Napier University, Edinburgh

Heading by Elizabeth Davenport - the aim of the Centre for Social Informatics is

"*To continue to develop a distinctive body of work that reflects a shared interest in socio-technical interaction at different levels of organization, and at different stages in the system life cycle, as well as in methods to support research in these areas*

The Centres research area is through the European International Tele-democracy Centre which is working closely with governments, parliaments, and NGOs across Europe and worldwide, looking at software engineering applications with political and sociological analysis". [6]

Their publications are involved in knowledge management systems and political systems.

4   Social Informatics Research Unit University of Brighton

Led by Flis Henwood, the aim of the group is to "*understand the social processes shaping the production, consumption and use of information in contemporary organisations and society*."[7]

Current research themes include:

- Health informatics
- Library and information sector research
- Information and communication ethics
- Community informatics
- Gender and technology

5   Key players- Socio -Technical Model.

In all investigations concerning social informatics there are key players. These are

- The makers/software programmers of the product that is to be used
- The users of the system
- The managers of the systems
- The technology itself.

All of these have to be at ease and seamless for any information system to operate as one. Kling (1996) named this the Socio-technical system (see Figure 2).

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[6] University of Edinburgh http://www.csi.soc.napier.ac.uk/researchgroup/op/display members/researchgroupid/256826 (16-2-09)

[7] University of Brighton
http://www.brighton.ac.uk/cmis/research/groups/siru/index.php?PageId=2050 (14-2-09).

People				Technology
	Owners	Software developers	Hardware	
	Managers	Software		
	Users	Management models.		
	Support Staff	Software support/rules	Hardware rules	

Figure 2 The Socio-Technical model. (Kling 1996)

6 Findings from Social Informatics research

Lamb and Sawyer (2005) summarised the main findings from Social Informatics research in seven main sections:-

1. The context of ICT use directly affects their meanings and roles.
2. ICTs are not value neutral: their use creates winners and losers.
3. ICT use leads to multiple, and often paradoxical, effects.
4. ICT use has moral and ethical aspects and these have social consequences
5. ICTs are Configurable – they are actually collections of distinct components.
6. ICTs follow trajectories and these trajectories favour the status quo.
7. .ICTs co-evolve during design/development/use (before and after implementation

7 What is the importance of social Informatics

Kling *et al* (2005, p85.) lists four reasons to teach Social Information's to technologists

1. To set a framework for ICT students to "organize and assimilate the social and organizational forces affecting functionality embedded into ICTs".
2. To help these students understand that designing and implementing ICTs is a socio technical process.
3. For the students to develop analytical skills to identify and evaluate the social consequences of ICT based systems.
4. To assist technically trained students in developing a more critical (problem based) view of ICT: that is benefits and limitations

The authors also note that critical thinking means developing skills of reflection, on areas that include

- Failure costs

- Risks in ICT design

- Problem centred approach with public debates on ICT

- Hands on experience in designing systems for the real world.

The purpose of teaching and researching social informatics is that ICT policy will be more effective, and future researchers will

"*ask more substantial questions and provide more useful insights than those who ignore the interconnections among the social and technical aspects of computing*". (Kling *et al* 2005, p154).

8 Community informatics

This is an emerging discipline, which aims to use and study ICT in group settings, especially for groups who are excluded from the main stream communication systems

Definition:

The main definition for Community Informatics is

"*Community Informatics (CI) is concerned with carving out a sphere and developing strategies for precisely those communities {disadvantaged} to take advantage of some of the opportunities which the technology is providing.* " (Gurstein, 2000:2)

There would be a role for local communities to become empowered and engage with technology and access information which would increase their life changes. Unlike Social Informatics this is a comparatively new field which has an ethical base, to empower communities through the use of technology. Technology is therefore seen as a catalyst to change.

Main Research Centres

Two of the main schools are run by Michael Gurstein, in Canada and Gunilla Bradley in Sweden. Gorstein's' seminal text is Community Informatics: Enabling Communities with Information and communications Technologies', (Gurstein, 2000). Bradleys' seminal text is Social and Community Informatics, Humans on the Net (Bradley 2006).

Gurstein (2000) and Bradley (2006) notes that the mobile (wireless technology) is especially useful – as the connecting costs are low.   An added feature to Community Informatics is that the community dictates the agenda of the information and what is required. (Bell *et al* 2004) Both Gurstein in Canada and Bradley in Scandinavia, were researching the use of network technology to connect distant communities from the centre of the Nation.

Bradley (2006) notes that the future direction of Community Informatics can be used for promoting peace and the quality of life for all. Therefore there is an agenda to Community Informatics, that it improves the life of the poor and disadvantaged

 One of the most noted projects is the MS Swaminathan Research Foundation project that aimed in Mission 2007, to make every Village a Knowledge Centre in India, with information customised to Indian farmers and families (Swaminathan 2007).

9   Current research areas

2007 IT for Change (Bangalore, India) -- CCIRDT Executive Director Michael Gurstein has been invited to participate in a Workshop on Tele-centres and ICT policy development and prepare a background paper on ICT policy and Tele-centres for the leading India based NGO IT for Change www.itforchange.net

2006-07 UNESCO (Paris) -- CCIRDT is partnering with The Information Society Institute (Cape Town South Africa www.tisi.za.org to undertake a future oriented assessment of UNESCO's Information for All Programme www.unesco.org/webworld/ifap which is UNESCO's major Programme supporting transitions to Knowledge Societies globally.

2006-07 K-NET (Keewaytinook Okimakanak) (Northern Ontario, Canada) -- CCIRDT is working with the telecommunications organization for the First Nations in Northern Ontario, K-Net www.knet.ca on an overview and future oriented assessment of the K-Net's activities as a leading Community Informatics organization supporting the use of ICT for economic and social development among Canada's First Nations.

2006 – 2020 Communications Trust (NZ) -- CCIRDT Executive Director Michael Gurstein was invited to present the keynote address at the 10th anniversary celebration of the 2020 Communications Trust www.2020.org.nz, a leading New Zealand ICT foundation. In addition, he made a series of presentations to a large number of audiences in several NZ centres concerning the role of ICTs in social and economic development.

10 Community Informatics network

The Community Informatics Research Network (CIRN) is an international network of researchers, practitioners and policy makers concerned with enabling communities through the use of Information and communications Technologies (ICTs) and specifically with research and practice in Community Informatics and community networking or community technology practice [8]

11 Community Informatics: Further research work required

The field of community informatics is new but looking to develop. Stoecker (2005) looked at the emerging discipline of Community Informatics and asked the following questions:

1. Who is community Informatics for?

2. Is it a distraction to community building?

3. Does the technology have to lead or is it a tool that the community choose to use?

4. Who gains from Community Informatics: the academic, the workers or the community?

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[8]Community Informatics Research Network webpage (http://www.ciresearch.net/03/08/2009)-

5. How market driven is the discipline – is it about the economic community or the individual.

The way forward for Community Informatics has been suggested using the research method of living labs. This idea was mooted by Aldo de Moor, after the 5th Prato Community Informatics & Development Informatics Conference 2008 on the growingpains.blog site. There has been an increasing amount of research published on living labs, linking it to community informatics.

12 Living Labs

If there is a buzz word for the moment in social and technological research it is 'living lab'. First mentioned in America in the 1990's, the living lab concept became popular in the research environment when it was used widespread in Scandinavian countries.

It was adopted by the European Union at the Lisbon conference in 2000 as the way to encourage local regional growth and connect localities into modern technology and to encourage innovation and new ways of using technology. [9]

Definition:

A European definition of a living lab is:

"*Functional regions' where stakeholders have formed a Public Private Partnership (PPP) of firms, public agencies, universities, institutes and people, all collaborating for creation, prototyping, validating and testing of new services, products and systems in real life contexts*" (CoreLabs 2008)

The number of European Living Lab projects is 132 in May 2009, and cover areas from car production in new Eastern European States to a healthy 'city' project in Malta. (See Appendix A)

Living labs are where new technology, need communities and business/research meet. The key ideas are that the project is led by the community and facilitated by the other actors. Sociologically it follows the agency theory model, where the technology is considered an equal agent of change to the person. It is a qualitative research method as it is in the real word. Data is changing at all levels at all times.

The need for living labs is thought necessary because of the speed of change and the capabilities of new technologies. G3 technology in particular because the user does not need access to a power source or static space has meant that the creative space that people operate in has creative possibilities. Also it is noticeable that the younger generation are finding creative ways of using technology all the time, which other groups are not familiar with or use. This means that to communicate to younger people in a way that they are comfortable with means services, especially help services need to change.

The development of Living Labs is supported by the belief that the full potential of ICT today is not in the continued innovation of new technical products with superior

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[9] Corelabs. Coordination Action on Co-creating Living Labs for CWE, IST-035065. Official website: www.corelabs.eu.

technical performance, but rather the understanding of the user situation and innovation of solutions to match those in a changing society.

The implementation of a Living Lab is based on partnership between social and technological actions. Eriksson (2005) lists these as Market, Technology and Society. Where the technology may be new it may be uneconomical for society and not accepted to the market. (ie.industry). Society and industry can be seen as old fashioned without the technology. To gain innovation all the factors have to be involved in dynamic community change. (See Figure 3).
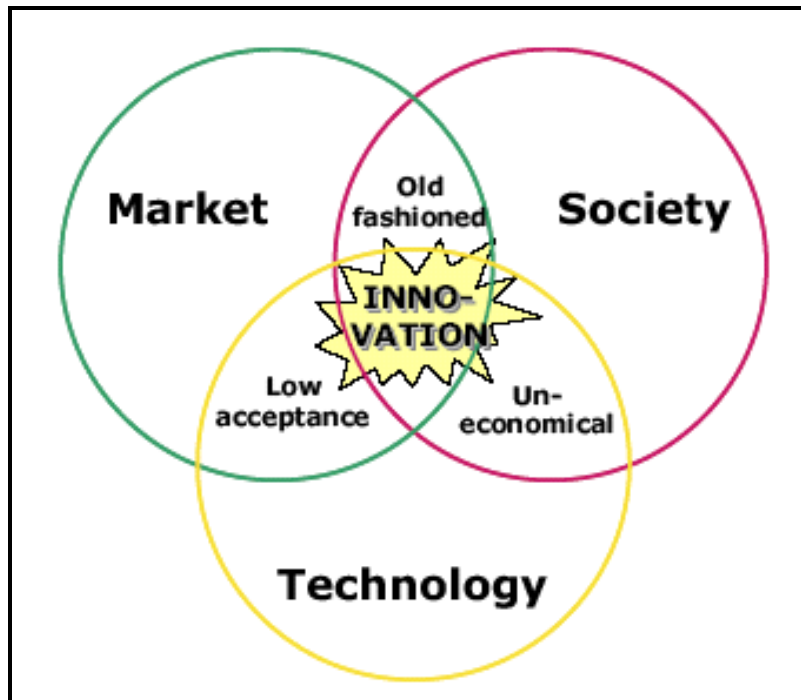
Figure 3. **Implementation of Living Labs Eriksson, 2005**

Strengths	Weaknesses
User involvement	Time- and budget consuming
Future market	Drop-out risk
Natural setting	Outlier problem
Large groups	Lack of studies
Cost-efficient	No incremental innovations
Opportunities	Threats
Cooperation	External funding
Awareness	Other TEPs
Using feedback	European lag
Web 2.0	

Table 1 SWOT analysis of living labs (Schuurman 2009).

The operationalisation of the project has been simplified by the formation of a Harmonization Cube (See Appendix B). Created by Mulder (2008) and central to the Corelabs project in Europe, the cube is a framework for setting up a lab and insuring that all the factors needed are in place to make a viable project.

Schuurman (2009) tabled the strength and weaknesses of living labs using the SWOT methodology see Table 1.

13 Recent Informatics Projects of Note

In this section we present those recent informatics projects of particular note to the Athlone living lab.

13.1 Grass Roots Information Centres

Driven by the natural disasters that hit the United States, for example terrorist attacks and hurricanes, a group of researchers led by Kalpana Shankar (2008) investigated among other questions the grass roots volunteers' mobile technology. After Hurricane Katrina, the Centre for Neighbourhood Technology in Chicago set up a wireless community which is still operating in the Gulf region. Integration of such activity into planned military and government schemes are difficult, as one is spontaneous and the other working with rules: for example the use of badges and paperwork.

13.2 A National NHS Computer – a social technological study

Connecting for Health is the British government's project to connect every patient's record on a central data base. This has led to the "choose to book" system where patients can have an appointment at a time convenient to them by email or telephone. However Ungoed (2007) raised the questions that the amount of data involved the security of data, the cost of the system (£12billion), the withdrawal of contractors developing the software and the systems users' aversion to the system means that this could be a social technological failure waiting to happen. Referring to the components of the Social Technological System by Klein, the elements of failure are shown in Figure 4.

	Owners	Software developers	Hardware	
	Managers	Software		
People	Users	Management models.		**Technology**
	Support Staff	Software support/rules	Hardware rules	

Figure 4: Areas of Failure using the Socio-Technological Model

Many governments in the world are trying to develop online user friendly software systems, but there are many problems due to the very logistics and amount of information involved. Also the assumption that the whole population is computer literate has to be questioned: especially the older person and the unskilled, illiterate. The question of social exclusion of these people is immediate and has serious impact on the system.

13.3 Athlone Living Lab

Athlone is situated on the Cape Flats of the Western Cape in Cape Town, South Africa, which is plagued with violence, drugs and gansterism. The society is described by Parker (2008) as a community in tension. The Athlone Living Lab project includes a community based non-governmental organisation Impact Direct Ministries (IDM). IDM opted to use technology to offer additional support and advice to people affected by substance abuse; HIV, and general social problems. Its services are available to all members of the community.

The Community in Tension Project fits into the emerging Community Informatics field for the following reasons:

- It is using wireless and community based technology from a local centre; This decreases installation and running costs

- It is there for a socially excluded group, who have no resources of their own

- The Mxit language used is cheaper to use than other texting formats

- The group manage the project – questions come in and are answered by the peers.

The Athlone Lab projects strengths and weaknesses are as demonstrated by the Schuurman analysis .The partnership model for the Athlone lab is the community, academia, industry and government. (See Figure 5). The difference of the Athlone project to other living labs is that the community; Athlone; leads the project and are not reliant on funds from other partners: (although funds have to be raised in other ways). The choice of technology was by the community, as was the choice of partners. The future social transformation of a community in tension is led by the community
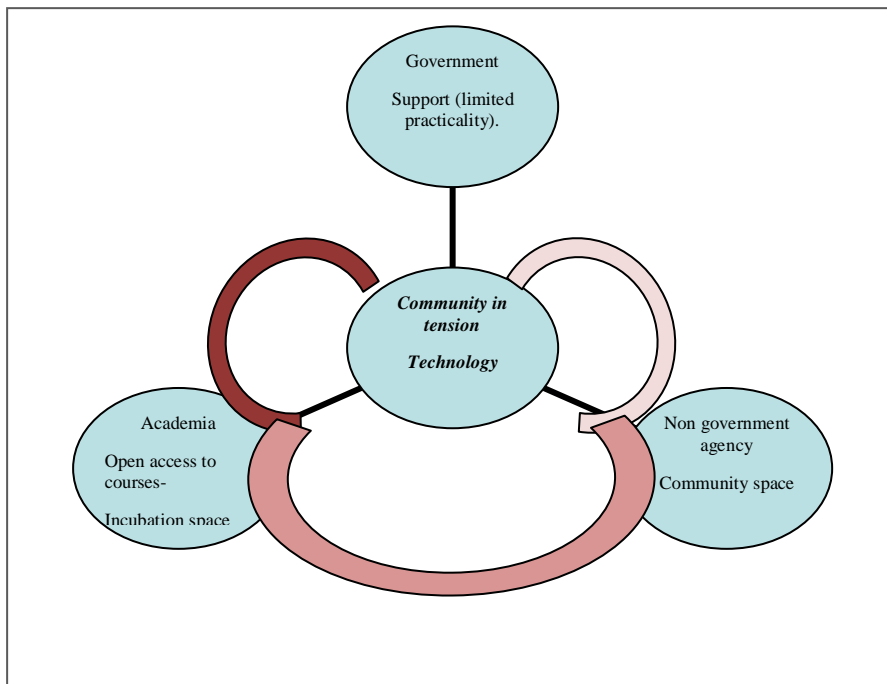
Figure 5 Athlone Living Lab: Circle of Innovation

The technology used in the Athlone Living Lab appears to be unique to non government organisations and therefore there is a possibility that funding may be achieved by marketing the product to other non government organisations involved in counselling and help lines, especially to lower income social groups.

Social Theories		
New Action Theories		*New Structural Theories*
Post industrialism Daniel Bell (1975)		Reflexive Modernisation Anthony Gibbons, (2000).
The informational mode of development Manuel Castells (1996).		Regulation theory Michel Aglietta, (1979)
Postmodernism Jean Baudrillard, (1998)		Neo Marxism Herbert Schiller (1972)
Flexible specialisation Michael Piore *et al* (1984)		Flexible accumulation (David Harvey 1975) The public sphere (J Habarmas 1962)
New Theory	Action Network Theory (Callon *et al* 1986)	

Table 2 Social Network Theories (based on Webster 2002)

14 Sociological Theories of the Network Society

Sociological theories, traditionally divide into two groups: - Structuralist groups which study society through its structures: for example, economics, industry, family. The second group is the action theory that looks at the agent in the movement rather than the structures and sees society built by the networking of agents. The information network has been seen by many to be new phenomena; and there have been a mass of new social theories, driven by this new society. Webster (2002) divides these new theories by those that regard the network as a new society and those that see it structurally as a continuation of the old, (See table 2).

The three main theories to note are Post Industrialism, Reflexive Modernisation Theory, and the Action Network Theory.

1. The Post Industrialism of Daniel Bell, published in 1975, is a classic work, which begins to look at the changes in society, especially in the economic sector, caused by information and the change to a service community. It can be seen as relevant to the industrialised west, but not to the third world. It did and still does affect Castells' writing (see below).

    Bradley, (2006) rightly describes the defining work on the network, as that written by Castells not just in, the informational mode of development, which is the classic work, but in the plethora of writings that he has produced. Indeed part of the problem is the developmental nature of the work, so that conclusions are revisited. The key facts are that technology has to be in society, that is in use and it can be liberating to communities. Indeed, he sees it as a way that power can be distributed to different groups that are not part of the hierarchies. Carr (2008) makes a similar claim in the 'Big Switch' where products can be made with less labour due to software development. Hence power can be distributed in smaller nodes of space.

2. The main proponent for the continuation theories is Anthony Giddens, with his Reflexive Modernisation theory. Giddens (2002) in Runaway World marks that it is Globalisation and the consequences that it is making change, not information, and that the end will be a cosmopolitan world. Information is only secondary to this process. It can be suggested that Kling's Social technological model fits into this group of theories as the social leads the technology, and implements it through the social actor network. To Kling the technology is not the actor in the situation. The context and the social actor's knowledge and involvement are all important.

3. The Action Network Theory, proposed by Callon M (1986), takes the opposite view and makes the technology, and science an equal free actor in the social world. The networks produced are from people and the technology, each with the ability to create and make scenarios. In other words, the technology is not passive but active in the creative process: Many researchers exploring computer technology use this theory model. However as Walsham, (2005) notes action network theory is used for all kinds of machine/human research and the researcher has to justify why that theory is 'relevant' for the study and how does it give an understanding of the research question? It may be that Kling's socio-technology model is of more use to purely empirical research and observational study.

The Action Network Theory, proposed by Callon M et al (1986), takes the opposite view and makes the technology an equal free actor in the social world. The networks produced are from people and the technology, each with the ability to create and make scenarios. In other words, the technology is not passive but active in the creative process: Many researchers exploring computer technology use this theory model. For example, De la Harpe (2009) used ANT (Actor Network Theory) to investigate data quality in organisations.
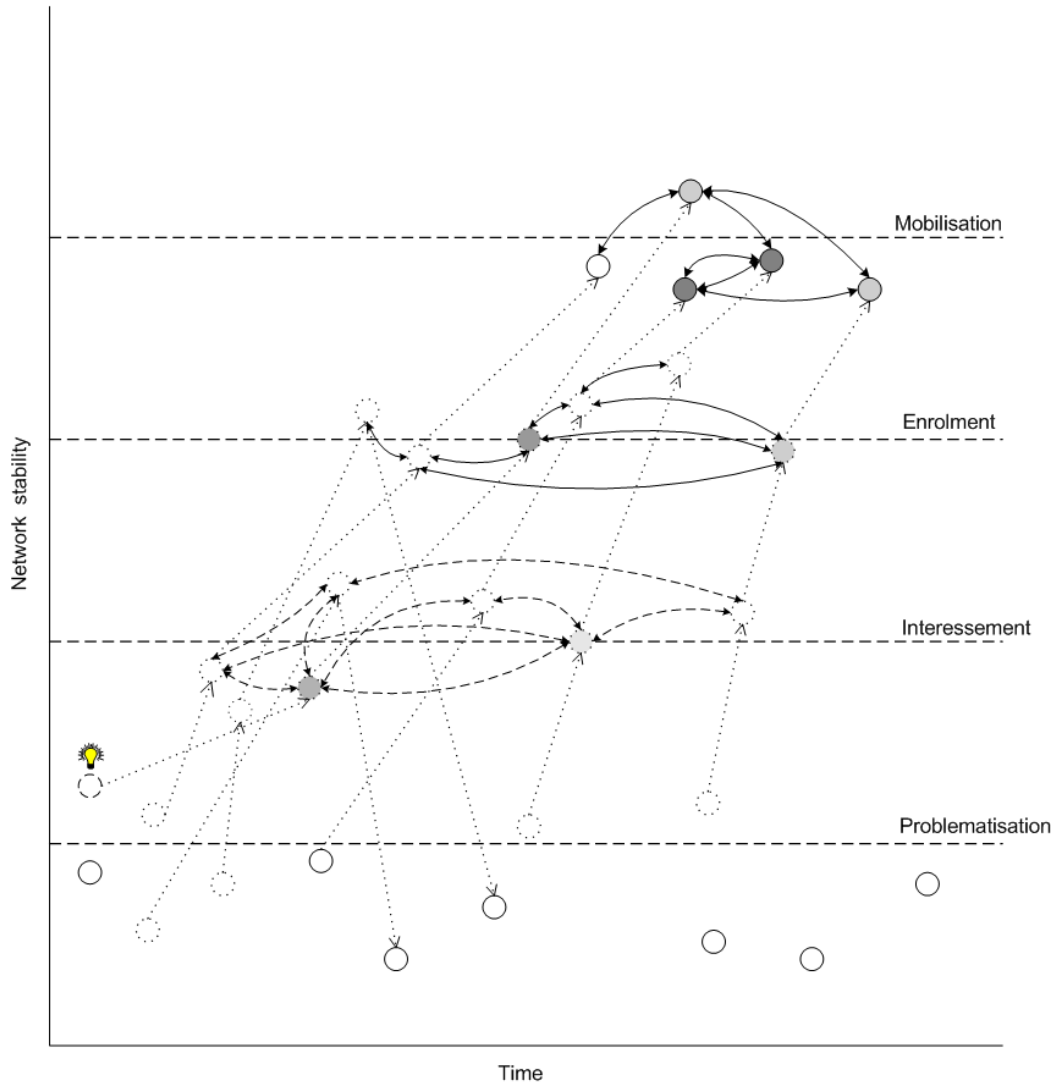
Figure 6 A graphical representation of the formation of an actor-network (De la Harpe 2009).

The process of the action network theory is very nebulous, for from being a direct cause and effect, there is a large amount of 'translation' points that occur. There is one focal actor who initiates that idea, and there are four translation points. (See Figure 6). The aim is for all the actors to be fulfilled at the end of the time. There is fluid movement with actors, (technological or people) free to join and live at any time, so there is a possibility that the focal actors plan is never realised. This fluidity makes definitive action difficult. However as Walsham, (2005) notes action network theory is used for all kinds of machine/ human research and the researcher has to justify why that theory

is 'relevant' for the study and how does it give an understanding of the research question? It may be that Kling's socio-technology model is of more use to purely empirical research and observational study.

15 Conclusion

This technical report has investigated and described the development of three separate academic research fields: Social informatics, Community Informatics, and Living Labs that are researching multi disciplinary problems of how technology, society and the person interact.

Particularly in Community informatics and Living Labs, the aim of the groups are to utilise technology in a way that is accessible to socially excluded groups in society, whether they are excluded by geography, inequalities of wealth, lack of access to technology or an inability to take advantage of new technology in a way to improve basic life provisions.

This report provided the researchers with an interest in the technology used in the Athlone Living Lab to recent community and social projects of a similar nature. It also provides the practitioner of living labs with grounding in the academic research to which the project could be linked. It also described social science networking theories that will be of use in understanding the language of the project and describing aspects of the project in an academic medium.

The main conclusion is that the Athlone Living Lab fulfils most of the criteria of a successful Community informatics project and as it has generated a vast amount of data this can be mined to answer many social research questions.

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	Defined Group	European Living Labs at May 2009 {Open Living Labs is published by European Network of Living Labs http://www.openlivinglabs.eu/} Defined by JW		
	Defined Group	**Name**	**Investigation**	**Contact**
1	Broadband Mobile Technology	Mobile City Bregenz Austria	The objective of the Mobile City Bregenz is to provide innovative products and services to its citizens and tourists using advanced technologies	FHV, jens.schumacher@fhv.at
2	Social Action	LivingLab Schwechat Austria	It focuses on rehabilitation and Ambient Assisted Living technologies - modern urban planning techniques	h.paugger@innocon.at
3	Mobile Technology	Evolaris Mobile Living Lab Austria	mobile services for young people in education	christian.kittl@evolaris
4	Business	Open Innovation Centre Brussels	policy and business goals using stakeholder designers	Pieter.Ballon@vub.ac.be)
5	Broadband mobile Technology	IBBT-iCity Living Lab Brussels	research into mobile applications	jo.pierson@vub.ac.be
6	Computational	ESPÍRITO SANTO CIDADANIA DIGITAL LIVING LAB Brazil	offers computational services to the community Digital inclusion	anilton@inf.ufes.br
7	Social Action	Amazon Living Lab	broad variance of people who have special needs,	rcaetano@fpf.br)
8	Workplace	INdT- Well Being and Health Care LL / Mobile Work Spaces Living Lab	Mobile Nokia	robson.lisboa@indt.org.br

9	National	Virtual Services and Open Innovation Bulgaria	a set of service-oriented LLs targeting different industrial and public sectors	roumen@virtech-bg.com
11	Professional Networking	Digital Spaces Living Lab Bulgaria	to create a real-life and online community of specialists and non-specialists who are interested in digital	stavri.nikolov@attentivedisplays.com
12	Technological	TianJin-China Living Lab	The next wireless mobile communication technology and service (at all levels	leeca2008@gmail.com
13	Rural	Wirelessinfo Czech LL Karel Charvat	new web based GIS solutions to improve the quality of decisions	charvat@wirelessinfo.cz)
14	Social Action	Copenhagen Living Lab Thomas Hammer-Jakobsen	quality development within childcare services, understanding and increasing life quality for elderly	hamm@copenhagenlivinglab.com)
16	Regional	Helsinki Living Lab Jarmo Eskelinen	Virtual Village is a real living lab	jarmo.eskelinen@forumvirium.fi
17	Business	Turku Archipelago LL Region Åbolan, Kaj Söderman,	business development centre and tourism industry developer	kaj@sgnet.fi
18	Rural	Agro Living Lab Seinäjoki Technology Centre Ltd., Sanna Kankaanpää,	technologies in agriculture and forestry	sanna.kankaanpaa@stoy.fi)
19	Health	Kainuu Living Lab Snowpolis Oy, Anti Leppävuori,	Snowpolis is dedicated to human well-being: sports, nutrition and winter technology.	antti.leppavuori@snowpolis.com
20	Social Action	Lahti Living Lab	public sector service development	Suvi.Konsti-Laakso@lut.fi

21			service development.	
22	Regional	Northern Rural Urban	economic and social development	martti.hyry@oulu.fi
23	Health	Laurea Living Labs Network	Delivering healthcare & welfare services directly to home through interactive TV.	petteri.ikonen@laurea.fi)
24	Social Networking	Living Lab for Design and Services	collaborative activities between research and education, science parks and businesses.	mirja.kalviainen@pkamk.fi
25	Business	HumanTech LivingLab	large investments in tourism,	asta.wahlgren@jamk.fi
26	Broadband	Owela Open Web Lab	digital media services	(pirjo.nakki@vtt.fi
27	Regional	Suupohja Living Lab	the regional main clusters and growth pilot development.	(jaakko.panula@suupohja.fi
28	Social Networking	Tampere Central Region Living Lab	Innovative ideas are developed via joint projects in a learning environment	(kirsi.lindfors@hermia.fi
29		LL ICT Usage Lab	challenges and legal, social, societal and economical issues related to new ICT usages.	Brigitte.trousse@inria.fr
30		secure electronic transaction technology	Normandy Living Lab (Pôle TES / e-secure transactions Competitiveness Cluster, Magali Scelles,	magali.scelles@pole-tes.com)
31		implement and bechnchmark innovating Mobile - in City	Quartier Numerique	marie@siliconsentier.org)
32	Regional	A broadband infrastructure interconnecting fixed and mobile areas	LEVIER (Images et Réseaux / Media and networks, Dominique Guillois	dguillois@images-et-reseaux.com)

35		a better tourist, economic and cultural valorization of heritage, notably through Tourists Mobility	Territories of Tomorrow Living Lab	jfaure@cetir.net
36	Professional Networking	a joint work on ICT Usage between academic and industrial research laboratories	Integrative Usage Lab	baccino@lutin-userlab.fr
37	Business	is to provide companies and start-up,	TPMed Lab	sjalliffier-verne@tpmed.org
38	Business	products and solutions for the future, based on the use of 3D and 3D related resources	3D Living Innovation	eric@lafabriquedufutur.org, nts@distance-expert.com)
39	Social Action	developing solutions for compensating the loss of autonomy, based on a rationale of social inclusion and social care	Autonom'IS Limousin	(dominique.roussel@elopsys.fr)
40	Broadband	Broadband network, to accelerate the prototyping and the industrialization of new innovative online services.	GREATER PARIS REGION LIVING LAB	philippe.roy@capdigital.com)
41	Web	The target users are users and provides of solutions for the net economy	iRegion Karlsruhe - creating the net economy	(Bernhard.koelmel@cas.de)
42	Mobile Technology	research, development, testing and marketing of mobile products and services in a mobile cluster	Mobile City Bremen	dieter.voss@big-bremen.de)
43	Academic	knowledge workers and their working environments	Knowledge Workers LL	prof.Katzy@cetim.org)
44	Business	developers, suppliers and users of the technologies of the digital product development,	VDC - Virtual Dimension Center Fellbach	achim.czaykowska@vdc-fellbach.de>
45	Web	more than 100.000 users on the platform	ViRaL Cooperation Lab	Steffen.Budweg@fit.fraunhofer.de

46	Social Action	in which innovative AAL services and the underlying technical solutions can be conceived	Ambient Assisted Living Environment	(Michael.Nordschild@nik-nbg.de)
47	Regional	creating infrastructure and institutions that promote technology and innovation	Lever- Thessaloniki Lever for Open Innovation	info@Technopolis.gr)
48	Regional	economic development, called AUTOPOLIS program,	Györ Automotive LL	tkallai@axelero.hu)
49	Mobile Technology	The wireless mesh network enables uses to access internet by computers handheld devices and mobile phones	Homokháti Rural Living Laboratory	frittman@inf.u-szeged.hu)
50	Web	an IT based connection (in connection with the processing industry0 in the field of robotics plastic centres, the producers and the end users	Creative Knowledge Centre (CKC)	peter.csonka@bacs-lea.hu
51	Environment	energy efficiency, renewable energy and energy system	Centre for Sustainable Technologies (CST)	nj.hewitt@ulster.ac.uk
52	Professional Networking	Arc Labs co-locates high-end postgraduate research with fledgling businesses.	Arc Labs Waterford	miguelpdl@tssg.org
53	Professional Networking	Multi-disciplinary, collaboration integrated with meritocracy	Leaning Lab	g.fantoni@ing.unipi.it
54	Environment	Earth Science applications and in space com services	Frascati Living Lab	Luigi.Fusco@esa.int
55	Web	four fibre network, entirely dedicated to research and experimentation, which covers all the Trentino Territory and population,	Trentino as a Lab	ivan.pilati@infotn.it
56	Professional Networking	supporting expert body to operate in the transport and logistics field.	ITL – Living Lab for Logistics	rrosini@regione.emilia-romagna.it

57	Regional	e-Democracy, e-Government services, and GIS-based tools for strategic planning	Territorial Living Lab for the Sicilian Region	jesse@atelier.it
58	Business	new products and services which could be appealing for the market	Living Piemonte	(giovanna.bossi@finpiemonte.it
59	Regional	innovation opportunities and services of economic interest to local small and micro enterprises.	Lunigiana Amica	mail@francescomolinari.it
60	Regional	ICT technologies in the entrepreneurial system of small and medium companies	C.LAB - Piedmont Community Labs	nicola.bizzarro@csi.it)
61	Environment	for IT enabled services in developing sustainable cities Smart Cities	Living Lab Malta	franco.degabriele@smartcity-malta.com.mt)
62	Regional	encouraging the development, customization and deployment of technologies within the Mediterranean Region. It	Euro-Mediterranean Initiative for Technology and Innovation	ceo@euromediti.com
63	Mobile Technology	to realize 4G communication	Freeband experience lab (FreeBand)	Daan.Velthausz@InVivio.eu
64	Web	Internet panel and an online environment	The RECORD online Living Lab	olag@opinion.no
65	Wireless	A shared Wi-Fi network covering the main part of the city centre	Wireless Trondheim Living Lab	krogstie@idi.ntnu.no
66	Regional	The Living Lab for mobility and innovative IT services and technologies.	Madeira Living Lab	jac@dsi.uminho.pt)
67	Business	Identification of the industrial needs in the shoe and automotive SME	SJM-ILL - S	alexandre.rios@ua.pt
68	Media	digital journalism and participatory media	Creative Media Lab	catarina.s@inteli.pt

69	Environment	RENER LL aims to foster the development of a local community by developing the smart grid concept associated with new renewable energy technologies.	RENER – Renewable Energies Friendly Community	mpinto@inteli.pt
70	Environment	which a waste resource of one company is taken as a raw resource by other different companies	ECO LivingLab@Chamusca	cm-chamusca@sapo.pt
71	Business	Increased competitiveness of the business and industrial community automotive engineering and manufacturing	FIAPAL Living Lab	ana.sarmento@fiapal.com
72	Environment	promote innovation and the development of research in new technologies and applications in the field of lighting,	Lighting Living Lab	(marlene.marques@cm-agueda.pt
73	Regional	integrating telecommunication and e-contents into all spheres of the future lives of its inhabitants and businesses.	Slovenia eLivingLab	gricar@fov.uni-mb.si
74	Professional Networking	companies, research institutions and universities join together in order to boost the R&D on the area of information and communication technology	ICT Technology Network	andrej.krenker@ltfe.org
75	Business	an active role in building the future of the automotive business	Slovenian automotive living lab	Dusan.Busen@acs-giz.si
76	Computational	develop and field-test the prototype of a simple, cost-effective and robust, integrated e-business/telecommunication platform,	Siyakhula Living Lab	siyakhula@ru.ac.za

77	Broadband	promotes the deployment of services and wideband applications from both public and private research and innovation communities	i2Cat Catalonia Digital Lab	almirall@lsi.upc.edu
78	Environment	offer technical support and services to users involved in fishing industry	Cudillero Rural Living Lab	leaderve@conectia.net
79	Regional	aims to support and impel local entrepreneurs and emerging SMEs in the development of innovative projects as the basis to create new local business along with fostering the region	Living Lab Berlanga de Duero - Soria	alvaro.berlanga@terra.es,
80	Social Action	a national and international reference in research and development of the Ambient Intelligence (AmI) paradigm put into practice in the field of prevention, care and promotion of health and wellbeing of the citizens, support for the independent living (AAL paradigm) and social inclusion,	Experimental Centre of Ambient Intelligence Services	jplazaro@itaca.upv.es
81	digital	is the user-centric innovation system under the umbrella of the Milla Digital (Digital Mile) initiative, a big urban project now on course which will transform more than 100 ha. of former railway facilities in the centre of Zaragoza, Spain, into a space for innovation and creativity.	Zaragoza Living Lab	ricardopedrol@zaragoza.es)
82	Broadband	provides broadband to more than 5,000 homes and the total network "path" extends over 6,000 kilometres of connections.	guifi.net	Ramon.roca@guifi.net
83	Health	Fostering a culture in Health Care	LIVING LAB SALUD ANDALUCÍA	franciscoj.lopez.narbona@juntadeandalucia.es

84	Health	to experiment with and better understand the role of innovation to improve social and health services for rural populations;	Río Nacimiento Living Lab	iperez@i2bc.es)
85	Media	CAT is involved on Techmedia (Communications Technologies and Digital Media) industry	Segovia Tech Living Lab	Lopez@caytec.es
86	Web	The community is made up of different organisations from the area of Catalan traditional and popular culture that organise web2.0 events around the contents.	VILANOLAB.	**jclluch@vilanova.cat**
87	Health	eHealth Living Lab in Granada, Spain, means real public health environments (remote elderly care, home hospitalization and technologies for hospitals),	eHealth Living Lab	lpap@tid.es
88	Web	Botnia's focus is to support human-centric innovation of advanced ICT Services for "Extended Capabilities and Mobility".	Botnia Living Lab	annika@cdt.ltu.se)
89	Business	user-driven development of automotive and transport applications and services.	The Swedish Living Lab on Vehicle and Transport	ola.henfridsson@viktoria.se
90	Wireless	user-driven projects within mobile and wireless technology in the Øresund Region.	Living Labs Øresund	micael.gustafsson@oresundit.org
91	Health	Halmstad Living Lab's main application field is health technology aimed at empowering elderly people.	Halmstad Living Lab	carina.ihlstrom_eriksson@hh.se
92	Airport	improve the airport processes at Stockholm-Arlanda Airport	Airport Living Lab	hozan@csc.com)

93	Health	The Swiss Cyber Care Living Lab (CCLL) aims to offer a novel virtual - reality-based healthcare system for integrated clinical and in -home services.	Cyber Care Clinique Living Lab	prolog-rtdi@gmx.ch
94	Professional Networking	A Swiss Living Lab Platform is additionally planned to generate together with the establishment of the "ENoLL Knowledge Academy" as a prototype for any European Living Lab environment	Ecologies for learning in distributed project teams	charles.huber@fhnw.ch
95	Business	The SOLET is devoted to the use of information and communication technology (ICT) in tourism.	Swiss Open Laboratory for E-Tourism	thomas.myrach@iwi.unibe.ch)
96	Business	is a best place to design, test, and verify service/business models of innovative ideas.	Living Labs Taiwan	klchen@iii.org.tw
97	Social Development	develop creative smart living products and quality mental sensation living space Web 2.0 technology	Center for Technologies Of Ubiquitous Computing and Humanity	jfyang@ee.ncku.edu.tw)
98	Education	to ensure that local people can develop the skills to participate fully in the emerging information society	Manchester EastServe	s.r.curwell@salford.ac.uk
99	Development	optimize the design and development of pervasive computing technologies in inhabited environments	Digital Lifestyles Centre	mgardner@essex.ac.uk
100	Health	identify the unmet health-related needs of ageing, rural dwellers of Northern Ireland	TRAIL	md.mulvenna@ulster.ac.uk

101	Wireless	'creative communities' for creation and testing of wireless applications and services with commercial and public	Scottish Living Lab	j.k.stewart@ed.ac.uk)
102	Wireless	promoting social cohesion through the reduction and ultimate elimination of digital exclusion within the city.	ConnectMK – Living Lab for Milton Keynes	steven.jewell@milton-keynes.gov.uk)

Appendix B The Six Faces of the Harmonization Cube (Mulder 2008)

User Involvement		
organizational,	technological,	contextual
set up — get users motivated	which type user User expectation	provide tools to have users involved
sustainability — keep users motivated	need for unobtrusive methods	automatic data collection
scalability — different approaches to motivate different users	knowledge on cultural and legal differences	need for low cost observation methods

Service Creation		
organizational,	technological,	contextual
Organisational , training	Idea generation Business support services	communication services
governance	Services specific to stakeholders	Collaboration services
management	market customisation	demonstration validation prototyping

set up

sustainability

scalability

Infrastructure		
organizational,	technological,	contextual
	selected	Infrastructures
set up		
to deploy collaboration processes	Selected infrastructure Providers	used to deploy
		first defined
		scenarios
sustainability		
collaborative	Best fitting infrastructures	Inter operative standardised
infrastructures	With environment	infrastructures
	infrastructure	
scalability		
collaborative	to be adapted to other environments	most used
Infrastructures in Enoll		infrastructures

Governance		
organizational,	technological,	contextual
set up commitment & responsibilities	ownership drivers/ management structure	management working practices
sustainability financing service selection	funding strategy dynamics	sharing resources & infrastructure
scalability business models	Extensions (services, partners users)	operational excellence

Innovation Outcomes		
organizational, innovation expertise, competencies	**technological, target market, value for stakeholders**	**contextual innovationsupportive environments Idea, Patent**
IPR early phase innovation	**contextsensitive optimal degree of Interaction,**	**interaction supporting optimal**
involvement of experts, stakeholders	**extendable context, target market**	**massively distributed, multi-user environment**

Row labels (left column): **set up**, **sustainability**, **scalability**

Methods & Tools		
organizational,	**technological,**	**contextual**
taxonomy of	**appropriate**	**technology**
methods	**methods for**	**support for**
& tools	**LL available**	**methods &**
		tools
methods &	**Living Lab**	**technologies**
tools are	**methods**	**are**
institutionalised		**implemented**
methods &	**pan-European**	**new**
tools are	**Living Lab**	**technologies/**
exchanged in	**projects –**	**possibilities**
the ENoLL	**sharing best**	**through**
	practices	**ENoLL**

Row labels (left column): set up, sustainability, scalability